

School and Community Sports Participation and Positive Youth Development: A Multilevel Analysis

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Abstract

The Positive Youth Development (PYD) framework highlights the strengths and competencies of youth and the supportive factors in surrounding environments that foster positive outcomes (Benson, Scales, Hamilton, & Sesma, 2006). For many youth across the USA, participation in sports provides a context for these strengths and competencies to develop (Aud, KewalRamani, & Frohlich, 2011). They include opportunities for youth to develop relationships with their peers, adults, and the community; relationships that are essential for supporting their ability to learn, grow, and thrive (Roehlkepartain, Pekel, Syversten, Sethi, Sullivan, & Scales, 2017). The present study utilizes hierarchical linear modeling (HLM) to examine how student and school characteristics are associated with participation in school-organized sports and community sports (e.g., club, recreational, travel) and whether school sports and community sports are differentially associated with developmental outcomes.

Sports Participation and Developmental Outcomes

Participation in sports has long been associated with positive developmental outcomes. Youth who participate in sports tend to score higher than their non-participating peers on outcomes related to academic achievement, such as choosing academically rigorous courses, grades, resiliency, school engagement, and college enrollment (Authors, 2016; Pearson, Crissey, & Riegle-Crumb, 2009; Owen, Parker, Van Zanden, MacMillan, Astell-Burt, & Lonsdale, 2016; Snyder & Spreitzer, 1990; Wang & Eccles, 2012). Similarly, student athletes tend to report higher levels of mental health, such as happiness and emotional self-efficacy, than non-athletes (Belton, Prior, Wickel, & Woods, 2017; Duncan, Strycker, & Chaumeton, 2016; Fraser-Thomas, Côte, & Deakin, 2005; Fry & Gano-Overway, 2010; Gano-Overway et al., 2009; Noack, Kauper, Benbow, & Eckstein, 2013). Sports participation has also been shown to provide opportunities for building supportive relationships, particularly with parents, coaches, and peers (Authors, 2016; Jowett & Timson-Katchis, 2005; Linver, Roth, & Brooks-Gunn, 2009, Seefeldt & Ewing, 1997).

Predictors of Sports Participation

Participation rates in high school sports is at an all-time high having risen each of the last 28 years (National Federation of State High School Associations, 2017). Participation rates, however, are not equal across all students. Research has shown consistent disparities in youth's participation by gender, race/ethnicity, socioeconomic status, and grade level (Eime, Harvey, Charity, & Payne, 2016; Johnston, Delva, & O'Malley, 2007; Seefeldt & Ewing, 1997). Although sports participation studies often include individual characteristics, less is known about the role contextual variables play in youth's decision to participate in sports, though some evidence suggest that sports participation serves different purposes for students who attend lower- and middle-class schools compared to students who attend upper-class schools (Guest & Schneider, 2003). Understanding the environmental conditions surrounding and interacting with youth as they play sports is imperative for understanding how to best promote positive development (Fraser-Thomas, Côte, & Deakin, 2005).

School vs. Community Sports

Youth tend to participate in school sports at higher rates than community (including intramural) sports (Seefeldt & Ewing, 1997). Although there is evidence that the gaps in participation rates for gender, race/ethnicity, and socioeconomic status only exist for schools sports and not community sports (Johnston, Delva, & O'Malley, 2007; Morris, 2015). Of the beneficial associations between participation in sports and youth development discussed above, these associations are typically stronger when the sporting activities are school-organized compared to community-based (Broh, 2002). Community and intramural sports tend to be less structured, often require less commitment to both the team and the sport, thereby limiting the social/relational aspect often observed in school-organized sports (Covay & Carbonaro, 2010).

Literature specifically comparing school sports and community sports is limited and even less is known about whether school sports and community sports share similar contextual factors that play a role in fostering positive youth development. With the understanding that not all sporting contexts confer the same advantages, our research explores the following research questions:

1. What student and school characteristics are associated with participation in school sports and community sports?

2. While controlling for student and school variables, including participation in other out-of-school time activities, is participation in school sports, community sports, or both associated with higher self-reported developmental skills, supports, and grade point average?

Methods

Data Sources

The data come from three sources: 1) the 2013 Minnesota Student Survey (MSS, see <http://education.state.mn.us/MDE/dse/health/mss>), 2) the 2012 Civil Rights Data Collection (CRDC, see <https://ocrdata.ed.gov/>), and 3) median values from the 2011-2015 collections of the American Community Survey (ACS, see <https://www.census.gov/programs-surveys/acs/>). The MSS, the primary data source, was designed by the Minnesota Departments of Education, Health, Human Services, and Public Safety, and administered every three years to 5th, 8th, 9th, and 11th grade students from public and charter schools to monitor important trends in students' habits, experiences, and beliefs about positive and risky behaviors. Students completed the survey anonymously via computer or paper-and-pencil versions. Student-level data from the MSS was aggregated by school to create school-level variables for the present study. The CRDC and ACS provided additional school-level variables. Use of the MSS and CRDC for secondary analysis was granted from their governing agencies with a review by the author's institutional review board. The ACS data is available for public use.

Participants

Overall, 84% of all Minnesota public school districts participated in the MSS, including about 67% of all students in grades 5, 8, 9, and 11, which totaled 162,034 students in 2013 (Minnesota Student Survey Interagency Team, 2013). Only 9th and 11th grade students without missing data were used in the present study ($n = 61068$). Standardized mean differences for all variables were calculated between the final sample and all grades 9 and 11 students in the original dataset to determine if the listwise deletion produced a descriptively different sample. The differences for all variables were $< .10$ standard deviations, indicating that the final sample did not meaningfully differ from the original sample. Descriptive statistics of the developmental skill and support outcomes, student-level predictors, and school-level predictors are in Table 1. In the final sample, 51% of students were female, 79% White, 24% received free/reduced price lunch, 8% special education services, 6% identified as LGBTQ, and 72% reported that they plan to

attend a 4-year college or university after high school. For sports participation, 34% of students reported playing community sports at least 1-2 times per week, 49% played school sports, and 24% of students participated on both community and school sports teams. At the school level, in the average school, 29% of students participated in community sports, 53% in school sports, and 23% participated in both community and school sports.

Measures

Participation in activities. Eight items on the MSS assessed students' participation in a variety of out-of-school time activities. Following the initial item question, "During a typical week, how often do you participate in each of the following activities outside of the regular school day?" the eight items were listed with five response options: "0 days", "1 day", "2 days", "3 to 4 days", or "5 or more days". Two items referred to participation in sports, specifically "School sports teams" (School Sports) and "Club or community sports teams, such as park and rec teams, in-house teams or traveling teams" (Community Sports). The remaining six items were "School sponsored activities or clubs that are not sports, such as drama, music, chess or science club" (Non-Sport School Clubs), "Tutoring, homework help or academic programs" (Tutoring), "Leadership activities such as student government, youth councils or committees" (Leadership Activities), "Lessons, such as music, dance, tennis, or karate lessons" (Lessons), "Other community clubs and programs such as 4-H, Scouts, Y-clubs or Community Ed" (Non-Sport Community Clubs), and "Religious activities such as religious services, education or youth group" (Religious Activities). All eight items were dichotomized so 0 = 0 days and 1 = 1 or more days per week. An additional dichotomized variable was created to signify whether a student participated in both school and community sports (coded as 1) or not (coded as 0).

Developmental skills and supports. Based on models of developmental skills and supports from the Developmental Asset Profile (Benson, Leffert, Scales, & Blyth, 1998; Leffert, et al., 1998; Search Institute, 2017) that are referenced in over 17,000 peer-reviewed journal articles (Benson & Scales, 2011), six measures were constructed from the MSS items. The measures of developmental skills are Commitment to Learning (CtL), Positive Identity and Outlook (PIO), and Social Competence (SC) and the measures of supports are Empowerment (EM), Family/Community Support (FCS), and Teacher/School Support (TSS). To support construct-related inferences, the internal structure of the measures were evaluated through confirmatory factor analysis using Mplus v. 7 (Muthén & Muthén, 2012) and differential item functioning analyses by race/ethnicity, gender, and grade using Winsteps v. 3.92 (Linacre, 2016) with results summarized in Rodriguez (2017). We followed common guideline for adequate fit indices where RMSEA is below than .10, CFI and TLI are greater than .90 (Brown, 2015; Kline, 2011), and standardized factor loadings are .40 or higher (Brown, 2015). The measures were then scored using the partial credit Rasch model in Winsteps 3.92 (Linacre, 2016). The partial credit Rasch model allows each item to have its own structure and places persons and items onto the same scale. The Rasch reliabilities of these measures were also adequate: CtL (.70), PIO (.79), SC (.79), EM (.72), FCS (.71), and TSS (.85).

