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The Use of Refundable Tax Credits to Increase Low-Income Children's After-School Physical Activity Level

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Abstract

Objective—The present study investigates the extent to which a refundable tax credit could be used to increase low income children's after-school physical activity levels.

Methods—An experimental study was conducted evaluating the effectiveness of an intervention offering a simulated refundable tax credit to parents of elementary school-age children (n=130) for enrollment in after-school physical activity programs. A randomized-controlled design was used, with data collected at baseline, immediately following the four month intervention (post-intervention), and six-weeks after the end of the intervention (follow-up). Evaluation measures included: (a) enrollment rate, time spent, weekly participation frequency, duration of enrollment and long term enrollment patterns in after-school physical activity programs; and (b) moderate-to-vigorous physical activity (MVPA).

Results—The simulated tax credits did not significantly influence low- income children's rates of enrollment in after-school physical activity programs, frequency of participation, time spent in after-school physical activity programs, and overall moderate-to-vigorous intensity physical activity at post-intervention or follow-up.

Conclusion—The use of refundable tax credits as incentives to increase participation in after-school physical activity programs in low-income families may have limited effectiveness. Lawmakers might consider other methods of fiscal policy to promote physical activity such as

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direct payment to after-school physical activity program providers for enrolling and serving a low-income child in a qualified program, or improvements to programming and infrastructure.

Keywords

obesity; children physical activity; tax credits

BACKGROUND

One-third of children and adolescents in California are either obese or overweight.[1] Low-income children are particularly at excess risk of obesity,[2] a phenomenon partly attributed to lower physical activity levels[3] and increased sedentary behavior.[4] A particular area of concern is the disparity in physical activity levels by income level in the after-school context. Children from lower income families are significantly less likely than children from higher income families to report involvement in organized after-school physical activity programs.[5] Studies found the participation rate in after-school organized physical activity programs of children and youth in low-income urban areas is less than 20% compared to more than 80% for children and youth in more well off suburbs.[6, 7] Enrollment in after-school physical activity programs is positively associated with physical activity, with children attending after-school programs engaging in twenty minutes of moderate-to-vigorous physical activity, on average, during that period.[8] Thus, children enrolled in after-school physical activity programs have the potential to accumulate more total physical activity than children who are not enrolled in such programs.[9]

Financial incentives may be used to increase children's enrollment in after-school physical activity programs. To explore behavioral change of a financial incentive on children's level of physical activity in the after-school setting, this study utilized the economic theory of household production.[10] Under the household production theory, individuals consume resources to produce household commodities (e.g. health status) that maximize well-being. By allocating different amounts of time to various activities (e.g., physical activity leisure vs. sedentary leisure), individuals are able to maximize their utility towards lifetime well-being.

Young children's time allocation is largely dependent on decisions made by their parents, thus, to affect children's time allocation it is necessary to influence parental decision making. However, the parents' decision regarding their children's time allocation is subject to budgetary constraints. If the price of an activity is altered, parents will reallocate expenditures and time. Similarly, if the price of after-school physical activity programs falls while the prices of other sedentary after-school leisure activities remain constant, we may expect parents to reallocate their budget in order to “buy” for their children more of the after-school physical activity programs and less of sedentary leisure time activities.[11]

Cost is considered one of the more significant barriers facing low income parents in supporting their children to engage in after-school physical activity.[12, 13, 14, 15, 16] One way to reduce the cost barrier is to offer financial incentives for enrolling low income children in after-school physical activity programs. Facilitating financial incentives, particularly cash incentives, can significantly improve healthy behaviors.[17] A financial incentive to engage in

a certain behavior may be created through a tax legislation. Few studies have examined the impact of tax legislations on healthy eating habits of people.[18, 19, 20] However, no study to date has examined the impact a refundable tax credit may have on the promotion of physical activity.[11] This study explores a new and as yet untested approach for combating childhood obesity rates among low-income children by examining the potential impact refundable tax credits may have on these children's participation level in organized after-school physical activity program.

A refundable tax credit provides the taxpayer with a supplement payment when the tax credit amount exceeds the tax liability. Hence, a refundable tax credit is particularly helpful for taxpayers at the lowest end of the income spectrum.[21] It enables low and moderate income taxpayers to receive a refund check from the government if the tax credit amount is larger than the taxpayer's income tax liability.[22]

Research Questions and Hypotheses

Our overall hypothesis is that tax legislation that offers a refundable tax credit to parents who enroll their children in organized after-school physical activity would reduce the cost barrier that currently deters some low-income parents from enrolling their children in such activities, and thus promote more children to engage in after-school physical activity programs. Our specific hypotheses are as follows:

Hypothesis 1: Rates of enrollment in after-school physical activity programs, maintenance of enrollment for the duration of the four-month intervention, and continuation of enrollment six weeks after the end of the intervention will be higher for children in the treatment group.

Hypothesis 2: Children in the treatment group will attend after-school physical activity programs at a significantly higher rate per week and will report a higher amount of time spent on after school physical activity than participants in the control group.

