

## **Adolescent After School Program Participation and Physical Fitness**

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### Abstract

In this study we examine the effects of after school program participation—both physical fitness and other types of programs—on students’ physical fitness outcomes. We use both administrative and survey data on students from fifth to ninth grade to follow their program participation and fitness outcomes. Although we do not yet have enough data to fully explore the issue, preliminary findings suggest that the physical fitness programs that are already in place in communities may help students improve their fitness outcomes over time. Students’ beliefs about themselves also appear to be a mediator in this process, but more waves of survey data are necessary before conclusions can be drawn.

## **Introduction**

The most recent figures indicate that 30.1% of U.S. children ages 2 to 19 have body mass index (BMI) high enough to classify them as overweight, 15.5% are obese (95th percentile), and 10.9% are severely obese (97th percentile) (Ogden, Carroll, & Flegal, 2008). With childhood obesity rates rising and the dire consequences of obesity for lifelong health and well-being, many policymakers, funders, researchers, and practitioners are searching for feasible solutions to this intractable problem. One promising intervention area that warrants further attention is after school programming. Medical research has shown that activity-focused after school programming can lead to improvements in youth obesity and fitness outcomes. Especially for low-income and minority adolescents, productive and prosocial after school activities have the potential to fulfill a variety of developmental needs—including health.

The positive youth development framework embraced by the after school field emphasizes features of developmental settings that promote adolescent well-being across four domains of functioning: intellectual, emotional, social and physical (Eccles & Gootman, 2002). According to two recent reviews, high quality after school programs have the potential to improve participants’ academic achievement, self-efficacy, civic engagement and emotional regulation, but studies have not considered the health consequences of participation (Durlak & Weissberg, 2007; Lauer, et al., 2006). The medical literature also concentrates on after school programs, specifically those involving sports and physical activity, and points to the efficacy of these interventions for reducing obesity (Ara, et al., 2006; Elkins, Cohen, Koralewicz, & Taylor, 2004; Robinson, 1999; Story, et al., 2003; Weintraub, et al., 2008). This literature is narrowly focused, concentrating on health outcomes without considering the intellectual, emotional and social ramifications of such programming. Some medical studies have linked youth obesity with

outcomes in these other domains, but have done so mostly from a deficit perspective, examining problems such as depression, poor self-esteem, low physical quality of life, and unfavorable body image (Fallon, et al., 2005; Johnson, et al., 2008; Schwimmer, Burwinkle, & Varni, 2003; Strauss, 2000; Swallen, Reither, Haas, & Meier, 2005; Wardle & Cooke, 2005; Williams, Wake, Hesketh, Maher, & Waters, 2005).

A drawback of the interventions tested in the medical literature is that they tend to be smaller research trials of programs that are developed and run by research universities. It is unknown whether traditional after school programs—those that are developed and run by community practitioners and educators—also accrue health benefits for their participants. In addition, it may be that even programs that are not focused on physical activity have the potential to reduce obesity or improve fitness.

We hypothesize that the mechanism through which after school programming could be linked to improved fitness and reduced obesity is two-fold. First, a direct link—for youth engaged in physical activities after school, research has already shown a relationship to reduced BMI and other overweight measures. Aligned with this, we posit that even youth who are engaged in other kinds of after school activities, including those focused on youth leadership, art, or academics, may experience improved BMI or fitness simply because these activities replace sedentary at-home alternatives, like watching television or playing video games, which are associated with increased obesity (Gortmaker, et al., 1999; Mahoney, Lord, & Carryl, 2005; Motl, McAuley, Birnbaum, & Lytle, 2006; Robinson, 1999). Second, we hypothesize a more indirect link—that youth who engage in high quality after school programs, including physical activity and athletics, gain other types of developmental assets such as a sense of competency and connectedness, which are likely to positively affect the physical health. For example, high

quality after school programs create a sense of community and encourage youth to develop strong relationships with their peers and with adult staff. Through these new relationships, youth may be both encouraged and supported to revise their physical lifestyle choices and habits. In this analysis we are able to track improvements in students’ physical fitness over time, but students’ social development was measured only during one year.

In this article, we study the link between adolescents’ participation in quality after school programming and their health outcomes as measured by BMI and physical fitness. We infuse a positive youth development framework into the study of BMI and physical fitness in order to understand the processes through which after school programming can promote positive health outcomes. We consider both after school programs focused on physical activity and those focused in other areas. We concentrate on San Francisco Bay Area community, which has a large share of low-income and Latino young people attending its schools.

## **Literature Review**

Recent reviews of the medical literature on childhood and youth obesity indicate that even with heightened attention to the problem and its consequences, reliable and replicable solutions to this health issue remain elusive (Campbell, Waters, O’Meara, & Summerbell, 2001; Summerbell, et al., 2009). Non-experimental research has shown a strong link between physical activity and lower obesity for school-age youth (Berkey, Rockett, Gillman, & Colditz, 2003; Delva, O’Malley, & Johnston, 2007; Dowda, Ainsworth, Addy, Saunders, & Riner, 2001; Elkins, et al., 2004). Research also finds that physical activity, and especially intense physical activity, can be associated with improved mental health outcomes for youth (Nelson & Gordon-Larsen, 2006; Norris, Carroll, & Cochrane, 1992). However, this body of research is limited in two ways.

Studies have not adequately addressed selection bias issues—that students who pursue physical activities and athletics may be either more motivated toward fitness or less likely to suffer from overweight and obesity problems—both of which would result in overestimates of the link between physical fitness and reduced obesity. A further limitation is the cross-sectional nature of most of this work, as the positive effects of physical activity can be undone over time if youth do not persist in prioritizing this aspect of their lives.

Responding to these methodological problems is a medical literature that relies on small randomized trials testing the efficacy of sports and physical activity programs on obesity outcomes. The results corroborate the non-experimental work, showing that these programs can reduce youth’s BMI and other measures of obesity over a relatively short period of time (Ara, et al., 2006; Robinson, et al., 2003; Story, et al., 2003; Weintraub, et al., 2008). Activities ranging from participation in sports teams to dance programs, coupled with other program components—such as family participation and reduced television viewing—have been shown to lead to reductions in measurements of BMI, fat accumulation, and waist circumference.