Grade Point Average. One item on MSS asked students, “How would you describe your grades this year?” with the response options “Mostly As”, “Mostly Bs”, “Mostly Cs”, “Mostly Ds”, “Mostly Fs”, “Mostly Incompletes”, “None of these letter grades”. To approximate grade point average (GPA), the first four responses were given numeric codes of 4, 3, 2, and 1 respectively while “Mostly Fs”, and “Mostly Incompletes” were coded as 0 and “None of these letter grades” was coded as missing data.

Data Analysis

Given the inherent nesting structure of the data with students nested in schools, hierarchical linear modeling (HLM) was used to account for violation of the independence assumption of regression. This methodology not only produces more precise estimates of regression coefficients and variance components than single level regression, but also allows for closer examination of how variation in the outcome measure is attributed to differences within-school (i.e., student-level) or between-schools (i.e., school-level; Raudenbush & Bryk, 2002). Although intraclass correlations for the models are small, ranging from .01 - .06 (Table 2 and 3),

without accounting for the nested structure of the data, standard errors would be 4 – 12 times larger, as indicated by the design effects (Muthén & Satorra, 1995; Peugh, 2010). The *lme4* package (Bates, Maechler, Bolker, & Walker, 2015) in R was used to fit the HLM regression models. For the first research question investigating the student and school characteristics associated with participation two logistic HLM models were fit with an adaptive Gauss-Hermite estimation method, one predicting school sports participation and one predicting community sports participation. Unconditional models were first fit for each of the two outcomes in order to determine the intraclass correlation and design effect.

To answer the second research question investigating the association between school and community sports participation with self-reported developmental skills, supports, and GPA while controlling for various student and school characteristics, separate linear HLM with full-information maximum likelihood (FIML) were fit for each of the seven outcome measures (3 developmental skills, 3 supports, and GPA). FIML estimation was chosen over restricted ML because it allows for models to be directly compared to determine the best fitting model (Peugh, 2010). For each outcome measure five models were fit and a deviance test was used to select the better fitting model. The models were fit in the following order with the variables in the subsequent models being added to the former: 1) unconditional, 2) Non-activity student and school variables, 3) Non-sport activity participation variables, 4) Sports participation variables, 5) random effects for sports participation which estimates the slopes for the sports participation variables separately for each school. This sequential model building process allows for determining whether sports participation uniquely explains variation in the outcome measures after accounting for other student and school characteristics including participation in other out-of-school time activities. Along with the deviance test comparing models, the reduction in between-school variance (τ_{00}) and within-school variance (σ^2) from the unconditional model as well as the Likelihood-ratio based pseudo- R^2 (Nagelkerke, 1991) and conditional pseudo- R^2 for generalized mixed effects models (Johnson, 2014) are reported for each model.

Prior to fitting the HLM models, all student-level characteristics were group mean centered within school and all school-level characteristics were grand mean centered. As a result the intercept values are interpreted as the unadjusted mean student score or unadjusted student logodds for continuous and dichotomous outcomes, respectively (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). Furthermore, the centering procedures result in the student-level and

school-level characteristics being uncorrelated, and thus, the regression coefficients are the unbiased within-school (i.e., student-level) and between-school effects. For variables that have been aggregated to the school level, this allows us to determine whether the student characteristic or school characteristic is more closely associated with the outcome. For instance, whether commitment to learning is more closely associated with a student receiving special education services or the proportion of students in a school receiving special education services. All of the variables in the present study were measured at a single point in time, thus the results are cross-sectional and all conclusions are correlational, not casual, in nature.

Results

Characteristics Associated With Sports Participation

Table 2 contains the full results of the two logistic HLM regressions for school and community sports participation while Figure 1 displays the student-level and school-level fixed effects estimates that are associated at $p < .01$ with sports participation. Many student demographics are associated with school sports (SS) and community sports (CS) participation in a similar manner and only differ by matter of degree. For instance, the odds of participating in either school or community sports is lower for 11th grade (SS: $OR = 0.68$, CS: $OR = 0.65$), female (SS: $OR = 0.66$, CS: $OR = 0.80$), LGBTQ (SS: $OR = 0.49$, CS: $OR = 0.57$), students who receive special education services (SS: $OR = 0.63$, CS: $OR = 0.88$), receive free/reduced price lunch (SS: $OR = 0.64$, CS: $OR = 0.69$), and have experienced trauma (SS: $OR = 0.79$, CS: $OR = 0.90$) than their 9th grade, male, heterosexual, non-special education, non-FRPL, and non-traumatized peers.

Participation in other out-of-school time activities is also associated similarly with both school and community sports participation in that students who participate in sports tend to also participate in other activities. Specifically students who participate in tutoring (SS: $OR = 1.49$, CS: $OR = 1.55$), leadership activities (SS: $OR = 1.87$, CS: $OR = 1.61$), and religious activities (SS: $OR = 1.72$, CS: $OR = 1.45$) are more likely to participate in both school and community sports than students who do not participate in those activities. Whether a student plans to attend a 4-year college or university has one of the strongest associations for both school and community sports participation. The odds of playing a school sport are 2.24 times higher and the odds of

playing a community sport are 1.62 higher for students who plan to attend a 4-year college or university than students who do not.

School characteristics and student race/ethnicity, however, are differentially associated with school and community sports participation. While controlling for all other student and school characteristics, Asian (SS: *OR* = 0.53, CS: *OR* = 0.71) and Hmong (SS: *OR* = 0.41, CS: *OR* = 0.82) students are less likely to participate in both school and community sports than their White peers. American Indian (SS: *OR* = 0.82, CS: *OR* = 0.90), Black (SS: *OR* = 1.17, CS: *OR* = 1.06), Latino (SS: *OR* = 0.78, CS: *OR* = 0.97), and Somali (SS: *OR* = 0.54, CS: *OR* = 0.75) students, however, participate in community sports at a statistically similar rate to their White peers.

At the school level, schools with higher proportions of female (SS: *OR* = 0.34, CS: *OR* = 1.04) and LGBQ (SS: *OR* = 0.09, CS: *OR* = 0.55) students have, on average, lower odds of participation in school sports, but there is no statistical association with the community sports participation rate. As with the student level, schools with higher proportions of students involved in other out-of-school time activities had, on average, higher odds of sports participation, however, specific activities were differentially associated with school sports and community sports. For instance, schools with higher proportions of students in tutoring also had higher proportions of students playing community sports but there was no statistical association with school sports (SS: *OR* = 1.61, CS: *OR* = 3.60). The converse held for schools with higher proportions of students participating in religious activities (SS: *OR* = 1.77, CS: *OR* = 1.05). Notably, school level characteristics of median household income, total number of sports teams and AP courses offered, expenses per student, and teacher related variables were not associated with either school sports or community sports participation.

Sports Participation and Developmental Outcomes

Table 3 contains the variance explained and model comparison indices for the five models predicting the seven developmental skills, supports, and academic grades outcomes. As a whole, the variables in the models explain 54% - 84% of the between school variance (τ_{00}) and 12% - 30% of the within school variance (σ^2) in the seven outcomes. The variables for participation in school sports, community sports, or both sports explain < 2% of the variation in the outcome variables above and beyond what was explained by the student- and school-level controls and other activity variables as indicated by the reduction in between school (τ_{00}) and

within school variance (σ^2) and increase in pseudo- R^2 measures. Although the additional explained variance is small, the deviance tests were significant and AIC values were lower for the model including sports participation, which suggests that it was the better fitting model for all seven outcomes. Furthermore, the deviance test and AIC values showed that for commitment to learning, social competence, family/community support, teacher/school support, and GPA, the model including random slopes was the best fitting model. This implies that for these five outcomes the association of sports participation and the outcome varies significantly from school to school whereas the association between school and community sports participation with students' positive identity & outlook and their sense of empowerment is statistically similar across all schools. Overall, the results in Table 3 demonstrate that sports participation, regardless of the school or community distinction, is significantly associated with developmental skills, supports, and GPA after controlling for students' participation in other out-of-school time activities and other common student and school characteristics.