Hypothesis 3: Children in the treatment group will increase their daily moderate to vigorous physical activity level (MVPA).

METHODS

Data Collection Protocol

Data was collected at baseline, following the four month intervention, and six-weeks after the end of the intervention. A formal intervention was introduced between the first two measurement occasions. Participants that were randomly selected to take part in the treatment group were given a letter stating that they will receive up to $200 reimbursement following the enrollment of their elementary school-aged child in a qualified after-school physical activity program of their choice. This amount was chosen because a $200 reimbursement would cover approximately half of the average cost of a two day per week after school physical activity program over a four month period. Fifty percent refundable tax credit has been estimated previously to have a large impact on the behavior of low-income uninsured taxpayers in the context of health insurance acquisition.[25] A qualified program for the purposes of our intervention was one that encourages children to strive towards at least

30 minutes of sustained moderate to vigorous physical activity per session, be supervised by an adult, and suitable for children. Eligible programs must last at least eight weeks, and meet at a minimum of one session per week. To receive the $200, parents must sign up their child to a qualified physical activity program, obtain a receipt from the organization providing the program, and complete, sign and submit a claim form. To simulate the burdens associated with receipt of a tax credit, the claim form that the parents were required to complete as part of this study was a one page form requiring similar information that they would be required to provide in a tax return seeking a tax credit. The form asked for the following set of information: child's name, organization name & address, type of physical activity program/s (soccer, swimming, etc.), dates of enrollment, and amount paid & date paid. Similar to a tax refund claim, the parents participating in the intervention, who fulfilled the requirements for reimbursements, receive their reimbursement within six to ten weeks after submitting the form. Children randomized to the control group received no invitation to the tax credit.

Sample

Our study population included low-income children between the age of 6 and 11 years old (1st through 5th grade). Eligibility in the federally funded free or reduced lunch program served as a proxy for low-income household, [23] and all 1st-5th grade students enrolled in the three schools receiving free or reduced lunch program were invited to participate in the study. This age group was selected because early childhood years are the most crucial years for shaping attitudes and behaviors,[24] overweight status at that age is linked with an increased risk of coronary heart disease in adulthood,[25] and because parental influence appears to be robust during that period in a child's life.[2627]

Participants were recruited from three elementary schools in a suburb of Los Angeles. All three schools are public schools within the Los Angeles Unified School District, located only a few miles apart in the San Fernando Valley. The schools are Title 1 schools serving similar diverse student population: 30% Latino; 25% White; 14% Asians; and 13% Blacks. The student population is primarily low-income, with approximately half of enrolled students participating in the federally funded reduced or free lunch program. Students across schools are exposed to similar in-school physical education curriculum of one hour per week. One important distinction between the three schools is the availability and accessibility of after-school physical activity programs. In one school there was no after school physical activity programs available. In the second school, there was an after school physical activity program available for a fee. In the third school, there was an after school physical activity program that was free of charge. This allowed us to examine the effect of simulated tax incentive in different environments.

All those individuals, who were invited to participate in our study and who consented to participate, were allowed to join our study and were part of our sample. Students were aggregated in each of the three schools and then randomized. Randomization was performed within each schools using a randomization software, Research Randomizer.[28] A total of 64 participants were assigned to the treatment group and 66 were assigned to the control group. The Human Subjects Protocol and Informed Consent was approved by the university's Human Subjects Committee.

Measures

Measures used to assess the efficacy of the simulated refundable tax credit were: (a) enrollment rate in after-school physical activity programs; (b) time spent participating in after-school physical activity programs; (c) weekly participation frequency in the after-school physical activity programs; (d) duration of enrollment (in weeks) in after-school physical activity programs; (e) moderate-to-vigorous physical activity (MVPA); and (f) long term enrollment patterns in after-school physical activity programs. With the exception of the MVPA, all measures were exclusively collected using self-reported data provided by the children's parents. MVPA was collected using time diaries completed by the children's parents and by data collected using accelerometers. Data were collected from the participants at baseline, post-intervention (four months after baseline) and follow up stage of the study (six weeks after post-intervention). In one school we were unable to collect follow up data because school year ended prior to the follow-up period.

Parents completed a survey at baseline asking demographic and family characteristics and their children's enrollment in after-school physical activity programs, including the frequency of attendance and the duration of the after school physical activity programs which they were enrolled. Demographic characteristics included race/ethnicity, child's age, parent's marital status, parent's level of education, acculturation, household size, vehicle ownership, and number of hours the parent worked per week. Acculturation was measured using the proxy of American citizenship to discern differences between recent immigrants and those who were either born in the United States or became naturalized citizens, which requires U.S. residence for at least five years. Marital status was dichotomized (1=married; 0=other) consistent with previous research that detected differences between married and non-married groups relative to their physical activity level.[29] Education was categorized into: less than high school graduate, high school graduate, some college/associate's degree, college graduate, and post-graduate education. The number of hours worked by the parent was divided into five categories: 1) 0 hours; 2) <35 hours; 3) 35-40 hours; 4) 41-50; and 5) >50 hours. The reference category was 35-40 hours worked per week.