From a youth development perspective, these medical trials lack important details on the well-being of participating youth. Although the causal relationship between increased physical activity and reduced BMI seems clear, other types of developmental changes that might result from both increased activity and decreased BMI—including intellectual, emotional, and social changes—remain understudied. These studies do not assess the extent to which youth participating in physical activities also experience the sorts of positive developmental outcomes that are associated with high quality after school programming in general—academic achievement, self-efficacy, civic engagement and emotional regulation. This is important

because assets such as positive self-image, self-confidence and peer acceptance have independently been associated with reduced obesity (Gesell, et al., 2008; LaFontaine, 2008).

Moreover, the relationship between participation in after school programs of any kind and physical health outcomes remains underexamined in the vast after school program literature. Participation in high quality after school programming has been linked to improved test scores (Klein & Bolus, 2002; Vandell, Reisner, & Pierce, 2007; Welsh, Russell, Williams, Reisner, & White, 2002), increased school attendance (Espino, Fabiano, & Pearson, 2004; Fabiano, Pearson, Reisner, & Williams, 2006; Huang, Kim, Marshall, & Pérez, 2005; Vandell, et al., 2007), and positive social development in attitudes such as self-perception and school bonding (J. S. Eccles & Barber, 1999; Lerner, et al., 2005; Morrissey & Werner-Wilson, 2005), as well as important social development outcomes such as civic engagement and leadership (Gardner, Roth, & Brooks-Gunn, 2008; Kirshner, Strobel, & Fernandez, 2003; Larson, Hansen, & Moneta, 2006).

This same literature also documents the features of after school settings that are associated with many of these outcomes. By offering meaningful opportunities for youth to be engaged in their communities, high quality after school programs help them to develop their own personal abilities (McLaughlin, 2000). For instance, research has consistently associated achievement gains and school engagement with after school settings that offer opportunities for youth leadership, positive relationships and meaningful skill-building (Birmingham, Pechman, Russell, & Mielke, 2005; Durlak & Weissberg, 2007; Huang, et al., 2005).

The study draws on seemingly disparate medical and youth development literatures to examine adolescents’ BMI and physical fitness trajectories in the context of their participation in a variety of after school programs—those focused on physical activities as well as others—and link both to their physical fitness and youth development outcomes.

Our study adds to the literature in several ways. First, by studying all types of after school activities together, we will be able to identify the differential health effects of physical activity and other types of programs, including combinations of these at once or over time. Second, our longitudinal data allow us to track youth BMI and physical fitness, as well as after school participation and other contributors, over three to five years, which is an improvement over much of the literature. Finally, by combining survey and administrative data, we are able to link health with other positive youth development outcomes.

## **Data and Methods**

We rely primarily on data from the Youth Data Archive (YDA), a collaboration of public, private, and university partners in the San Francisco Bay Area that share administrative data across agencies and come together to ask and answer questions about youth in the community. With the YDA, we link individual-level administrative data over time and across schools, public agencies, and community-based organizations to support community partners to make data-driven policy and programmatic decisions to improve outcomes for youth.

For this analysis, we rely on data from two Bay Area school districts: an elementary district serving students in grades K-8 and the high school district to which it feeds, serving students in grades 9-12. A total of 67% of elementary district students are Latino, 47% are English learners, and 58% are Free and Reduced Price Lunch participants. Data include student demographics, physical fitness outcomes, and academic achievement from the 2004-05 to 2007-08 school years. We measure student BMI and physical fitness using the California Physical Fitness Test (PFT), which consists of the following six fitness standards: aerobic capacity, body composition, abdominal strength and endurance, trunk extensor strength and endurance, upper

body strength and endurance, and flexibility. Students take the PFT in fifth, seventh, and ninth grades and pass a standard if their score falls within a designated healthy fitness zone (Fitnessgram, 2007).

To examine students’ physical fitness trajectories over time, we follow two cohorts of students, those who took the PFT in the 2004-05 and 2006-07 school years and those who took the PFT in the 2005-06 and 2007-08 school years. Each cohort consists of students who took the PFT in both fifth and seventh grade or seventh and ninth grade. To assess students’ physical fitness, we adopt the California Education Code’s definition of passing the PFT: taking and passing five of the six standards. In order to examine the relationship between after school program participation and physical fitness over time, we divide students into four groups based on their PFT performance in the two years:

- Passed five of six standards in both academic years;
- Passed five of six standards in the first academic year but not the second;
- Passed five of six standards in the second academic year but not the first; and
- Did not pass five of six standards in either year.

We create a similar set of four categories for students focused solely on BMI in order to align with the literature that looks at overweight and obesity, but focus this paper on students’ overall physical fitness, rather than any one measure of health.

To these data, we individually link information on students’ after school program participation from a variety of after school providers.<sup>1</sup> The data currently include: one public agency that offers classes in daily, weekly, and monthly increments focused on sports, recreation, and other activities; the California After School Education and Safety Program

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<sup>1</sup> This administrative data analysis does not include the entirety of after school program offerings in the community. We have included some of the major providers, but plan to add to the analysis by including other providers as data come in.

(ASES); and two private organizations that offer physical activity and other kinds of activities after school.

We also rely on a survey of all students in grades 6 through 8 conducted in the spring of 2009. The survey focused on two main areas: (1) understanding students’ sense of competency, autonomy and relatedness in the classroom; and (2) their self-reported participation in a variety of school-related and other sports, recreation, and other after school activities. The survey was confidential but not unidentified. We link the survey individually to the school and after school program administrative data using student identifiers. Although the survey focuses on students’ views of themselves in the classroom context, we use this as a proxy of their views of themselves more generally.