Figure 2 demonstrates the differential association of school sports participation and community sports participation on students' reported developmental skills, supports, and GPA. In both figures the association of participation on the outcomes is plotted with respects to quantiles of the proportion of students in a school who plan to attend a 4-year college or university, which was one of only three school characteristics (along with proportion disciplined in the last 30 days and who have experienced trauma) that was associated with the majority of the outcomes (see Appendix for fixed and random effects estimates for the final models). Students who do not participate on any sports teams consistently report lower developmental skills, supports, and academic grades than students who do participate on sports teams. For students who do participate in sports, those who participate only in school sports consistently report higher outcomes than those who only participate in community sports; however, with the exception of GPA, the students who participate in both school and community sports report the highest outcomes. In summary, although participation in sports only uniquely explains a small portion of the variation in reported developmental skills, supports, and academic grades, the students who participate in sports, and especially those who participate in both school and community sports, report higher outcomes on average than the students who do not participate in sports.

Discussion and Significance

Consistent with prior research (Johnston, et. al, 2007; Morris, 2015; Seefeldt & Ewing, 1997), youth in the sample participated in school sports at higher rates than in community sports and race/ethnic gaps were primarily only found in school sports. Contrary to these studies, participation gaps related to other student-level characteristics (e.g., gender, LGBTQ, free/reduced priced lunch) were similar for both school and community participation. Extending the literature, the present study found that school sports and community sports participation were associated with different school-level characteristics. Although our study is limited by only including variables related to schools and not having any directly measuring community environments, these results suggest that when youth are interested in joining a sports organization contextual factors play a role in the decision to devote time and energy to school or community sports. Similar to Broh (2002) as well as Covay and Carbonaro (2010), we also observed differences in the association of school sports and community sports with developmental skills, supports and GPA.

One possible explanation for our findings are the different types of relationships formed in school-organized sports compared to the typically less structured community and intramural sports. Youth who participate in community sports will certainly have the opportunity to develop relationships with their peers and possibly adults affiliated with these activities, but the relationships may not be as strong and thus not support positive youth development to the same degree. For relationships to truly support youth's ability to learn, grow, and thrive they should involve express care, challenge growth, provide support, share power, and expand possibilities (Roehlkepartain et al., 2017). For youth to flourish, it is imperative that they have these developmental relationships with adults (Futch Ehrlich, Deustsch, Fox, Johnson, & Varga, 2016; Newland, Lawler, Giger, Roh, & Carr, 2015). Organized out of school activities, like school-organized sports typically have more consistency with those involved (Covay & Carbonaro, 2010), and naturally build in opportunities for youth to engage in more complex roles as they gain more experience (Akiva & Petrokubi, 2016), thereby challenging their growth, providing opportunities to share power (e.g., team captain), and expanding possibilities (i.e., being around other people with shared interests and commitment to the sport). School organized sports also provide youth the opportunity to connect with their teachers on a level outside of the classroom, where they can explore shared interests. Drills and skill development not only challenges

students' growth as athletes, but also provides an optimal space for direct and descriptive feedback for improvement. Therefore, it is likely that the very nature of school-organized sports opens the door for the development of these very important developmental relationships between the students and their coach.

In our analysis we also explored the impact of participating in school-organized sports in conjunction with any other out of school activities. We observed that students who participated in school sports and/or community sports were also likely to participate in other out-of-school time activities, yet sports participation still uniquely improved students' perceptions of their developmental skills and supports. These findings are consistent with other research observing that adolescents who participate in a combination of organized and unstructured out of school activities tended to report more favorable scores on measures of academic achievement and wellbeing than their peers who engaged in fewer activities (Linver, Roth, & Brooks-Gunn, 2009; Sharp, Tucker, Baril, Van Gundy, & Rebellon, 2015). As students engage in more activities, they set themselves up for opportunities to develop with even more adults and peers which can further bolster their chances of learning, growing, and thriving.

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Table 1
Descriptive statistics for student- and school-level variables

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
Developmental Outcomes					
Commitment to Learning	60106	12.07	1.48	5.19	16.16
Positive Identity & Outlook	59415	11.07	1.80	5.19	15.16
Social Competence	58753	11.30	1.64	5.11	15.17
Empowerment	59383	12.37	1.86	5.50	15.77
Family/Community Support	60040	12.05	1.78	6.06	15.79
Teacher/School Support	57630	11.65	2.16	4.54	16.84
Grade Point Average	59934	3.14	0.92	0.00	4.00
Student-Level Characteristics					
11th Grade	61068	.48	.50	0	1
Age	61068	15.56	1.12	13.00	19.00
Female	61068	.51	.50	0	1
LGBQ	61068	.06	.24	0	1
Special Education	61068	.08	.28	0	1
Free/Reduced Lunch	61068	.24	.43	0	1
Homeless	61068	.05	.21	0	1
Experienced Trauma	61068	.37	.48	0	1
Moved Schools	61068	.04	.20	0	1
Disciplined in last 30 days	61068	.07	.26	0	1
4-yr college plan	61068	.72	.45	0	1
American Indian	61068	.04	.20	0	1
Asian	61068	.03	.17	0	1
Black	61068	.03	.18	0	1
White	61068	.77	.42	0	1
Multiracial	61068	.03	.17	0	1
Latino	61068	.06	.24	0	1
Somali	61068	.01	.08	0	1
Hmong	61068	.02	.15	0	1
Community Sports	61068	.34	.47	0	1
School Sports	61068	.49	.50	0	1
Comm. & Sch. Sports	61068	.24	.43	0	1
Non-Sport School Clubs	61068	.25	.43	0	1
Non-Sport Comm. Clubs	61068	.09	.29	0	1
Tutoring	61068	.12	.32	0	1
Leadership Activities	61068	.14	.34	0	1
Lessons	61068	.21	.40	0	1
Religious Activities	61068	.41	.49	0	1

Continued on next page

Table 1 (cont.)

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
School-Level Characteristics					
% 11th Grade	285	0.46	0.18	0.00	1.00
Avg. Age	285	15.56	0.37	14.49	16.73
% Female	285	0.50	0.05	0.33	0.75
% LGBTQ	285	0.06	0.03	0.00	0.18
% Special Education	285	0.10	0.04	0.00	0.25
% Free/Reduced Lunch	285	0.29	0.16	0.06	0.93
% Homeless	285	0.05	0.03	0.00	0.18
% Experienced Trauma	285	0.40	0.09	0.15	0.80
% Moved Schools	285	0.05	0.03	0.00	0.23
% Disciplined in last 30 days	285	0.09	0.05	0.00	0.35
% 4-yr college plan	285	0.64	0.11	0.30	0.92
% American Indian	285	0.06	0.09	0.00	0.90
% Asian	285	0.02	0.03	0.00	0.16
% Black	285	0.03	0.05	0.00	0.39
% White	285	0.79	0.18	0.00	1.00
% Multiracial	285	0.02	0.02	0.00	0.09
% Latino	285	0.06	0.06	0.00	0.39
% Somali	285	0.01	0.01	0.00	0.08
% Hmong	285	0.02	0.06	0.00	0.52
% in Comm. Sports	285	0.29	0.09	0.08	0.58
% in Sch. Sports	285	0.53	0.09	0.26	0.79
% in Comm. & Sch. Sports	285	0.23	0.06	0.07	0.40
% in Non-Sport Sch. Clubs	285	0.25	0.08	0.08	0.67
% in Non-Sport Comm. Clubs	285	0.11	0.06	0.00	0.42
% in Tutoring	285	0.10	0.07	0.00	0.54
% in Leadership Activities	285	0.14	0.05	0.00	0.31
% in Lessons	285	0.19	0.07	0.00	0.43
% in Religious Activities	285	0.42	0.11	0.05	0.78
Twin Cities	285	0.25	0.44	0.00	1.00
Total Students (/10)	285	73.15	63.64	6.40	316.00
Diversity	285	0.48	0.32	0.00	1.45
Median Income (/\$1000)	285	58.74	14.58	30.44	105.54
Total Teams	285	33.88	21.79	0.00	91.00
# AP Courses Offered	285	4.44	6.76	0.00	36.00
Expense/Student (/\$100)	285	61.71	38.84	0.00	486.32
% Certified Teachers	285	0.99	0.02	0.73	1.00
% Teachers <2 Yrs. Exp.	285	0.08	0.07	0.00	0.42
Student-Teacher Ratio	285	15.45	4.34	4.47	30.34

Note: For dichotomous variables, all of which were coded 1/0, the mean equals the proportion in the sample.