Parents completed time diaries for a week to assess the allocation of their children's time. These time diaries were given to the parents to complete in privacy, asked questions about the child's activities over a 24-hour period beginning at midnight of a randomly designated day. These questions asked the primary activity that was going on at that time, when it began and when it ended. Substantial methodological work has established the validity and reliability of data collected in time-diary form for children.[30] Primary activities of children were classified into 18 major categories previously used and validated.[31] Exercise reported in the diaries were coded using the task codes and corresponding metabolic equivalent of task [MET] values established in The Compendium of Energy Expenditures for Youth.[32] The research assistants (RAs) worked in teams of two to input the time engaged in an activity (in minutes) and the code and MET values that corresponds to the activity. Both members of the team had to agree on the code and MET value. If a team of RAs could not agree on a code, then the faculty director of the research lab was consulted. For the outcome of MVPA, MET values that were equal to or greater than 4.0 were averaged to compute an average energy expenditure for a weekday and for a weekend day were calculated. Each

participant received a $10 gift certificate for completing the time-diary instrument and survey.

Assessment of the children's MVPA level was obtained from Actigraph GT2Maccelerometers, which have previously been validated for assessment of physical activity among elementary school-aged children.[33] Baseline assessment was collected prior to the implementation of the intervention. Children wore the accelerometer for seven consecutive days. Children were asked to wear the accelerometers on their waist, on the right hand side during waking hours only. The participants did not complete an accelerometer log. Given the limited number of accelerometers available, only a third of children from the control group and the treatment group were asked to wear the accelerometer. The participants received $10 for each one week of accelerometer data retrieved.

Analysis of Accelerometer Data—A child's accelerometer record was included in the analysis if there were at least 4 complete days of data available, taken as the minimum needed to obtain a reliable measurement of habitual physical activity in children (reliability of 0.80).[34] We defined a complete day as ≥7 hour of data, after excluding periods in the day when the accelerometer appeared not to have been worn. Although 10 hours of worn time is often used, the reliability between 7 and 10 hours is not substantially different.[35] In practice, wear time was usually greater than 7 hours. Nonwear time was identified from the data by periods of ≥20 minutes of consecutive zero counts, making it unlikely that the monitor was worn.[36] MVPA thresholds (in counts per minute) were defined using age-specific prediction equations posed by Freedson.[3738] A threshold for moderate activity of 4 METs was used for children to account for higher resting energy expenditure in children and youth.[3940]

Analysis

Participant and family characteristics were described and reviewed for possible inconsistencies between groups. Attrition and missing data rates were examined and rate of attrition between groups was compared using Fisher's exact χ^2 tests. Analyses were performed with SPSS v.21; *a priori* $\alpha = 0.05$ for all analyses.

Due to the data structure of this randomized trial, whereby randomization and treatment assignment was at the family level, all analyses were performed using statistics appropriate for nested data to account for similarity within family members. Thus analyses were performed at the family level, not the individual level, though for most families, there was only a single child. To test difference by group in prevalence of enrollment and maintenance in after-school physical activity programs (Hypothesis 1), the rates of children (a) enrolled in after school activity, (b) maintained in the programs through 4 months, and (c) continued to enroll were compared using binary logistic and generalized estimating equations were computed. To test the difference by group in attendance of activity programs and (amount of time spent on after school activity), as well as moderate to vigorous physical activity (MVPA) (Hypothesis 2 & 3), repeated linear mixed effects modeling were applied, to account for the same nesting issues described above. *A priori* covariates included perceived child health status (ordinal), , and child and family characteristics (e.g., race/ethnicity

(Latino/not Latino), child's age, parent's marital status (Married/not Married), Parent education (ordinal scale), family income, number of cars in the household, number of hours worked (ordinal), born in the USA. In addition to the primary factor (treatment group), school × group effects were tested. This effect modifier was important, as each school had different support for after school physical activities.

RESULTS

Retention

Across the three schools, 130 participants were randomized by family unit—64 into the intervention group 66 into the control group. Figure 1 shows the study flow through the three data collection points for the study for each group, and broken down by school. Six week follow-up data were only available for two out of the three schools (follow up data was not available in the school that offered a free after-school physical activity program). Through the post-intervention time point, there were comparable attrition rates between intervention and control groups. Fifteen percent of participants who were randomized did not return for baseline evaluation; attrition at post-intervention was 26% and 41% at 6-week follow up. Of those who participated in the baseline evaluation ($Z = 0.3$, $p = 0.75$), and 89% of intervention participants and 84% of control participants who completed the baseline also completed the post-intervention assessment ($Z = 0.8$, $p = 0.44$); at 6-week follow- up assessment participation within the control group was 77% versus 65% of intervention group participants ($Z = 1.2$, $p = 0.24$).