In the analyses that follow, we focus mainly on the results from the administrative data files because only fifth grade students in the 2005-06 to 2007-08 cohort were administered the survey, when they were in eighth graders in spring 2009. We begin with raw tabulations of students’ obesity and physical fitness trajectories. We then model students’ after school program participation using logit regressions that control for a variety of baseline characteristics, including physical fitness status. We separately model students’ participation in physical activity and other kinds of after school programs.

The main goal is to understand how participation in after school programs – both physical activity and other types of programs – affects physical fitness trajectories. One problem with this analysis is that fitness relies on a variety of different factors, including parental influences, genetics, food habits at home, classroom differences in physical education, and others which are not measured by our data. Some of these factors may be highly correlated with after school program participation, possibly confounding our measurements. As one example, low-income

families who do not have the resources to enroll their children in sports programs may also lack the resources to purchase healthy foods. There is also the potential for selection bias in after school participation, for example, students who are already physically fit may be more likely to enroll in programs with fitness benefits, and would have remained fit regardless of their after school participation. We also focus on four large after school service providers, but do not capture all the possible after school programs available to students. We attempt two ways to account for these problems. First, we examine the role of baseline fitness, as well as other characteristics, on the likelihood of after school program participation. Knowing the magnitude of the effect will help us to gauge the interpretation of the results. Second, we follow fitness trajectories rather than examining fitness at one point in time. In other words, we are examining students’ follow-up fitness measure, after controlling for their initial fitness level, family demographics (income and parental education), and initial academics, which are influenced by a student’s home and school environment. We believe that accounting for these factors eliminates some of the potential selection bias and helps isolate the true effect of attending an after school program.

## **Findings**

Table 1 presents obesity (using BMI) and physical fitness (passing five of six standards) statistics for students in fifth, seventh and ninth grades. We present this information overall and separately by sex, Latino ethnicity, and Free and Reduced Price Lunch Program participation. We do not present other minority groups because the district’s predominant ethnic group is Latinos.

For boys in ninth grade, obesity is 9 percentage points (from 41% to 32%) lower and fitness is 21 percentage points (from 50% to 71%) higher than boys in fifth grade. This has much to do with the maturation process as boys tend to gain muscle mass during adolescence. Girls experience very little change in their physical fitness across fifth to ninth grades – with a relatively constant 60% of girls testing as physically fit during these years. They see a small 4 point increase in their obesity levels over the same period, from 22% to 28%.

Fifth grade boys are nearly twice as likely to be obese and less likely to be fit compared to girls. However, by ninth grade things have reversed and boys are 10 percentage points more likely to be fit (71% compare to 61%) and only slightly more likely to be obese (32% compared to 28%).

As is well documented in the literature, Latino students have higher obesity rates in our data than those who are not Latino, with a persistent 10 percentage point difference in each of the three grades. Latino students are also less likely to be physically fit, but their growth in fitness improves more over time than for non-Latino students. In fifth grade, 47% of Latino student are fit, compared to 61% in ninth grade. This compares to an increase of 65% to 73% for non-Latino students. The comparison between higher and lower income students, as proxied by Free and Reduced Price Lunch participation, is similar to the Latino to non-Latino comparison. Those who are lower income are more likely to be obese and less likely to be fit. Although obesity levels do not change much over time, lower income students experience greater gains in fitness compared to higher income students over time.

Figures 1 and 2 show the physical fitness trajectories for students in both the younger and older cohorts. In both cases, the most common fitness trajectory is persistent fitness over the three-year period, and this is especially the case for girls. Nearly half the girls in the younger

(46%) and older (45%) cohorts are persistently fit over time. A substantial share of students is also persistently unfit over time. Among the younger cohort, 33% of boys and 24% of girls are persistently unfit. The percents are a bit lower among the older cohort, but still one-fifth of both boys and girls are persistently unfit. The switching categories—those who move from fit to unfit and the reverse—comprise fewer students, but there are substantial differences between the older and younger cohorts. Roughly three times as many older boys improve their fitness compared to those whose fitness declines (21% compared to 7%). Girls in the older are the only group that has more students move from fit to unfit than the reverse. These trajectories also include students who are on the margin between fit and unfit and vacillate between the two.

Table 2 presents raw tabulations on participation in after school programs for the fifth to seventh and seventh to ninth grade cohorts using the administrative data. The first and fourth columns show physical activity program participation rates for students overall and in various subgroups. The second and fifth columns present participation in other types of programs. The third and sixth columns show the percent of students who have no participation.<sup>2</sup> Overall, 27% of students in the fifth to seventh grade cohort participate in physical activity programs, as measured in the administrative data, during that period. A total of 37% are participating in other types of after school programs, yet nearly half (49%) are not participating in any programs that we are measuring. Students in the seventh to ninth grade cohort are less likely to go to both types of after school programs. In general, Latino and lower income are less likely to participate in physical activity programs and are more likely to participate in other programs. For the younger cohort, this is likely related to the After School Education and Safety Program (ASES),

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<sup>2</sup> The administrative data analysis includes the four previously mentioned after school program offerings and the survey data analysis is students’ self-reported after school participation.

which operates in eight of the elementary district schools. ASES serves students who are educationally at-risk, including a concentration of Latino and lower income students.

There is no relationship between overweight status, physical fitness, and after school participation for the older cohort, but in the younger cohort, students who are initially physically fit are 6 percentage points more likely to participate in physical activity programs (30% compared to 24%) and those who are initially obese are 5 percentage points more likely to participate in other after school programs (41% compared to 36%).

We are not able to capture every single after school program with the administrative data, so we asked students in the middle school survey to report the types of activities they engage in after school. We grouped these similarly into programs focused on physical activity and those focused in other areas. Table 3 reports a comparison of the survey to the administrative data. Note that the survey cohort overlaps some with each of the administrative data cohorts as it is asked of students in grades six through eight. Table 3 shows that indeed the administrative data are missing information about program participation, especially for the physical activity programs. A total of 67% of sixth to eighth graders reported to us that they participated in after school programs focused on physical activity or sports. This is substantially higher than administrative data records for the fifth to seventh grade cohort (27%) and the seventh to ninth grade cohort (16%). In comparison, there is only a small difference between the percentage of students who reported on the survey participation in other types of after school program (43%), compared to 37% in the administrative data for the younger cohort and 21% for the older cohort. The discrepancy is not surprising given the sources of administrative data included in the archive (which are mostly from public agencies), and we therefore rely on estimates with both these sources of information in the regression analysis that follows.