Table 2

Multilevel logistic regression model fit, coefficients (99% confidence interval), and odds ratios predicting school and community sports participation

	School Sports		Community Sports	
	61068 (285)		61068 (285)	
# of students (schools)	61068 (285)		61068 (285)	
Intraclass Correlation	0.031		0.043	
Design Effect	7.559		10.132	
	<i>B</i> (99% CI)	OR	<i>B</i> (99% CI)	OR
Fixed Effects				
Student-Level Characteristics				
Intercept (γ_{00})	0.11 (0.07, 0.16)*	1.12	-1.02 (-1.07, -0.97)*	0.36
11th Grade	-0.38 (-0.48, -0.28)*	0.68	-0.42 (-0.53, -0.32)*	0.65
Age	0.07 (0.03, 0.12)*	1.07	0.02 (-0.03, 0.06)	1.02
Female	-0.41 (-0.46, -0.37)*	0.66	-0.22 (-0.27, -0.17)*	0.80
LGBQ	-0.71 (-0.82, -0.60)*	0.49	-0.56 (-0.68, -0.45)*	0.57
Special Education	-0.47 (-0.56, -0.38)*	0.63	-0.13 (-0.23, -0.04)*	0.88
Free/Reduced Lunch	-0.45 (-0.51, -0.39)*	0.64	-0.37 (-0.43, -0.30)*	0.69
Homeless	0.06 (-0.05, 0.18)	1.06	0.08 (-0.04, 0.21)	1.09
Experienced Trauma	-0.24 (-0.29, -0.19)*	0.79	-0.10 (-0.16, -0.05)*	0.90
Moved Schools	-0.27 (-0.39, -0.15)*	0.76	-0.12 (-0.25, 0.01)	0.89
Disciplined in last 30 days	-0.04 (-0.13, 0.05)	0.96	0.10 (-0.00, 0.19)	1.10
4-yr college plan	0.81 (0.75, 0.86)*	2.24	0.48 (0.42, 0.54)*	1.62
American Indian	-0.20 (-0.32, -0.08)*	0.82	-0.10 (-0.23, 0.02)	0.90
Asian	-0.63 (-0.77, -0.49)*	0.53	-0.34 (-0.48, -0.19)*	0.71
Black	0.15 (0.02, 0.29)*	1.17	0.06 (-0.08, 0.19)	1.06
Multiracial	0.08 (-0.06, 0.21)	1.08	-0.00 (-0.14, 0.14)	1.00
Latino	-0.25 (-0.35, -0.14)*	0.78	-0.03 (-0.13, 0.08)	0.97
Somali	-0.61 (-0.89, -0.32)*	0.54	-0.29 (-0.59, 0.01)	0.75
Hmong	-0.89 (-1.08, -0.69)*	0.41	-0.20 (-0.39, -0.02)*	0.82
Non-Sport School Clubs	-0.15 (-0.21, -0.10)*	0.86	0.02 (-0.04, 0.08)	1.02
Non-Sport Comm. Clubs	0.07 (-0.01, 0.15)	1.07	0.32 (0.24, 0.40)*	1.38
Tutoring	0.40 (0.32, 0.47)*	1.49	0.44 (0.36, 0.51)*	1.55
Leadership Activities	0.63 (0.55, 0.70)*	1.87	0.48 (0.41, 0.55)*	1.61
Lessons	0.01 (-0.05, 0.07)	1.01	0.25 (0.19, 0.31)*	1.29
Religious Activities	0.54 (0.49, 0.59)*	1.72	0.37 (0.32, 0.42)*	1.45
School-Level Characteristics				
% 11th Grade	-1.16 (-2.05, -0.26)*	0.31	-1.46 (-2.38, -0.54)*	0.23
Avg. Age	0.46 (0.03, 0.88)*	1.58	0.43 (-0.01, 0.87)	1.54
% Female	-1.09 (-2.08, -0.10)*	0.34	0.04 (-1.01, 1.09)	1.04
% LGBQ	-2.40 (-4.28, -0.52)*	0.09	-0.60 (-2.52, 1.33)	0.55
% Special Education	-0.49 (-1.81, 0.83)	0.61	0.47 (-0.91, 1.85)	1.60
% Free/Reduced Lunch	-0.39 (-1.13, 0.36)	0.68	-0.06 (-0.84, 0.71)	0.94
% Homeless	-2.27 (-4.64, 0.09)	0.10	-0.16 (-2.62, 2.31)	0.86
% Experienced Trauma	-0.01 (-0.83, 0.82)	0.99	-0.23 (-1.09, 0.63)	0.80
% Moved Schools	-0.27 (-2.62, 2.07)	0.76	0.37 (-2.02, 2.76)	1.45
% Disciplined in last 30 days	0.68 (-0.39, 1.75)	1.98	-0.14 (-1.26, 0.98)	0.87
% 4-yr college plan	0.59 (-0.18, 1.36)	1.81	1.38 (0.57, 2.19)*	3.97
% American Indian	-0.06 (-0.94, 0.82)	0.94	-0.32 (-1.25, 0.62)	0.73
% Asian	-0.67 (-3.03, 1.69)	0.51	-0.66 (-3.05, 1.72)	0.51
% Black	-0.84 (-2.37, 0.69)	0.43	-0.26 (-1.80, 1.28)	0.77
% Multiracial	1.21 (-2.62, 5.05)	3.36	-0.71 (-4.44, 3.03)	0.49
% Latino	0.28 (-0.76, 1.33)	1.33	0.12 (-0.97, 1.21)	1.13
% Somali	-1.20 (-5.00, 2.60)	0.30	-3.04 (-6.86, 0.77)	0.05
% Hmong	-0.05 (-1.09, 0.99)	0.95	-0.94 (-2.01, 0.12)	0.39

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Table 2 (cont.)

	<i>B</i> (99% CI)	OR	<i>B</i> (99% CI)	OR
% in Non-Sport Sch. Clubs	0.91 (0.16, 1.65)*	2.47	-0.08 (-0.87, 0.70)	0.92
% in Non-Sport Comm. Clubs	0.10 (-0.93, 1.14)	1.11	-0.40 (-1.49, 0.68)	0.67
% in Tutoring	0.48 (-0.59, 1.55)	1.61	1.28 (0.18, 2.38)*	3.60
% in Leadership Activities	0.67 (-0.40, 1.74)	1.96	1.80 (0.69, 2.91)*	6.06
% in Lessons	-0.49 (-1.36, 0.39)	0.62	0.23 (-0.68, 1.14)	1.26
% in Religious Activities	0.57 (0.01, 1.13)*	1.77	0.05 (-0.53, 0.63)	1.05
Twin Cities	0.05 (-0.12, 0.22)	1.05	0.03 (-0.14, 0.21)	1.03
Total Students (/10)	-0.00 (-0.00, -0.00)*	1.00	0.00 (0.00, 0.00)*	1.00
Diversity	-0.10 (-0.44, 0.25)	0.91	0.15 (-0.21, 0.50)	1.16
Median Income (/\$1000)	-0.00 (-0.01, 0.00)	1.00	0.00 (-0.00, 0.01)	1.00
Total Teams	0.00 (-0.00, 0.00)	1.00	-0.00 (-0.00, 0.00)	1.00
# AP Courses Offered	0.00 (-0.01, 0.01)	1.00	-0.00 (-0.01, 0.01)	1.00
Expense/Student (/\$100)	-0.00 (-0.00, 0.00)	1.00	-0.00 (-0.00, 0.00)	1.00
% Certified Teachers	-1.53 (-3.33, 0.28)	0.22	0.68 (-1.16, 2.53)	1.98
% Teachers <2 Yrs. Exp.	-0.10 (-0.81, 0.61)	0.90	0.41 (-0.33, 1.16)	1.51
Student-Teacher Ratio	-0.01 (-0.02, 0.00)	0.99	-0.00 (-0.01, 0.01)	1.00
Random Effects				
Intercept (τ_{00})	0.030		0.030	
% Reduction - τ_{00}	0.717		0.794	
Likelihood-ratio R^2	0.120		0.068	
Residual df	61008		61008	
AIC	76103		72492	