Participant characteristics

Table 2 shows demographic and family characteristics by study group. The groups were comparable with the exception of Latino ethnicity: Seventy-five percent of parents in the intervention group reported being Latino, while 55% reported Latino ethnicity in the control group ($Z = 2.1$, $p = 0.03$).

Enrollment in After-School Physical Activity Programs (Hypothesis 1)

Table 3 compares the rates of enrollment in after-school physical activity programs at post-intervention and follow-up between groups. After controlling for covariates, group differences in after-school physical activity program enrollment were not statistically significant for either time point. However, the OR was 1.8 (95% CI = 0.2–17.2) for after-school physical activity program enrollment at post-intervention suggesting that children in the intervention group were 80% more likely to be enrolled in an after-school physical activity program at the end of the intervention than the control group. The direction of effect shifted when examining continued after-school physical activity program enrollment at the 6-week follow-up (OR = 0.8, 95% CI = 0.6–9.7), with the intervention group being 20% less likely to continue to enroll after 6 weeks. Child health was a significant predictor of enrollment in a physical activity program at the post-intervention time point (OR = 2.0, 95% CI = 1.2–3.5).

Frequency and Time Spent *in* After-School Physical Activity Programs (Hypothesis 2)

Table 4 compares the number of times children attended after school physical activity programs per week (i.e., attendance) and the total time spent (in minutes) in after-school physical activity programs between groups at the post-intervention and follow-up. After controlling for covariates, group differences in times per week of attendance to after-school physical activity programs were not statistically significant. However, there was a trend in the group x school interaction for times per week of attendance to after-school physical activity programs at the post-intervention assessment ($F_{99} = 2.94$, $p = 0.06$). As shown in Figure 2, the intervention group attended statistically more sessions per week than the control in the school with the fee-based after-school physical activity program than the school that did not offer any after-school physical activity programs ($t_1 = 2.36$, $p = .02$), with the group differences in total time spent in after school physical activity programs during the intervention did not differ between groups.

MVPA (Hypothesis 3)

Group comparisons in descriptive statistics for average MVPA min·day^{-1} (measured by accelerometer) at the post-intervention and follow-up time points are shown in Table 5. After controlling for covariates, group differences in average MVPA min·day^{-1} were not statistically significant for either time point. However, average MVPA min·day^{-1} was significantly lower among children whose parents were not married ($\beta = -39.4$, $\beta = -54.4$, $p = .08$) and at post-intervention and follow-up, respectively.

DISCUSSION

This study used a randomized controlled trial design to test the effectiveness of a simulated tax incentive program at increasing low-income children's participation in organized after-school physical activity. A number of national- and state-level governing bodies have either proposed or implemented the use of tax incentives to promote physical activity.[41,42] However, only one study to date has directly evaluated the impact of a non-refundable tax incentive on physical activity, but results did not offer support for its effectiveness.[43] Results of the current study indicate that the simulated tax credits did not significantly influence low-income children's rates of enrollment in after-school physical activity programs, frequency of participation and time spent in after-school physical activity programs, or overall moderate-to-vigorous intensity physical activity at post-intervention or follow-up. However, there was a post-intervention trend suggesting that children eligible for the simulated tax credits were 80% more likely than children in the control group to have enrolled in an after-school physical activity program. Given that our post-hoc power was rather low, these findings are in line with a small yet emerging body of evidence suggesting that low-income families may not benefit from tax credit programs to promote children's physical activity.[42,44] In a recent analysis of the Children's Fitness Tax Credit (CFTC) system in Canada, a federal policy implemented in 2007 offering a non-refundable tax credit of up to $500 to register a child in an eligible physical activity program, low-income families were less aware of and less likely to claim the tax credit.[43] Post-hoc analyses of the current study, found that 21% of families submitted the paperwork to receive the $200 in monetary credit to cover the costs of enrollment in physical activity programs. This rate is

similar to the 28% of families in the lowest income quartile claiming the CFTC in the 2007 tax years in the large Canadian study.[43]

The simulated refundable tax credit examined in this study may have placed an undue burden on the participants because the estimated sufficiency of covering half of the anticipated costs of the programs may not have been enough of a financial relief to the participants. Families were required to cover the costs of the physical activity program out of pocket up front. For many low-income families, these initial costs might have been prohibitive, regardless of the opportunity for delayed reimbursement. While prior studies have found cash subsidies to have an impact on certain health behaviors,[17] those studies have only looked at direct assistance to the individual where the individual did not have to front the money in order to engage in the targeted health behavior. The 2007 Canadian CFTC study concluded that tax credits appear to only benefit taxpayers who are wealthy enough to afford to pay upfront costs of a physical activity program and wait for reimbursement following the end of the tax year.