With the administrative data we are also able to estimate the amount of time students spend in their after school programs. Table 4 reports the number of days of participation (aggregated across all programs in each broad category) overall and for different subgroups of students. Among those who participate, the younger cohort spends an average of 36 days per year in physical activity after school programs and 76 days in other types of programs. Older students spend relatively less time in these programs, with an average of 31 days in physical activity programs and 40 days in other types of programs. In both cases, students who engage in non-physical activity programs spend more days in these programs than students who are in physical activity programs. This pattern of participation holds across the various subgroups shown.

We next turn to an analysis of the determinants of after school program participation. For the administrative data, we combine the younger and older cohorts and include a control variable for cohort. Because we currently have just one year of survey data, we can only examine the younger cohort. Table 5 reports the results of a logit regression examining the effects of base year characteristics on after school program participation using administrative data, and Table 6 reports similar regressions using the survey data on program participation. As mentioned previously, the administrative data on after school programs include mostly programs that are operated by city agencies with only a small number of programs operated privately by nonprofit organizations. In contrast, the survey includes student self-reporting of any kind of after school program, including school sports, and as a result covers many more students. The contrast between coefficients reported in Tables 5 and 6 reflects these differences.

For instance, Latino ethnicity and English language status are important detractors from program participation in the administrative data, but play virtually no role in the multivariate

model with the survey data. Parents’ higher education level is an important predictor of participation in other programs using the administrative data, but much less so with the survey data. Looking at Table 5, Free and Reduced Price Lunch students are less likely to participate in physical activity programs, but no more or less likely to participate in other programs once school dummy variables are included. With the survey data, we find Free and Reduced Price Lunch students are less likely to participate in both types of programs.

Most importantly for our analysis, the effects of base year fitness status on participation varies depending on the source of data examined. With administrative data, we find higher fitness students are more likely to participate in physical activity programs and other programs (both statistically significant). The survey data show a much larger link between fitness and physical activity program participation, but no link between fitness and participation in other types of programs.

Table 7 provides estimates of the key question we are attempting to answer—the effect of participation in different types of after school programs on physical fitness outcomes. Specifications 1 and 2 focus on the administrative data, and 3 and 4 focus on the survey data. The regressions indicate that participation in physical activity programs is associated with passing the physical fitness test only when program participation is measured with the survey. It has a zero effect when we use the administrative data and include school dummy variables. Participation in other school programs has no effect at all on physical fitness outcomes. All models include the base year fitness status, which as expected is highly related to post-participation fitness status. Other control variables also have the expected signs, except for Free and Reduced Price Lunch Program participation in the survey regressions. At this time, it is not

clear why this low-income variable predicts positive fitness, after controlling for other characteristics.

We are concerned that the relationships we estimate are potentially counteracted by the presence of very different subgroups—low and high income students, Latino and non-Latino students. Table 8 therefore estimates these same regressions separately for Latino and low income subgroups, as well as students who attend schools with specific ASES programs and students who were initially unfit. These regressions use the administrative data only, as there are not enough observations in the survey cohort to reliably estimate separate regressions for each subgroup. We do not find that after school program participation—physical activity or otherwise—as measured by the administrative data affects physical fitness outcomes.

One final question is whether the developmental gains students make through after school program participation is also a mechanism for improving physical fitness. We plan to use repeated student surveys, which would allow us to examine changes in youth development over time. At the present we have one survey wave, but use this as a first step to understand whether and which youth development indicators might be candidates for this type of mediator. Table 9 explores this question. It uses survey data only and includes the same regressors as are included in the Table 7 models, but also includes dummy variables for five different scales measured on the survey. The scales ask specifically about student belief structures regarding their motivation, efficacy, and sense of care.

The scales (described in detail in Appendix 1) include three to six questions each with six response categories. Responses are averaged to create one composite per scale, which we then break into three dummy variables: (i) low average ranging from 1 up to but not including 4; (ii) medium average from 4 up to but not including 5; and (iii) high average of 5 up to and including

6. In all cases, questions are scaled so that higher responses indicate a more positive developmental response.

Findings indicate that two of these scales have a positive association with physical fitness: mastery goal orientation and classroom sense of care. The mastery goal orientation scale is a measure of student motivation for learning and their goals for the school year. In the regression, respondents with medium level agreement on this scale (compared to low agreement) had a higher probability of physical fitness in year two, controlling for baseline fitness level. High agreement on this scale is not associated with a significant effect on physical fitness. Classroom sense of care includes questions about the extent to which students share ideas and information in class and whether they obtain help from other students when needed. Both medium and high agreement on this scale are associated with higher year two fitness levels, controlling for baseline fitness.

It is not clear whether it is these scales themselves or something for which they proxy that is associated with higher levels of fitness, but these concepts are worth exploring more. We intend to use future waves of the survey to better understand the extent to which measures of motivation, efficacy and caring are associated with physical health outcomes and mediate the relationship between after school program participation and physical fitness outcomes.

## **Discussion**

Eccles and Gootman (2002) laid out four domains of functioning that can be addressed by high quality after school programs: intellectual, emotional, social and physical. We have focused on the physical health domain in an attempt to better understand the relationship between physical fitness, after school program participation, and the mediators that may link these together.

Importantly, we have concentrated on after school programs that already exist in the community, trying to gauge the potential for relying on existing community assets to solve the entrenched problem of childhood obesity. Although medical trials have shown the efficacy of after school interventions for promoting weight loss and physical activity, these interventions are usually brought to the community by medical researchers, and in many cases lack the potential for scalability and sustainability.