Note: All student-level characteristics were group mean centered and all school-level characteristics were grand mean centered; * $p < .01$

Table 3

Multilevel regression model comparisons for developmental skills, supports, and grade point average

Commitment to Learning		n = 60106	schools = 285	ICC = .023	DE = 5.81
	Unconditional	Controls	Other Activities	Sports	Random Effects
% Reduction - τ_{00}	0.000	0.650	0.664	0.668	0.667
% Reduction - σ^2	0.000	0.127	0.152	0.154	0.155
Likelihood-ratio R^2	0.000	0.129	0.154	0.156	0.157
Conditional R^2	0.023	0.145	0.170	0.172	0.173
Residual df	60103	60057	60045	60039	60030
AIC	216930.7	208700	206987.1	206835.1	206828
Deviance Test (df)		8322.7 (46)*	1736.9 (12)*	164 (6)*	25.1 (9)*
Positive Identity & Outlook		n = 59415	schools = 285	ICC = .014	DE = 3.91
	Unconditional	Controls	Other Activities	Sports	Random Effects
% Reduction - τ_{00}	0.000	0.759	0.774	0.775	0.764
% Reduction - σ^2	0.000	0.123	0.134	0.143	0.144
Likelihood-ratio R^2	0.000	0.126	0.137	0.146	0.146
Conditional R^2	0.014	0.135	0.146	0.154	0.155
Residual df	59412	59366	59354	59348	59339
AIC	237975	230087.5	229353.6	228746.9	228748.9
Deviance Test (df)		7979.4 (46)*	758 (12)*	618.7 (6)*	16 (9)
Social Competence		n = 58753	schools = 285	ICC = .033	DE = 7.80
	Unconditional	Controls	Other Activities	Sports	Random Effects
% Reduction - τ_{00}	0.000	0.822	0.837	0.845	0.841
% Reduction - σ^2	0.000	0.124	0.145	0.150	0.152
Likelihood-ratio R^2	0.000	0.128	0.149	0.154	0.155
Conditional R^2	0.033	0.151	0.172	0.177	0.177
Residual df	58750	58704	58692	58686	58677
AIC	223203	215250.4	213833.3	213479.1	213462.1
Deviance Test (df)		8044.5 (46)*	1441.2 (12)*	366.2 (6)*	35 (9)*
Empowerment		n = 59383	schools = 285	ICC = .031	DE = 7.34
	Unconditional	Controls	Other Activities	Sports	Random Effects
% Reduction - τ_{00}	0.000	0.798	0.815	0.820	0.816
% Reduction - σ^2	0.000	0.146	0.159	0.169	0.169
Likelihood-ratio R^2	0.000	0.149	0.163	0.173	0.173
Conditional R^2	0.031	0.173	0.186	0.196	0.196
Residual df	59380	59334	59322	59316	59307
AIC	240628.6	231109.2	230196.1	229498.1	229506.2
Deviance Test (df)		9611.4 (46)*	937.1 (12)*	710 (6)*	9.9 (9)
Family/Community Support		n = 60040	schools = 285	ICC = .026	DE = 6.46
	Unconditional	Controls	Other Activities	Sports	Random Effects
% Reduction - τ_{00}	0.000	0.791	0.809	0.819	0.812
% Reduction - σ^2	0.000	0.147	0.159	0.173	0.174
Likelihood-ratio R^2	0.000	0.150	0.162	0.176	0.177
Conditional R^2	0.026	0.169	0.180	0.194	0.194
Residual df	60037	59991	59979	59973	59964
AIC	238207.7	228538.8	227702.2	226690.5	226682.7
Deviance Test (df)		9760.8 (46)*	860.7 (12)*	1023.6 (6)*	25.8 (9)*

Continued on next page

Table 3 (cont.)

Teacher/School Support	n = 57630		schools = 285		ICC = .055	DE = 12.07
	Unconditional	Controls	Other Activities	Sports	Random Effects	
% Reduction - τ_{00}	0.000	0.497	0.544	0.542	0.535	
% Reduction - σ^2	0.000	0.097	0.113	0.116	0.118	
Likelihood-ratio R^2	0.000	0.099	0.116	0.119	0.119	
Conditional R^2	0.055	0.144	0.161	0.164	0.165	
Residual df	57627	57581	57569	57563	57554	
AIC	249831.9	243921.7	242871.7	242688.4	242661.5	
Deviance Test (df)		6002.2 (46)*	1074.1 (12)*	195.3 (6)*	44.9 (9)*	
Academic Grades	n = 59934		schools = 285		ICC = .045	DE = 10.34
	Unconditional	Controls	Other Activities	Sports	Random Effects	
% Reduction - τ_{00}	0.000	0.675	0.705	0.717	0.695	
% Reduction - σ^2	0.000	0.267	0.291	0.299	0.301	
Likelihood-ratio R^2	0.000	0.269	0.293	0.301	0.302	
Conditional R^2	0.045	0.296	0.320	0.328	0.330	
Residual df	59931	59885	59873	59867	59858	
AIC	157770.1	139103.5	137105.6	136395.3	136353.9	
Deviance Test (df)		18758.6 (46)*	2021.8 (12)*	722.3 (6)*	59.4 (9)*	

* $p < .01$

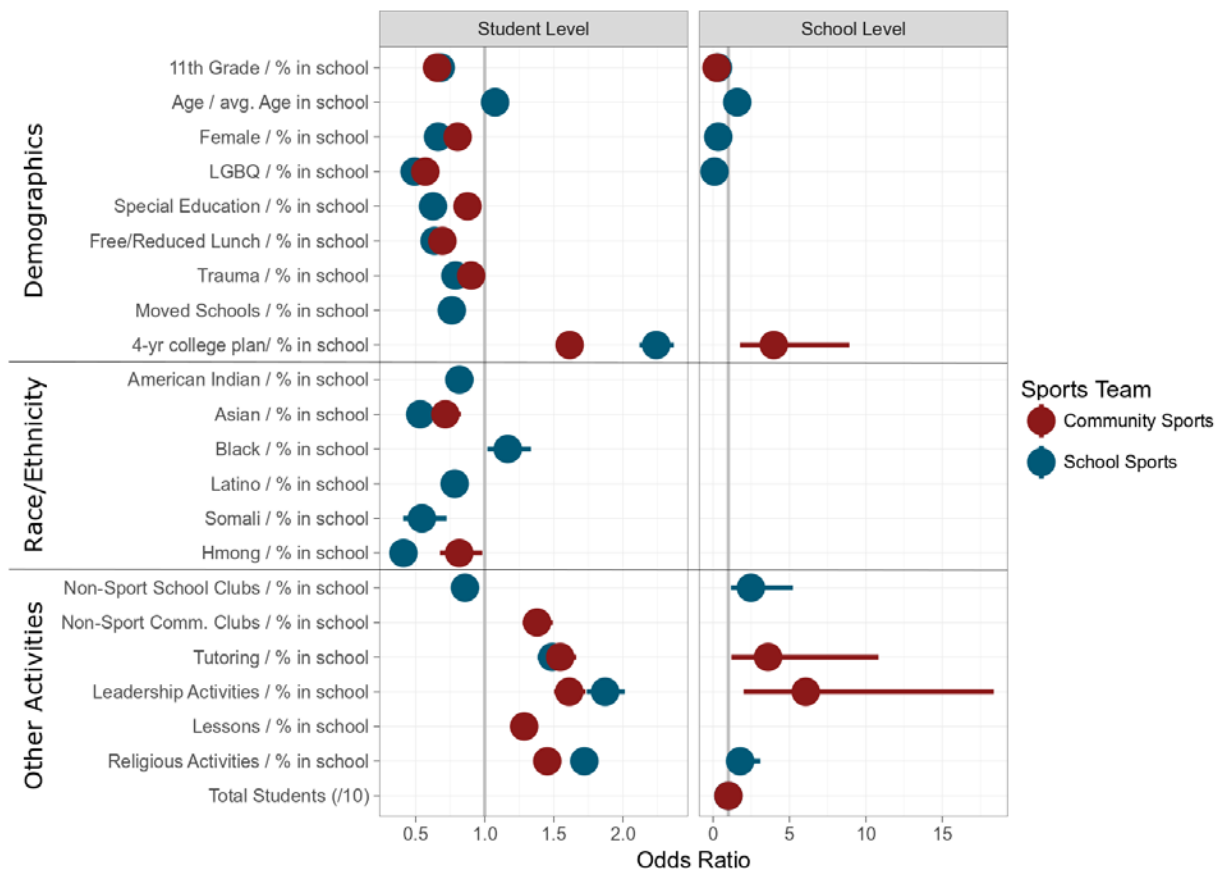


Figure 1. Odds ratios for student-level and school-level characteristics predicting school and community sports participation. Only characteristics significant at $p < .01$ are included in the figure. Error bars represent 99% confidence interval. Grey vertical line is an odds ratio of 1 which indicates no association with sports participation. The odds ratio scale for the student and school plots are different.