An important finding in the current study was the observed difference in the effectiveness of the simulated tax credit program across schools. The simulated tax credit intervention appeared to be the most effective in the school that only offered a fee-based after-school physical activity program. As compared with schools that offered free or no after-school physical activity programs, there were larger group differences observed in the school offering fee-based programming, with the simulated tax incentive intervention group showing greater participation in after-school physical activity programs in terms of the number of sessions attended per week and the total number of sessions attended. These findings suggest that in order for tax credits to be incentivizing, reimbursable physical activity programs may need to be readily available (e.g., offered on site) and not necessarily require additional time and transportation costs, as suggested by economic models.[41]

Taken together, these findings may have some relevant implications for future tax policies to promote physical activity. First, as also suggested by others, tax credit policies for participation in qualified physical activity programs utilizing delayed reimbursement (i.e., refundable tax credit) or income tax reduction methods (i.e., tax deduction) may do little to ultimately reduce income-related disparities in physical activity and obesity.[4,243] Some have argued that these types of programs may even go so far as to increase inequities because higher income families, with more expendable income up front and higher income tax payments, may be more likely to take advantage of them.[43] Instead, it has been recommended that funds may be better spent subsidizing physical activity programming to lower or eliminate up-front costs through direct payments to the service providers, and building new and improving existing physical activity infrastructure such as parks and playgrounds.[43] However, the current study is the first known to test the effectiveness of a simulated tax credit program to promote children's physical activity through a rigorous RCT. Results need to be replicated in other studies before any definitive conclusions can be made.

Despite the strengths of the study design, including a randomized control group; multiple follow-up measurements; and objective physical activity and anthropometric measures; this study had a few limitations. First, it was not adequately powered to detect some of the small

effect sizes that were observed. A priori power analyses were based on the sample size (N = 144) necessary to detect a medium effect size of .5 (assuming 80% power and a two-sided significance level of 0.05), which had been observed in previous school- and community-based interventions to increase physical activity.[45] Also, challenges with recruitment and greater attrition than expected further reduced the sample size at the follow-up time point (n = 54) from what was planned in the original power calculation (n = 128 after attrition). Furthermore, accelerometers could only be used in a subsample due to cost restrictions, further limiting the ability to detect significant group difference in objectively-measured physical activity level. The limited use of accelerometers also increased the reliance on self- and parent-reported physical activity outcomes, which may be prone to recall errors and biases[4647]Another potential limitation was the use of simulated instead of *actual* tax credits. It is not known whether families would behave differently in response to the implementation of a true tax credit system. Also, the study was limited in exploring a single tax credit amount. Future studies may test different amounts of tax credits, thereby determining whether a behavior response may result from a different incentive level. Lastly, this study was conducted in primarily low-income, Hispanic families residing in Southern California. While we did manage to target an at-risk population, the extent to which results generalize to other populations, settings, and regions of the country is unknown.

Results from the current study suggest that the use of refundable tax credits as incentives to increase participation in after-school physical activity programs in low-income families may have limited effectiveness. It appears that the promise of reducing parents' taxes in the future is not enough to encourage their children to exercise now. Lawmakers might consider other methods of fiscal policy to promote physical activity such as direct payment to an after-school physical activity program provider for enrolling and serving a low-income child in a qualified program, or improvements to programming and infrastructure.

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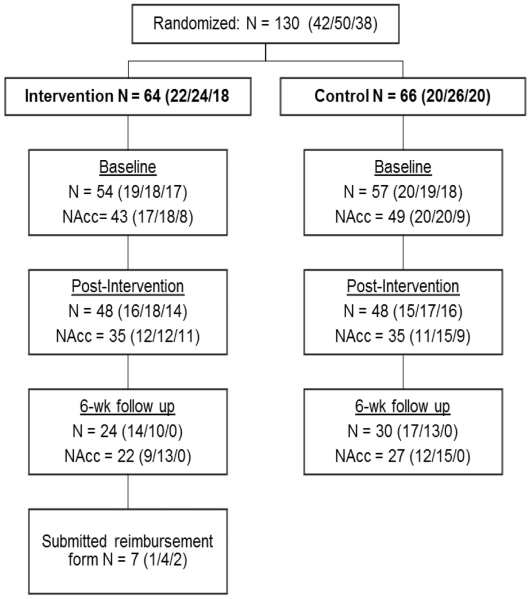

Note. N's in parentheses represent schools (Knollwood/Dearborn/Lorne); N_{Acc} = N for accelerometers; No 6-wk data was collected at Lorne