Findings from this preliminary study point to the promise of existing after school programs for promoting physical health outcomes, but more data are needed to fully explore the issue. The community studied has a physical fitness gap, with lower income and Latino students more likely to fail the physical fitness test administered by their schools to fifth, seventh and ninth graders. These students may also be less likely to be able to afford sports leagues and other physical activity programs, which tend to have costs associated with them. Indeed, when we examine physical activity and other after school program participation using the YDA, we find that Latinos and lower income students are less likely to participate in physical activity programs. Students who are physically unfit are also less likely to participate. When we examine participation in a multivariate model, we find that specifically the English learner Latino youth are less likely to participate.

We are concerned, however, that the YDA does not contain a sufficient number of after school programs to properly assess the extent of participation. We therefore also rely on a survey of middle school students which asks about after school athletic, physical activity, and other program participation. Reported rates of after school participation in the survey are much higher than in the YDA, specifically for physical activity programs. However, the survey

regressions do not indicate a statistically significant lower rate of participation for Latino and low income students.

Survey and administrative data also show differencing results for our main regression models, which examine the effects of after school participation on physical fitness over time. Controlling for baseline fitness status, we find no effect of participation in physical health or other programs on fitness status using the YDA. However, the survey shows a consistent positive and weakly significant effect. It is possible to hypothesize multiple reasons why these data produce differencing results. The survey data indicate that many more students are participating in physical fitness programs than are captured in our administrative data, and that the inclusion of these students appears to minimize the effects of socio-economic status on program participation. Nonetheless, looking specifically at subgroups with the administrative data, we also find no effect. We cannot examine these subgroups in the survey due to small sample sizes.

Still the survey regressions point to a potential effect that is worth further consideration. We next examine the effects of student beliefs about themselves in their school environments to understand if physical health improvements are associated with other measures of youth development. We find two of the scales are associated with higher levels of year two fitness, but it is unclear whether the concepts measured by the scales or some unobserved correlate with them is responsible.

This study points to the possible importance of considering the youth development promoting after school programs that exist in communities today. More data are needed to reliably study the problem, but these early findings suggest that focusing on the programs that

communities already have in place may be a potential route to helping youth maintain physically healthy lives.

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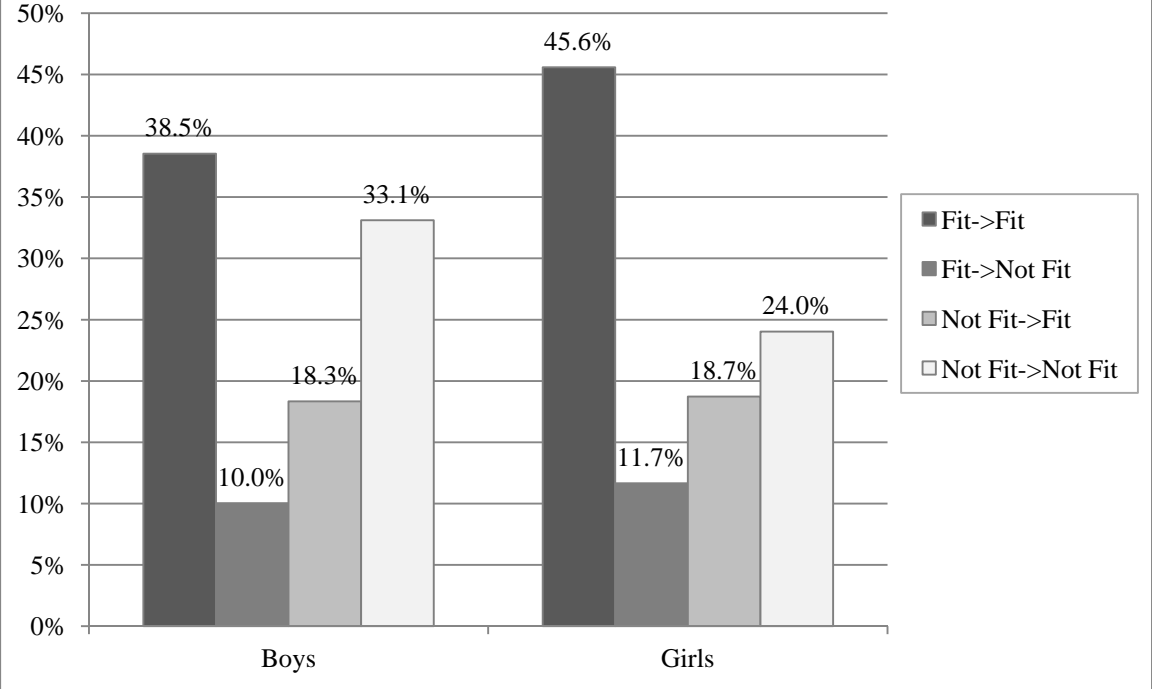
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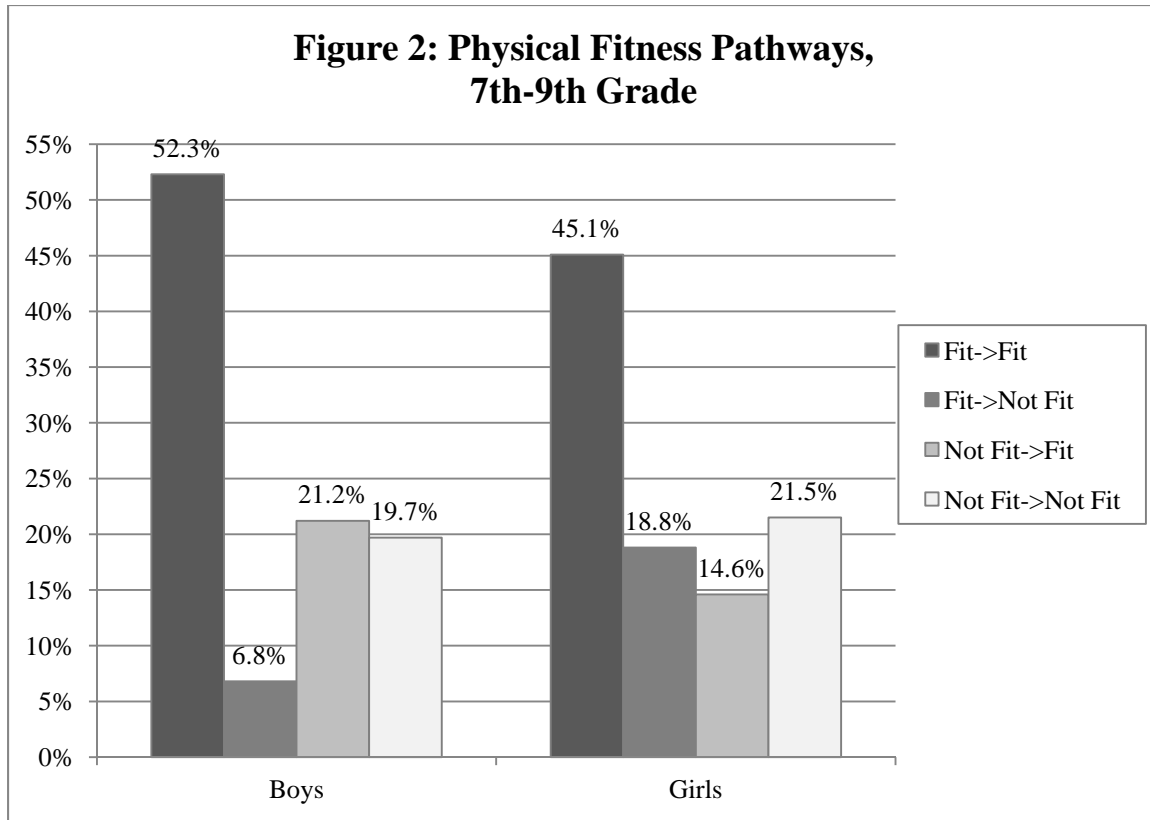
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**Figure 1: Physical Fitness Pathways,  
5th-7th Grade**