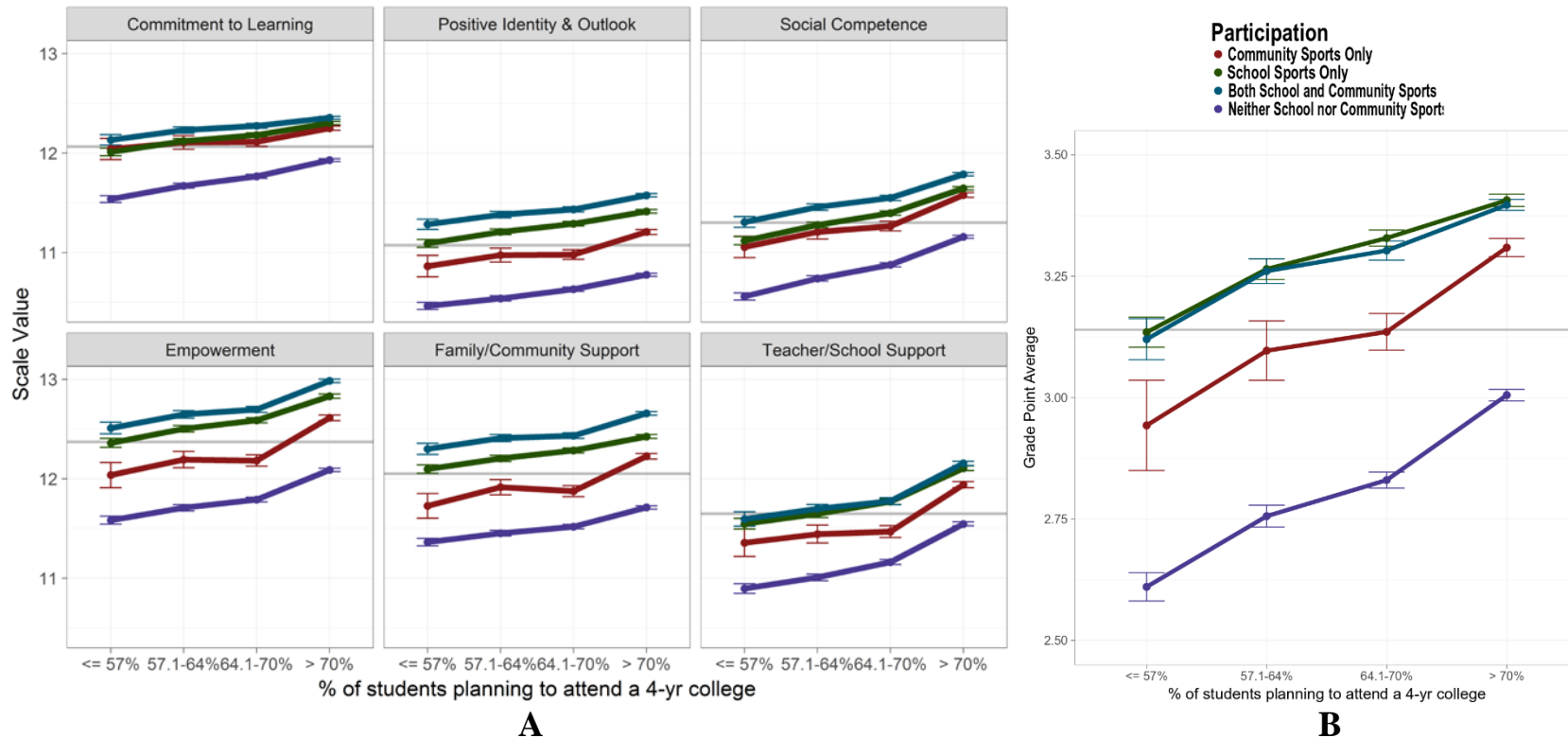


Figure 2. Model predicted value for developmental skills and supports (A) and for grade point average (B) by sports participation and percent of students in a school who plan to attend a 4-year college or university. Error bars represent 99% confidence interval. Grey horizontal line is the mean predicted value for all students.

Appendix

Fixed (99% CI) and random effects estimates for final models predicting developmental skills, supports, and grade point average