Figure 1.
Study Flow

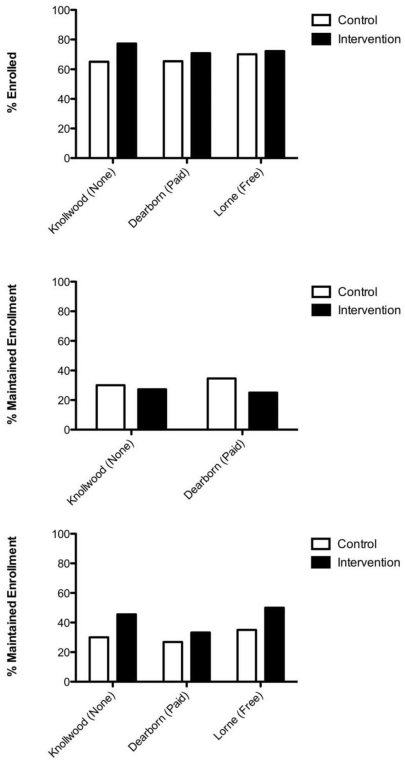

Figure 2.
Hypothesis 1 by School and Group

Table 1

Number of Classrooms and Participants in Each of the Three Schools

	Elementary School Offering no After School Physical Activity Program	**Elementary School Offering After School Physical Activity Program for a Fee**	**Elementary School Offering After School Physical Activity Program for Free**
1st Grade	3 (n=6)	2 (n=4)	3 (n=5)
2nd Grade	3 (n=10)	3 (n=11)	2 (n=3)
3rd Grade	1 (n=3)	4 (n=9)	5 (n=6)
4th Grade	3 (n=15)	4 (n=11)	5 (n=14)
5th Grade	3 (n=6)	2 (n=3)	4 (n=5)
Total	13 (n=40)	13 (n=38)	19 (n=35)

Table 2

Participant Characteristics by Treatment Group

		Control		Intervention	
		N	%	N	%
School	*Elementary School Offering no After School Physical Activity Program*	20	30.3%	22	34.4%
	Elementary School Offering After School Physical Activity Program for a Fee	26	39.4%	24	37.5%
	Elementary School Offering After School Physical Activity Program for Free	20	30.3%	18	28.1%
Gender	*Male*	24	41.4%	26	47.3%
	Female	34	58.6%	29	52.7%
Student Grade	*1*	7	12.3%	8	14.5%
	2	16	28.1%	8	14.5%
	3	9	15.8%	9	16.4%
	4	21	36.8%	19	34.5%
	5	4	7.0%	11	20.0%
Sex of the student's parent who completed exercise diary	*Male/Father*	7	13.2%	6	11.8%
	Female/Mother	46	86.8%	45	88.2%
Marital status of the student's parent	*Single*	12	23.1%	15	28.8%
	Married	31	59.6%	31	59.6%
	Divorced	6	11.5%	4	*7.7%*
	Separated	3	5.8%	2	3.8%
	Widowed	0	0.0%	0	0.0%
Married/not married	*Not Married*	21	40.4%	21	40.4%
	Married	31	59.6%	31	59.6%
Parent's education level	*No formal education*	0	0.0%	0	0.0%
	Some grade school	0	0.0%	0	0.0%
	Grade school	3	5.6%	2	3.8%
	Some middle school	0	0.0%	1	1.9%
	Middle school	5	9.3%	0	0.0%
	Some high school	1	1.9%	4	7.7%
	High school graduate	11	20.4%	11	21.2%
	Some college	22	40.7%	22	42.3%
	College graduate	8	14.8%	7	13.5%
	Some graduate school	0	0.0%	1	1.9%
	Graduate School	4	7.4%	4	*7.7%*
Parental education	*< High School graduate*	9	16.7%	7	13.5%
	High school graduate	11	20.4%	11	21.2%
	Some college	22	40.7%	22	42.3%
	College graduate	8	14.8%	7	13.5%

		Control		Intervention	
		N	**%**	**N**	**%**
	Post-graduate	4	7.4%	5	9.6%
Parent's race	*African American/Black*	4	7.5%	2	3.8%
	Asian	1	1.9%	1	1.9%
	Hispanic/Latino	28	52.8%	38	73.1%
	White	17	32.1%	8	15.4%
	Other	3	5.7%	3	5.8%
Latino	*No*	23	45.1%	13	25.5%
	Yes	28	54.9%	38	74.5%
Number of Cars	*0*	2	3.7%	0	0.0%
	1	26	48.1%	17	33.3%
	2	22	40.7%	25	49.0%
	3	3	5.6%	8	15.7%
	4	1	1.9%	1	2.0%
		N	**M±SD**	**N**	**M±SD**
Child Age		58	10.1±1.2	55	10.3±1.4
Family Income ($k)		52	40.0±29.7	43	37.7±18.3
Work hours/week		51	26±19	49	28±20
		N	%	**N**	%
Work hours/week categories	*0*	12	23.5%	11	22.4%
	<35	11	21.6%	12	24.5%
	35-40	21	41.2%	18	36.7%
	41 - 50	6	11.8%	5	10.2%
	>50	1	2.0%	3	6.1%
Birth country	*Foreign born*	30	55.6%	26	54.2%
	US Born	24	44.4%	22	45.8%