**Table 1. Percent of 5th, 7th, and 9th Grade Students who are Obese and Physically Fit (%)**

	5 <sup>th</sup> Grade		7 <sup>th</sup> Grade		9 <sup>th</sup> Grade	
	Boys	Girls	Boys	Girls	Boys	Girls
% Obese	41.3	22.3	40.0	24.8	32.3	28.1
% Phys Fit	49.5	57.2	56.9	63.8	71.0	61.1
N	1,575	1,550	1,503	1,449	1,283	1,226
	Latino	Not Latino	Latino	Not Latino	Latino	Not Latino
% Obese	35.4	25.6	36.7	26.2	35.2	24.5
% Phys Fit	46.5	65.3	55.4	67.6	60.6	72.7
N	1,994	1,131	1,775	1,177	1,361	1,148
	F/R Lunch	Not F/R Lunch	F/R Lunch	Not F/R Lunch	F/R Lunch	Not F/R Lunch
% Obese	35.4	26.9	37.2	27.2	36.6	27.3
% Phys Fit	44.4	65.6	54.3	67.1	57.5	70.3
N	1,809	1,316	1,567	1,385	804	1,705

**Table 2. Percent of Students Participating in After School Programs, Administrative Data (%)**

	5 <sup>th</sup> -7 <sup>th</sup> Grade Cohort			7 <sup>th</sup> -9 <sup>th</sup> Grade Cohort		
	Physical Activity Programs	Other Programs	No Program	Physical Activity Programs	Other Programs	No Program
Overall	27.3	37.3	48.7	15.5	21.1	67.0
Boys	28.5	43.0	43.5	16.7	24.1	63.3
Girls	26.0	31.4	54.2	14.3	18.1	71.0
Latino	23.3	37.1	50.2	11.4	23.3	68.0
Not Latino	33.3	37.7	46.5	21.3	18.0	65.6
F/R Lunch	19.7	38.8	50.2	10.2	24.5	68.0
Not F/R Lunch	36.7	35.5	47.0	20.9	17.7	66.1
Physically Fit	30.3	36.6	48.0	15.6	22.7	66.0
Physically Unfit	23.9	38.2	49.5	15.3	18.6	68.6
Not Obese	27.0	35.5	51.0	15.0	20.5	68.8
Obese	27.8	40.8	44.4	16.6	22.4	63.6
N	1,155	1,155	1,155	1,031	1,031	1,031

Note: Students can participate in both physical activity and other types of programs, so the percents do not sum to 100.

**Table 3. Comparison of Administrative Data and Self-Reported After School Program Participation (%)**

	<b>Physical Activity Programs</b>	<b>Other Programs</b>	<b>No Program</b>
Admin Data: 5 <sup>th</sup> to 7 <sup>th</sup> Grade Cohort	27.3	37.3	48.7
Admin Data: 7 <sup>th</sup> to 9 <sup>th</sup> Grade Cohort	15.5	21.1	67.0
Survey Data: 5 <sup>th</sup> to 7 <sup>th</sup> Grade Cohort	67.4	42.6	24.0

Note: (1) Students can participate in both physical activity and other types of programs, so the percents do not sum to 100. (2) The survey data cohort applies only to the 5<sup>th</sup> to 7<sup>th</sup> grade cohort in the 2005-06 and 2007-08 school years.