Predictor	CtL	PIO	SC	EM	FCS	TSS	GPA
Fixed Effects							
Level 1 - Student							
Intercept (γ_{00})	11.93 (11.90, 11.96)*	10.95 (10.92, 10.99)*	11.08 (11.05, 11.11)*	12.20 (12.17, 12.24)*	11.95 (11.91, 11.98)*	11.47 (11.40, 11.54)*	3.02 (2.99, 3.04)*
11th Grade	-0.22 (-0.29, -0.16)*	-0.17 (-0.25, -0.09)*	-0.13 (-0.21, -0.06)*	-0.04 (-0.12, 0.04)	-0.07 (-0.15, 0.00)	-0.18 (-0.27, -0.08)*	-0.02 (-0.06, 0.01)
Age	0.04 (0.01, 0.07)*	0.03 (-0.00, 0.07)	-0.01 (-0.04, 0.02)	0.02 (-0.01, 0.06)	0.01 (-0.03, 0.04)	0.01 (-0.03, 0.06)	0.00 (-0.02, 0.02)
Female	0.12 (0.09, 0.15)*	-0.56 (-0.59, -0.52)*	0.10 (0.07, 0.14)*	-0.23 (-0.27, -0.20)*	-0.02 (-0.05, 0.02)	-0.23 (-0.27, -0.18)*	0.15 (0.13, 0.17)*
LGBQ	-0.28 (-0.34, -0.22)*	-0.56 (-0.64, -0.48)*	-0.40 (-0.47, -0.33)*	-0.66 (-0.73, -0.58)*	-0.55 (-0.62, -0.47)*	-0.32 (-0.42, -0.23)*	-0.10 (-0.14, -0.07)*
Special Education	0.06 (0.01, 0.12)*	-0.02 (-0.09, 0.04)	0.03 (-0.03, 0.09)	-0.06 (-0.12, 0.01)	0.19 (0.12, 0.25)*	0.45 (0.37, 0.53)*	-0.32 (-0.35, -0.29)*
Free/Reduced Lunch	0.06 (0.02, 0.10)*	-0.01 (-0.06, 0.03)	-0.02 (-0.06, 0.03)	-0.04 (-0.09, 0.01)	-0.16 (-0.20, -0.11)*	0.06 (-0.00, 0.11)	-0.17 (-0.20, -0.15)*
Homeless	-0.09 (-0.16, -0.02)*	-0.17 (-0.26, -0.08)*	-0.17 (-0.25, -0.09)*	-0.26 (-0.35, -0.17)*	-0.17 (-0.26, -0.09)*	-0.13 (-0.24, -0.02)*	-0.10 (-0.14, -0.06)*
Experienced Trauma	-0.43 (-0.47, -0.40)*	-0.75 (-0.79, -0.71)*	-0.65 (-0.68, -0.61)*	-0.91 (-0.95, -0.87)*	-0.97 (-1.00, -0.93)*	-0.80 (-0.84, -0.75)*	-0.23 (-0.25, -0.21)*
Moved Schools	-0.08 (-0.15, -0.01)*	-0.05 (-0.14, 0.04)	-0.08 (-0.17, -0.00)*	-0.10 (-0.20, -0.01)*	-0.15 (-0.24, -0.06)*	0.00 (-0.11, 0.11)	-0.19 (-0.23, -0.15)*
Disciplined in last 30 days	-0.79 (-0.85, -0.73)*	-0.48 (-0.55, -0.41)*	-0.72 (-0.79, -0.66)*	-0.52 (-0.59, -0.44)*	-0.30 (-0.37, -0.23)*	-1.12 (-1.21, -1.03)*	-0.53 (-0.57, -0.50)*
4-yr college plan	0.58 (0.54, 0.61)*	0.37 (0.32, 0.41)*	0.39 (0.35, 0.43)*	0.43 (0.39, 0.48)*	0.27 (0.23, 0.31)*	0.41 (0.36, 0.47)*	0.47 (0.45, 0.49)*
American Indian	-0.09 (-0.17, -0.02)*	-0.08 (-0.17, 0.01)	-0.16 (-0.24, -0.07)*	-0.14 (-0.23, -0.04)*	-0.16 (-0.25, -0.07)*	-0.18 (-0.29, -0.07)*	-0.20 (-0.24, -0.16)*
Asian	0.25 (0.16, 0.34)*	-0.18 (-0.29, -0.07)*	-0.01 (-0.11, 0.08)	-0.20 (-0.31, -0.09)*	-0.37 (-0.47, -0.26)*	0.14 (0.00, 0.27)*	0.18 (0.13, 0.23)*
Black	0.20 (0.12, 0.29)*	0.26 (0.15, 0.37)*	0.05 (-0.05, 0.15)	0.09 (-0.02, 0.20)	-0.18 (-0.28, -0.08)*	-0.21 (-0.34, -0.08)*	-0.25 (-0.30, -0.20)*
Multiracial	-0.05 (-0.14, 0.03)	-0.06 (-0.17, 0.04)	-0.05 (-0.15, 0.04)	-0.08 (-0.19, 0.03)	-0.17 (-0.27, -0.06)*	-0.24 (-0.37, -0.11)*	-0.09 (-0.14, -0.04)*
Latino	0.02 (-0.04, 0.09)	-0.07 (-0.15, 0.00)	-0.13 (-0.20, -0.06)*	-0.09 (-0.16, -0.01)*	-0.20 (-0.28, -0.13)*	-0.13 (-0.23, -0.04)*	-0.24 (-0.27, -0.20)*
Somali	0.25 (0.07, 0.42)*	0.33 (0.12, 0.55)*	0.17 (-0.03, 0.36)	0.13 (-0.08, 0.35)	-0.15 (-0.35, 0.05)	-0.14 (-0.40, 0.12)	-0.13 (-0.22, -0.03)*
Hmong	0.28 (0.17, 0.39)*	-0.16 (-0.30, -0.03)*	-0.11 (-0.23, 0.02)	-0.25 (-0.39, -0.11)*	-0.70 (-0.83, -0.57)*	-0.10 (-0.27, 0.07)	0.13 (0.07, 0.19)*
Community Sports	0.10 (0.05, 0.16)*	0.18 (0.11, 0.24)*	0.14 (0.08, 0.20)*	0.21 (0.14, 0.28)*	0.21 (0.15, 0.28)*	0.10 (0.02, 0.18)*	0.10 (0.07, 0.13)*
School Sports	0.15 (0.11, 0.19)*	0.32 (0.27, 0.36)*	0.22 (0.17, 0.26)*	0.36 (0.31, 0.41)*	0.37 (0.32, 0.42)*	0.27 (0.21, 0.33)*	0.21 (0.18, 0.23)*
Comm. & Sch. Sports	-0.10 (-0.16, -0.03)*	-0.06 (-0.14, 0.03)	-0.07 (-0.15, 0.01)	-0.11 (-0.19, -0.03)*	-0.04 (-0.12, 0.04)	-0.13 (-0.24, -0.03)*	-0.14 (-0.18, -0.10)*
Non-Sport School Clubs	0.27 (0.23, 0.30)*	0.06 (0.02, 0.11)*	0.21 (0.17, 0.25)*	0.07 (0.03, 0.12)*	0.03 (-0.01, 0.08)	0.35 (0.29, 0.40)*	0.17 (0.15, 0.19)*
Non-Sport Comm. Clubs	0.08 (0.03, 0.13)*	0.09 (0.03, 0.15)*	0.04 (-0.02, 0.10)	0.06 (-0.00, 0.13)	0.03 (-0.03, 0.09)	0.10 (0.03, 0.18)*	-0.00 (-0.03, 0.03)
Tutoring	0.12 (0.07, 0.17)*	0.02 (-0.04, 0.08)	0.04 (-0.02, 0.09)	0.01 (-0.04, 0.07)	0.03 (-0.02, 0.09)	0.09 (0.02, 0.16)*	-0.12 (-0.14, -0.09)*
Leadership Activities	0.29 (0.25, 0.34)*	0.28 (0.22, 0.33)*	0.26 (0.21, 0.31)*	0.29 (0.24, 0.35)*	0.22 (0.17, 0.27)*	0.24 (0.17, 0.31)*	0.15 (0.12, 0.18)*
Lessons	0.11 (0.07, 0.15)*	0.12 (0.07, 0.16)*	0.19 (0.15, 0.23)*	0.07 (0.02, 0.12)*	0.06 (0.02, 0.11)*	0.11 (0.05, 0.17)*	0.06 (0.04, 0.08)*
Religious Activities	0.12 (0.09, 0.16)*	0.13 (0.09, 0.17)*	0.18 (0.14, 0.21)*	0.21 (0.17, 0.25)*	0.21 (0.17, 0.25)*	0.20 (0.16, 0.25)*	0.12 (0.11, 0.14)*
Level 2 - School							
% 11th Grade	0.00 (-0.62, 0.63)	-0.19 (-0.83, 0.45)	-0.13 (-0.75, 0.49)	-0.14 (-0.88, 0.59)	-0.45 (-1.11, 0.21)	-0.15 (-1.50, 1.20)	0.15 (-0.28, 0.58)
Avg. Age	-0.09 (-0.38, 0.21)	0.03 (-0.27, 0.33)	0.03 (-0.26, 0.32)	0.10 (-0.24, 0.45)	0.17 (-0.14, 0.48)	0.06 (-0.57, 0.69)	-0.16 (-0.36, 0.05)
% Female	0.38 (-0.28, 1.04)	-0.30 (-1.01, 0.40)	0.23 (-0.44, 0.91)	-0.05 (-0.84, 0.73)	-0.28 (-1.00, 0.43)	0.44 (-0.90, 1.77)	0.27 (-0.16, 0.71)
% LGBQ	-0.71 (-1.98, 0.55)	-0.67 (-1.99, 0.65)	-0.36 (-1.63, 0.92)	-0.04 (-1.54, 1.46)	0.01 (-1.34, 1.36)	-0.52 (-3.17, 2.12)	0.06 (-0.80, 0.92)
% Special Education	0.93 (0.06, 1.80)*	0.04 (-0.87, 0.96)	0.26 (-0.62, 1.14)	0.52 (-0.51, 1.55)	0.72 (-0.21, 1.65)	3.34 (1.53, 5.15)*	-0.38 (-0.97, 0.20)
% Free/Reduced Lunch	0.43 (-0.07, 0.92)	0.46 (-0.06, 0.97)	0.36 (-0.14, 0.86)	0.23 (-0.35, 0.82)	0.31 (-0.22, 0.84)	0.87 (-0.16, 1.90)	-0.04 (-0.37, 0.30)
% Homeless	-0.83 (-2.38, 0.73)	0.19 (-1.44, 1.82)	-0.39 (-1.97, 1.19)	-0.34 (-2.18, 1.50)	-0.22 (-1.89, 1.46)	-2.44 (-5.64, 0.75)	-0.59 (-1.64, 0.45)
% Experienced Trauma	-0.50 (-1.05, 0.05)	-1.71 (-2.29, -1.14)*	-1.39 (-1.95, -0.83)*	-1.55 (-2.20, -0.89)*	-1.79 (-2.38, -1.20)*	-0.87 (-2.03, 0.29)	-0.38 (-0.75, -0.00)*
% Moved Schools	-0.66 (-2.14, 0.82)	-0.11 (-1.68, 1.45)	-0.15 (-1.66, 1.35)	-0.37 (-2.12, 1.38)	0.83 (-0.77, 2.43)	0.34 (-2.67, 3.34)	-0.35 (-1.33, 0.64)
% Disciplined in last 30 days	-1.17 (-1.88, -0.46)*	-0.66 (-1.40, 0.09)	-1.35 (-2.07, -0.63)*	-0.86 (-1.70, -0.02)*	-0.10 (-0.87, 0.66)	-3.37 (-4.85, -1.90)*	-0.40 (-0.88, 0.08)
% 4-yr college plan	0.68 (0.15, 1.20)*	0.40 (-0.15, 0.95)	0.57 (0.04, 1.11)*	0.79 (0.17, 1.41)*	0.80 (0.24, 1.36)*	0.86 (-0.21, 1.94)	0.63 (0.28, 0.98)*

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Appendix (cont.)