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Table 3

Univariate predi ctorof outcomes in Hypothesis 1

		Hyp 1A: Enroll					Hyp 1B: Maintain enrollment					Hyp 1C: Continue to enroll				
		No		Yes			No		Yes			No		Yes		
Categorical Predictors		**N**	**%**	**N**	**%**	**P**	**N**	**%**	**N**	**%**	**P**	**N**	**%**	**N**	**%**	**P**
Group	*Control*	22	33.3	44	66.7	0.45	46	69.7	20	30.3	0.20	51	77.3	15	22.7	0.67
	Intervention	17	26.6	47	73.4		37	57.8	27	42.2		52	81.3	12	18.8	
School	Elementary School Offering no After School Physical Activity Program	12	28.6	30	71.4	0.93	26	61.9	16	38.1	0.48	30	71.4	12	28.6	.53
	Elementary School Offering After School Physical Activity Program for a Fee	16	32.0	34	68.0		35	70.0	15	30.0		35	70.0	15	30.0	
	Elementary School Offering After School Physical Activity Program for Free	11	28.9	27	71.1		22	57.9	16	42.1		–	–	–	–	
Sex	*Male*	18	36.0	32	64.0	0.84	28	56.0	22	44.0	0.70	38	76.0	12	24.0	1.00
	Female	21	33.3	42	66.7		38	60.3	25	49.7		48	76.2	15	23.8	
Country of Birth	*Not USA*	20	35.7	36	64.3	0.68	33	58.9	23	41.1	0.69	39	69.6	17	30.4	0.17
	USA	19	41.3	27	58.7		25	54.3	21	45.7		38	82.6	8	17.4	
Child Health Status	*Fair*	1	2.6	2	3.0	0.27	2	66.7	1	33.3	0.01	3	100.0	0	0.0	0.08
	Good	12	30.8	9	13.6		16	76.2	5	23.8		18	85.7	3	14.3	
	Very Good	10	25.6	18	27.3		18	64.3	10	35.7		22	78.6	6	21.4	
	Excellent	16	41.0	37	56.1		22	41.5	31	58.5		37	69.8	16	30.2	
Parent marital Status	Not Married	13	34.2	29	43.9	0.41	19	45.2	23	54.8	0.11	33	78.6	9	21.4	0.65
	Married	25	65.8	37	56.1		38	61.3	24	38.7		46	74.2	16	25.8	
Number of cars	0	2	5.1	0	0.0	0.75	2	100.0	0	0.0	0.05	2	100.0	0	0.0	0.79
	1	13	33.3	30	45.5		19	44.2	24	55.8		31	72.1	12	27.9	
	2	17	43.6	30	45.5		28	59.6	19	40.4		35	74.5	12	25.5	
	3	5	12.8	6	9.1		7	63.6	4	36.4		9	81.8	2	18.2	
	4	2	5.1	0	0.0		2	100.0	0	0.0		2	100.0	0	0.0	
Work hour per week	*0*	9	23.7	14	22.6	0.96	12	52.2	11	47.8	038	16	69.6	7	30.4	0.30
	<35	10	26.3	13	21.0		12	52.2	11	47.8		17	73.9	6	26.1	
	35-40	9	23.7	30	48.4		22	56.4	17	43.6		32	82.1	7	17.9	

		Hyp 1A: Enroll					Hyp 1B: Maintain enrollment					Hyp 1C: Continue to enroll				
		No		Yes			No		Yes			No		Yes		
Categorical Predictors		**N**	**%**	**N**	**%**	**P**	**N**	**%**	**N**	**%**	**P**	**N**	**%**	**N**	**%**	**P**
	41-50	7	18.4	4	6.5		7	63.6	4	36.4		9	81.8	2	18.2	
	>50	3	7.9	1	1.6		3	75.0	1	25.0		3	75.0	1	25.0	
Parent education	*<HS*	6	15.4	10	14.9	0.15	8	50.0	8	50.0	0.86	13	81.3	3	18.8	0.67
	HS	9	23.1	13	19.4		13	59.1	9	40.9		16	72.7	6	27.3	
	Some College	18	46.2	26	38.8		25	56.8	19	43.2		34	77.3	10	22.7	
	BA/BS	3	7.7	12	17.9		7	46.7	8	53.3		11	73.3	4	26.7	
	Post-graduate	3	7.7	6	9.0		6	66.7	3	33.3		6	66.7	3	33.3	
Latino	*Not Latino*	12	31.6	24	37.5	0.67	18	50.0	18	50.0	1.00	26	72.2	10	27.8	0.47
	Latino/Hispanic	26	68.4	40	62.5		33	50.0	33	50.0		52	78.8	14	21.2	

Continuous	**M**	**SD**	**M**	**SD**	**OR**	**P**	**M**	**SD**	**M**	**SD**	**OR**	**P**	**M**	**SD**	**M**	**SD**	**OR**	**P**
	Hyp 1A: Enroll						**Hyp 1B: Maintain enrollment**						**Hyp 1C: Continue to enroll**					
	No		**Yes**				**No**		**Yes**				**No**		**Yes**			
Predictors																		
Age (yrs)	10.3	1.2	10.1	1.4	0.91	0.51	10.12	1.33	10.28	1.32	1.10	0.50	10.27	1.32	9.93	1.32	0.83	0.25
Number of Cars	1.8	0.9	1.6	0.6	0.76	0.30	1.79	0.83	1.57	0.65	0.68	0.15	1.72	0.80	1.62	0.64	0.83	0.54
Work Hours	28.3	21.4	26.7	17.9	1.00	0.68	29.23	19.56	24.89	18.72	0.99	0.26	27.99	19.41	25.09	18.84	0.99	0.37
Family Income ($k)	35.9	19.8	40.7	27.7	1.01	0.36	37465	22155	40767	28423	1.00	0.52	37811	23335	42358	30023	1.00	0.44

Note. Categorical outcome were tested with χ^2 testsL Fisher's exact for dichotomous, and 1 Pearsons exact for 3+ categories; ordinal outcomes were testd with Somer's D if not symetrical; continuous outcomes were tested with logistic regression modeling.