**Table 4. Average Number of Days of After School Program Participation, Select Programs (%)**

	<b>5<sup>th</sup>-7<sup>th</sup> Grade Cohort</b>		<b>7<sup>th</sup>-9<sup>th</sup> Grade Cohort</b>	
	<b>Physical Activity Programs</b>	<b>Other Programs</b>	<b>Physical Activity Programs</b>	<b>Other Programs</b>
Overall	36.3	76.0	31.0	40.3
Boys	36.9	73.4	24.2	41.6
Girls	35.6	79.7	39.2	38.7
Latino	33.2	91.4	29.1	50.1
Not Latino	39.6	52.8	32.4	22.4
F/R Lunch	34.3	99.3	30.6	54.4
Not F/R Lunch	37.7	44.4	31.1	20.7
Physically Fit	39.0	65.5	29.5	35.4
Physically Unfit	32.5	87.3	33.4	49.9
Not Obese	35.7	75.3	30.6	40.8
Obese	37.4	77.3	31.6	39.5
N	315	431	160	218

**Table 5. Determinants of After School Program Participation (Administrative Data)**

	Physical Activity Programs		Other Programs	
	(1)	(2)	(3)	(4)
Physically Fit in Base Year	0.102	0.175**	0.159***	0.145**
Female	-0.103	-0.140	-0.134*	-0.130
Grade 5 (reference)				
Grade 7	-0.574***	-0.525***	-0.421***	-0.170
Grade 9	-2.529***	-2.635***	-1.542***	-1.263***
Female * Grade 7	0.216	0.228	-0.033	-0.004
Female * Grade 9	0.202	0.252	-0.195	-0.207
Parent Ed HS Diploma (reference)				
Parent Ed Less than HS	-0.341***	-0.191*	0.067	-0.071
Parent Ed College	0.150*	0.124	0.174**	0.261***
Parent Ed Miss	0.035	0.076	0.187	0.268*
Free/Reduced Price Lunch	-0.437***	-0.401***	0.363***	0.029
Special Ed	-0.016	-0.081	0.021	0.076
White and not EL (reference)				
Latino and not EL	0.134	0.062	-0.099	-0.281***
Latino and EL	-0.228*	-0.268*	-0.028	-0.285**
Other Ethnicity and not EL	0.286**	0.233**	-0.187*	-0.303***
Other Ethnicity and EL	-0.452	-0.445	-0.259	-0.526**
CST ELA Basic (reference)				
CST ELA Below Basic	-0.118	-0.112	0.052	0.069
CST ELA Proficient	-0.046	-0.041	-0.114	-0.061
CST Math Basic (reference)				
CST Math Below Basic	-0.049	-0.055	-0.011	0.001
CST Math Proficient	0.179*	0.061	-0.109	-0.071
Low School Attendance	-1.051**	-1.067**	-0.824***	-0.709**
Medium School Attendance	-0.461***	-0.458***	-0.285***	-0.247***
Attendance Data Missing	-0.229**	-0.236**	-0.353***	-0.344***
High School Attendance (reference)				
School Dummy Variables	No	Yes	No	Yes
N	8,586			

\*\*\*p<.01, \*\*p<.05, \*p<.10.

**Table 6. Determinants of After School Program Participation (Survey Data)**

	Physical Activity Programs		Other Programs	
	(1)	(2)	(3)	(4)
Physically Fit in Base Year	0.512***	0.496***	-0.011	-0.103
Female	-0.374**	-0.375**	0.514***	0.566***
Grade 5 (reference)				
Grade 7	0.158	-0.061	0.112	0.078
Female * Grade 7	0.026	0.012	-0.550**	-0.563**
Parent Ed HS Diploma (reference)				
Parent Ed Less than HS	-0.039	-0.024	-0.152	-0.169
Parent Ed College	0.362*	0.299	0.129	0.014
Parent Ed Miss	-0.229	-0.178	0.138	0.041
Free/Reduced Price Lunch	-0.489***	-0.298	-0.313*	-0.323*
Special Ed	-0.301	-0.332	-0.279	-0.171
White and not EL (reference)				
Latino and not EL	-0.080	0.070	0.061	0.139
Latino and EL	-0.163	-0.009	0.020	0.104
Other Ethnicity and not EL	0.341	0.437	-0.010	0.048
Other Ethnicity and EL	-0.072	0.041	-0.457	-0.333
CST ELA Basic (reference)				
CST ELA Below Basic	-0.389*	-0.365	-0.043	0.005
CST ELA Proficient	-0.191	-0.212	-0.154	-0.274
CST Math Basic (reference)				
CST Math Below Basic	0.197	0.261	-0.101	-0.143
CST Math Proficient	0.460**	0.479**	0.081	0.157
Low School Attendance	-0.445	-0.473	-0.194	0.078
Medium School Attendance	-0.221	-0.213	-0.351**	-0.370**
Attendance Data Missing	-0.363**	-0.046	-0.684***	-0.625
High School Attendance (reference)				
School dummy variables	No	Yes	No	Yes
N	1,165			

\*\*\*p<.01, \*\*p<.05, \*p<.10

**Table 7. Effects of After School Participation on Post-Participation Physical Fitness**

	Administrative Data		Survey Data	
	(1)	(2)	(3)	(4)
Participate in Physical Activity After School Program	-0.259**	-0.190	0.472*	0.545*
Participation in Other After School Program	-0.019	-0.020	0.045	-0.048
Fit in Year 1	1.572***	1.699***	2.017***	2.136***
Female	0.192	0.230	0.592**	0.587**
Grade 5 (reference)				
Grade 7	0.603***	0.738***		
Female * Grade 7	-0.985***	-1.061***		
Parent Ed HS Diploma (reference)				
Parent Ed Less than HS	0.061	0.109	-0.097	-0.222
Parent Ed College	0.543***	0.606***	0.702**	0.884**
Parent Ed Miss	-0.137	0.048	-0.098	-0.336
Free/Reduced Price Lunch	-0.057	0.034	0.691**	1.051***
Special Ed	-0.031	-0.009	0.279	0.466
White and not EL (reference)				
Latino and not EL	-0.257	-0.196	-0.400	-0.705*
Latino and EL	-0.470**	-0.432**	-0.754	-1.275**
Other Ethnicity and not EL	-0.173	-0.101	0.062	0.314
Other Ethnicity and EL	-1.128***	-0.886**	-1.158	-1.361
CST ELA Basic (reference)				
CST ELA Below Basic	0.191	0.114	-0.228	-0.296
CST ELA Proficient	0.280*	0.206	0.563*	0.686*
CST Math Basic (reference)				
CST Math Below Basic	-0.376**	-0.431***	-0.103	0.185
CST Math Proficient	0.312**	0.366**	0.371	0.498
Low School Attendance	-0.271	-0.269	-0.469	-0.816
Medium School Attendance	-0.266**	-0.202	-0.778**	-0.766**
High School Attendance (reference)				
School dummy variables	No	Yes	No	Yes
N	2,186		484	

Notes: (1) Fitness and CST tests are from the base year of the analysis. (2) School attendance is averaged over the first two years. (3) Survey data regressions include only a fifth grade cohort. (4) \*\*\*p<.01, \*\*p<.05, \*p<.10.