Predictor	CtL	PIO	SC	EM	FCS	TSS	GPA
% American Indian	0.01 (-0.58, 0.59)	0.10 (-0.53, 0.73)	-0.06 (-0.66, 0.54)	0.09 (-0.61, 0.79)	-0.27 (-0.91, 0.36)	0.15 (-1.03, 1.33)	-0.10 (-0.49, 0.29)
% Asian	-0.58 (-2.13, 0.96)	-1.16 (-2.72, 0.39)	-0.71 (-2.22, 0.81)	-1.27 (-3.10, 0.56)	-1.68 (-3.28, -0.08)*	-1.08 (-4.52, 2.35)	-0.02 (-1.11, 1.06)
% Black	0.86 (-0.16, 1.88)	0.20 (-0.85, 1.24)	0.16 (-0.87, 1.18)	0.27 (-0.93, 1.47)	-0.70 (-1.78, 0.38)	-0.52 (-2.71, 1.67)	0.08 (-0.62, 0.78)
% Multiracial	0.09 (-2.35, 2.54)	-0.82 (-3.34, 1.69)	0.72 (-1.72, 3.16)	-0.72 (-3.62, 2.17)	0.03 (-2.55, 2.61)	-2.59 (-7.83, 2.64)	-0.06 (-1.74, 1.62)
% Latino	0.38 (-0.32, 1.08)	0.24 (-0.49, 0.96)	0.14 (-0.56, 0.85)	-0.04 (-0.86, 0.79)	-0.68 (-1.43, 0.06)	0.15 (-1.34, 1.64)	-0.23 (-0.70, 0.25)
% Somali	1.30 (-1.18, 3.78)	1.95 (-0.53, 4.43)	2.05 (-0.38, 4.48)	0.03 (-2.90, 2.96)	0.26 (-2.31, 2.83)	3.15 (-2.37, 8.68)	0.12 (-1.61, 1.86)
% Hmong	0.26 (-0.44, 0.95)	-0.40 (-1.10, 0.31)	-0.02 (-0.70, 0.67)	-0.56 (-1.39, 0.26)	-0.96 (-1.69, -0.24)*	0.22 (-1.32, 1.76)	-0.02 (-0.51, 0.47)
% in Comm. Sports	-0.38 (-1.53, 0.77)	0.28 (-0.90, 1.46)	0.32 (-0.83, 1.48)	0.29 (-1.07, 1.66)	0.57 (-0.65, 1.78)	-0.13 (-2.59, 2.33)	0.48 (-0.31, 1.27)
% in Sch. Sports	0.10 (-0.47, 0.68)	-0.05 (-0.65, 0.54)	-0.25 (-0.83, 0.33)	0.30 (-0.38, 0.98)	0.59 (-0.02, 1.20)	0.13 (-1.07, 1.34)	0.44 (0.05, 0.83)*
% in Comm. & Sch. Sports	0.39 (-1.10, 1.88)	0.02 (-1.52, 1.56)	0.28 (-1.21, 1.77)	0.01 (-1.74, 1.77)	-1.25 (-2.83, 0.33)	0.06 (-3.10, 3.21)	-0.39 (-1.41, 0.63)
% in Non-Sport Sch. Clubs	0.06 (-0.45, 0.56)	-0.09 (-0.62, 0.44)	-0.09 (-0.60, 0.42)	0.13 (-0.47, 0.73)	0.04 (-0.50, 0.58)	1.26 (0.21, 2.31)*	-0.07 (-0.41, 0.27)
% in Non-Sport Comm. Clubs	-0.28 (-0.97, 0.40)	-0.61 (-1.34, 0.11)	-0.58 (-1.27, 0.12)	-0.75 (-1.56, 0.06)	-0.55 (-1.29, 0.19)	-1.55 (-2.96, -0.15)*	0.12 (-0.34, 0.58)
% in Tutoring	0.16 (-0.56, 0.88)	-0.17 (-0.92, 0.57)	0.11 (-0.61, 0.84)	-0.32 (-1.17, 0.53)	-0.22 (-0.98, 0.55)	0.17 (-1.34, 1.68)	-0.52 (-1.01, -0.04)*
% in Leadership Activities	0.41 (-0.31, 1.13)	0.40 (-0.36, 1.16)	0.33 (-0.40, 1.06)	0.35 (-0.51, 1.21)	0.54 (-0.24, 1.32)	0.13 (-1.36, 1.62)	0.24 (-0.25, 0.73)
% in Lessons	0.35 (-0.24, 0.93)	0.28 (-0.33, 0.89)	0.43 (-0.16, 1.02)	0.15 (-0.54, 0.84)	0.10 (-0.52, 0.73)	0.46 (-0.77, 1.68)	-0.12 (-0.52, 0.28)
% in Religious Activities	0.02 (-0.36, 0.39)	0.01 (-0.38, 0.40)	0.11 (-0.26, 0.49)	0.39 (-0.06, 0.83)	0.36 (-0.04, 0.76)	0.73 (-0.05, 1.51)	0.18 (-0.07, 0.43)
Twin Cities	-0.02 (-0.13, 0.10)	0.03 (-0.09, 0.14)	0.01 (-0.10, 0.12)	0.02 (-0.12, 0.16)	0.01 (-0.11, 0.13)	0.12 (-0.14, 0.38)	-0.03 (-0.12, 0.05)
Total Students (/10)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)
Diversity	-0.03 (-0.25, 0.20)	-0.10 (-0.34, 0.13)	-0.16 (-0.39, 0.07)	-0.15 (-0.42, 0.12)	0.02 (-0.22, 0.27)	-0.12 (-0.60, 0.36)	0.02 (-0.13, 0.17)
Median Income (/\$1000)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (0.00, 0.01)*	-0.00 (-0.00, 0.00)	0.01 (0.00, 0.02)*	0.00 (-0.00, 0.00)
Total Teams	0.00 (0.00, 0.00)*	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)
# AP Courses Offered	-0.00 (-0.01, 0.00)	-0.00 (-0.01, 0.00)	0.00 (-0.00, 0.01)	0.00 (-0.00, 0.01)	0.00 (-0.00, 0.01)	0.01 (-0.00, 0.02)	-0.00 (-0.00, 0.00)
Expense/Student (/\$100)	-0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	-0.00 (-0.00, 0.00)	0.00 (-0.00, 0.00)
% Certified Teachers	1.62 (0.45, 2.79)*	0.52 (-0.65, 1.70)	0.41 (-0.70, 1.53)	-0.08 (-1.52, 1.37)	-0.59 (-1.74, 0.56)	0.62 (-2.03, 3.28)	0.26 (-0.57, 1.09)
% Teachers <2 Yrs. Exp.	0.44 (-0.04, 0.92)	-0.04 (-0.54, 0.46)	-0.11 (-0.60, 0.37)	-0.04 (-0.61, 0.53)	0.10 (-0.41, 0.61)	0.41 (-0.59, 1.42)	0.07 (-0.25, 0.40)
Student-Teacher Ratio	-0.00 (-0.01, 0.01)	0.00 (-0.01, 0.01)	0.00 (-0.01, 0.01)	-0.00 (-0.01, 0.01)	0.01 (-0.00, 0.02)	-0.01 (-0.03, 0.01)	-0.00 (-0.01, 0.01)
Random Effects							
Intercept (τ_{00})	0.017	0.010	0.014	0.019	0.015	0.120	0.012
Community Sports	0.005		0.005		0.004	0.000	0.000
School Sports	0.014		0.009		0.017	0.012	0.006
Comm. & Sch. Sports	0.006		0.028		0.011	0.031	0.000
Residual (σ^2)	1.814	2.739	2.199	2.776	2.536	3.899	0.564

Note. CtL = Commitment to Learning, PIO = Positive Identity & Outlook, SC = Social Competence, EM = Empowerment, FCS = Family/Community Support; TSS = Teacher/School Support; GPA = Grade Point Average; All student-level characteristics were group mean centered and all school-level characteristics were grand mean centered; * $p < .01$