Table 4

Survey data by group across measurements

	Baseline						Post-Inter vention						Follow-Up					
	Control			Intervention			Control			Intervention			Control			Intervention		
	N	%		N	%		N	%		N	%		N	%		N	%	
How is your child's health?																		
Poor	0	0.0%		0	0.0%		0	0.0%		0	0.0%		1	3.8%		0	0.0%	
Fair	3	5.7%		0	0.0%		3	6.8%		0	0.0%		0	0.0%		0	0.0%	
Good	11	20.8%		10	19.2%		6	13.6%		10	23.3%		8	30.8%		6	26.1%	
Very Good	11	20.8%		17	32.7%		8	18.2%		10	23.3%		4	15.4%		4	17.4%	
Excellent	28	52.8%		25	48.1%		27	61.4%		23	53.5%		13	50.0%		13	56.5%	
Over the past 30 days, has your child walked or bicycled as part of getting to and from school?																		
Yes	17	32.1%		5	10.0%		17	38.6%		10	23.3%		11	42.3%		2	9.1%	
No	36	67.9%		45	90.0%		27	61.4%		33	76.7%		15	57.7%		20	90.9%	
During the last four months, has yo ur child enrolled in an after -school physical activity program?																		
Yes	29	53.7%		32	61.5%		24	54.5%		30	68.2%		18	69.2%		16	69.6%	
No	25	46.3%		20	38.5%		20	45.5%		14	31.8%		8	30.8%		7	30.4%	
	N	**M**	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**
Howm any times per week did you child typically attend the after school physical activity program?																		
	28	3.4	1.9	32	2.8	1.3	24	3.7	1.5	29	2.9	1.6	18	2.7	1.3	16	3.7	1.1
On each of the times that the program meets, how long does it last?																		
	29	81.8	33.7	30	86.0	52.4	24	117.3	86.6	29	85.9	43.7	18	108.1	53.1	15	99.7	50.7
Number of weeks child attended after school physical activity program over the past4 months																		
	28	11.0	5.9	30	10.5	5.3	24	11.5	4.7	30	12.0	4.1	17	13.3	4.5	15	12.0	5.6
Dose for 4 Months (times perw week × length of time × number of weeks):																		
	27	3775	3979	29	2632	3160	24	5339	5203	29	3244	3378	17	4844	4502	14	5468	4336

Table 5

Moderate - Vigorous Activity (Mets) by group across measurements

	Baseline						Post-Intervention						Follow -Up					
	Control			Intervention			Control			Intervention			Control			Intervention		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Exercise Diary (Mets)																		
Week	40	3158	1790	39	3049	1598	25	4105	2332	30	4002	2236	16	50 94	1858	13	4141	2513
Weekday	43	1853	1138	41	1895	1150	26	2741	1615	32	2377	1596	17	27 42	1571	13	2513	1521
Weekend	40	1315	934	40	1164	816	25	1457	1042	30	1609	900	16	21 81	1084	13	1628	1577
Accelerometer (min/day)																		
Daily Average																		
Week	30	86.7	26.1	28	79.5	31.4	18	71.9	27.8	10	83.7	24.9	14	76. 6	29.6	10	71.9	29.4
Weekday	37	83.7	26.1	33	79.1	33.5	20	80.0	37.3	17	83.0	25.6	21	73. 8	30.8	15	75.9	29.1
Weekend	26	78.5	45.4	21	74.8	35.7	17	78.2	45.9	9	77.3	28.7	15	75. 5	37.8	10	69.1	41.1
Percent per week																		
Week	30	3.4%	1.5%	28	3.3%	1.3%	18	2.9%	0.9%	10	3.4%	1.1%	14	3.0%	1.2%	10	3.3%	1.6%
Weekday	37	3.4%	1.6%	33	3.2%	1.3%	20	3.1%	1.3%	17	4.0%	1.6%	21	3.3%	1.4%	15	3.7%	1.6%
After School																		
Average	33	38.0	13.1	30	38.4	19.0	19	39.8	32.8	16	41.6	23.9	19	38. 5	19.9	12	40.3	20.3
Percent	33	3.5%	1.4%	30	3.7%	2.0%	19	3.7%	3.4%	16	4.1%	2.2%	19	3.9%	2.3%	12	3.9%	2.1%

Note. Daily minimum for Accelerometers are as follows 4 days for week and weekday, and 2 days for weekend. After school minimum was 2 days.