**Table 8. Effects of After School Participation on Post-Participation Physical Fitness for Specific Subgroups (Administrative Data Only)**

	Administrative Data			
	Latino	Free and Reduced Price Lunch	Attend Schools with ASES	Unfit in Base Year
Participate in Physical Activity After School Program	-0.171	-0.105	-0.181	-0.310
Participation in Other After School Program	-0.166	-0.158	0.008	-0.012
Physically Fit in Base Year	1.705***	1.601***	1.639***	
Female	0.204	0.054	0.139	0.455***
Grade 5 in year 1 (reference)				
Grade 7 in year 1	0.990***	0.781**	0.591*	0.204
Female * Grade 7 in year 1	-1.112***	-0.860***	-0.948***	-0.941***
Parent Ed HS Diploma (reference)				
Parent Ed Less than HS	0.038	0.130	0.149	0.204
Parent Ed College	0.770***	0.323	0.520***	0.727
Parent Ed Miss	-0.007	0.511	-0.094	0.388
Free/Reduced Price Lunch	0.329*		-0.151	0.161
Special Ed	0.041	-0.075	0.102	0.184
White and not EL (reference)				
EL	-0.297*			
Latino and not EL		0.610*	-0.146	-0.178
Latino and EL		0.213	-0.420*	-0.370
Other Ethnicity and not EL		0.528	-0.008	0.140
Other Ethnicity and EL		-0.422	-0.852*	-1.187*
CST ELA Basic (reference)				
CST ELA Below Basic	0.189	0.244	0.091	0.158
CST ELA Proficient	0.248	0.170	0.290*	0.239
CST Math Basic (reference)				
CST Math Below Basic	-0.372*	-0.317	-0.599***	-0.444*
CST Math Proficient	0.401**	0.470**	0.183	0.276
Low School Attendance	0.097	-0.139	-0.270	-0.124
Medium School Attendance	-0.190	-0.288	-0.309**	-0.184
High School Attendance (reference)				
School dummy variables	Yes	Yes	Yes	Yes
N	1,303	1,158	1,477	943

Notes: (1) Fitness and CST tests are from the base year of the analysis. (2) School attendance is averaged over the first two years. (3) Survey data regressions include only a fifth grade cohort. (4) \*\*\*p<.01, \*\*p<.05, \*p<.10.

**Table 9. Effects of Youth Development Indicators on Post-Participation Physical Fitness (Survey Data)**

	(1)	(2)
Participate in Physical Activity After School Program	0.461*	0.615**
Participation in Other After School Program	0.016	-0.074
Academic Efficacy Scale – medium	0.177	0.224
Academic Efficacy Scale – high	0.484	0.415
Mastery Goal Orientation Scale– medium	0.702**	0.855**
Mastery Goal Orientation Scale– high	-0.260	-0.297
Performance Approach Scale– medium	-0.090	0.049
Performance Approach Scale– high	0.529	0.769
School-wide sense of care– medium	-0.255	-0.284
School-wide sense of care– high	-0.174	-0.057
Classroom sense of care– medium	0.552*	0.540*
Classroom sense of care– high	0.772**	0.751**
School Dummies	No	Yes
N	484	

Notes: (1) Regressions also include all variables shown in Table 7. (2) Reference group for each scale is low score. (3) \*\*\*p<.01, \*\*p<.05, \*p<.10.

**Appendix 1. Survey Youth Development Scales**

<b>Scale</b>	<b>Academic Efficacy Scale</b>	<b>Mastery Goal Orientation Scale</b>	<b>Performance Approach Scale</b>	<b>School-Wide Sense of Care</b>	<b>Classroom Sense of Care</b>
<b>What Scale Measures</b>	Students' sense of competence in their academic abilities	Students' own goals for learning: learning for the sake of learning	Students' feelings of connection and belonging in school as a whole	Students' feelings of care within their classroom	Students' feelings of care within their classroom
<b>Survey Questions</b>	I'm sure I can master the skills taught in [ ] class this year.	It's important to me that I learn a lot of new concepts in [ ] class this year.	It's important to me that other students in my [ ] class think I am good at my class work.	People care about each other in this school.	In [ ] class we are often allowed to discuss our work with classmates.
	I'm sure I can figure out how to do the most difficult work in [ ] class.	One of my goals in [ ] class is to learn as much as I can.	One of my goals is to show others that I'm good at my work in [ ] class.	My school is like a family.	In [ ] class we are encouraged to share ideas with one another.
	I can do almost all the work in [ ] class if I don't give up.	One of my goals is to master a lot of new skills in [ ] class this year.	One of my goals is to show others that work is easy for me in [ ] class.	Teachers and students treat each other with respect in this school.	In [ ] class we get to ask other students when we need help with our work.
	Even if the work is hard, I can learn it.	It's important to me that I thoroughly understand my work in [ ] class.	One of my goals is to look smart in comparison to other students in my [ ] class.	Students in this school help each other, even if they are not friends.	
	I can do even the hardest work in [ ] class if I try.	It's important to me that I improve my skills in [ ] class this year.	It's important to me that I look smart compared to others in my [ ] class.		

Note: Surveys asked about students’ views and beliefs in different types of classes, which were randomly assigned to respondents.