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After School Programs and Their Effect on Children's Well-Being

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Abstract

As female labor force participation has gone up, families have turned more and more towards after school programs to provide adult supervision for their children, especially in low income areas. This paper utilizes longitudinal household data to examine the effect of these after school programs on noncognitive outcomes in children, and, in particular, follows the early education literature in using within-family comparisons for identification. I find that children who participate in after school programs are less likely to be depressed, and are more likely to have a high degree of emotional, social, and psychological well-being. Generally, participation is associated in the short-term with 3-10% improvements on scales measuring depression, well-being, and children's self concept. In a limited sample, I also find that these improvements are maintained in the long-term. As these noncognitive measures are shown to affect later-life outcomes such as educational attainment and earnings (Heckman 2006), they are important to study when considering the efficacy of after school programs, but the literature on after school programs so far has focused on cognitive and behavioral outcomes.

1 Introduction

As female labor force participation has gone up, families have turned more and more towards after school programs to provide adult supervision for their children, especially in low income areas (Aizer 2004). There is also evidence that children who must care for themselves after school are at higher risk for behavioral issues such as skipping school and substance abuse (Dwyer *et al.* 1990). Despite these concerns, the Trump administration's 2020 budget proposal included a 12% decrease in federal spending for the Department or Education, eliminating federal funding for 21st Century Community Learning Centers, the federally funded after school program (Balingit and Douglas-Gabriel 2019). Although these budget cuts are unlikely to pass, they reflect skepticism about the importance of after school programs among some policy makers.

Research in medical journals has shown that after school programs are beneficial. These benefits are seen in reduced delinquent behaviors (Gottfredson *et al.* 2004), as well as in improved academic performance and social adjustment (Posner and Lowe Vandell 1994). Much of the existing economic research on childhood development outcomes are focused on programs such as Head Start (Deming 2009; Garces, Thomas, and Currie 2002) or other preschool and early education programs (Yoshikawa and Weiland *et al.* 2013). These studies find long term benefits of this early intervention; however, they are looking at programs that require families to meet certain eligibility requirements, as opposed to after school programs, which are largely voluntary and widely available, and they look at children who participated in the programs from age 3-5, younger than the 6-14 year old group that I study. Therefore, benefits associated with these early intervention programs are most likely not generalizable to after school programs. These studies also focus mainly on educational and professional outcomes. However, research has shown that noncognitive skills may play as large of a role as more traditional cognitive measures on labor market outcomes, schooling decisions, and behavior such as criminal and illegal activity, if not a larger role (Heckman *et al.* 2006). In this direction, Herbst and Tekin (2010) also look at programs designed with preschool children in mind, but include some noncognitive measure in addition to their focus on cognitive outcomes.

Despite the difference in both treatments and outcomes, the Head Start literature has provided insight into the econometric techniques best suited to using nonexperimental data to tease out the effects of early intervention programs, which this paper follows. In particular, the use of siblings as a basis for comparison has been practiced extensively (Currie and Thomas 1995; Garces, Thomas, and Currie 2002; Deming 2009). This comparison ensures that any time invariant family characteristic is differenced out of the regression.

While Head Start and other early intervention programs have been the focus of a wealth of research, there are far fewer sources to turn to when it comes to analyzing after school programs, and certainly no consensus on whether after school programs are beneficial or harmful to the children they serve. In experimental studies the lack of consensus remains: James-Burdumy *et al.* (2008) found that after school programs run as part of the U.S. Department of Education's 21st Century Community Learning Centers were associated with negative behavioral outcomes using a study in which applicants were randomly chosen to participate in after school programs in the United States, while Martinez and Perticara (2018), using a similar method in Chile, find that an experimental design focused on publicly run after school programs shows positive behavioral benefits conditional on the quality of both the after school program itself and other locally available alternatives for care. Both studies also acknowledge the lack of research into this area of childhood care. The issue is addressed from an adult supervision perspective by Aizer (2004) who finds that adult supervision is associated with a decrease in a number of risky behaviors such as skipping school or using alcohol or drugs.

In this paper, I follow Aizer and Dwyer *et al.* (1990) in the sense that participation in after school programs is viewed as an opportunity for extra adult supervision outside of regular school hours as opposed to participation in specific programs such as those mentioned in James-Burdumy *et al.* (2008) and Martinez and Perticara (2018). However, I differ in the particular variable of interest. While Aizer looks at time spent with parents, I look at participation in programs where nonparental adult supervision is present. This decision was in part forced by the available data – the PSID asks for participation in "any other school activities, such as clubs or student government,"

groups which usually meet outside of school hours, as well as similar questions about participation in sports, community groups, religious clubs, volunteer organizations, and tutoring groups. Since I am concerned about the effects of adult supervision on these individuals, I want to ensure that they are consistently participating in these programs. Therefore, I define an individual as participating in an after school program when that individual has indicated that they participate in one of the above activities at least once a week. To maintain the focus on school, and in particular to maintain relevance to the educational funding discussion, I also look at participation in school groups, and in school sports. These two activities had the largest participation rates (19% and 35% of my sample, respectively), and they are run directly through the schooling system.

This paper follows the nonexperimental Head Start literature in econometric analysis, using similar within-family comparisons to identify any effects of after school programs, while choosing to focus on noncognitive measures as suggested by Heckman *et al.* (2006) as outcomes, as opposed to the focus on cognitive measures that pervades most of the literature on early intervention and after school programs. These outcomes are the Children's Depression Inventory, Subjective Well-Being, and Global, Math Ability, and Reading Ability Self Concept scales. The first two outcomes are psychological measures, and the self concept scales measure individuals confidence in their abilities. These differ from cognitive measures in the sense that cognitive measures provide objective scores to indicate proficiency in a subject like math, while self concept scores reflect an individuals subjective comfort and confidence in the subject. I look both at short-term outcomes related to participation in after school programs as well as long-term outcomes measured six years after participation. Data is taken from the Panel Study of Income Dynamics (PSID). The PSID collected data on children's time use in the 2001-2002 and 2007-2008 waves of the Childhood Development Survey (CDS), including data on participation in after school programs. Advantages of using the PSID include detailed and extensive family background data, which allows for interfamilial comparison, and mitigated concerns about measurement error and recall bias due to contemporaneous reporting (Garces, Thomas, and Currie 2002).

I find that participation in after school programs is associated with short-term improvements in

all the noncognitive outcomes used, with the exception of Reading Ability, where no significant effect is observed. These improvements are significant, representing improvements of 3-10% in each outcome. I also find some evidence that these benefits may carry over in the long-term, suggesting that participation in after school programs sets children up for success both immediately as well as going forward in their lives. However, these results rely on the assumption that within families siblings are treated similarly, that there are no carry over affects with one siblings participation affecting outcomes for both siblings, and that the unobserved individual differences between siblings do not affect the results. Additionally, low response rates forced sample sizes down, and further exploration is required to ensure these results are not a sampling anomaly.

Showing these positive effects of after school programs could greatly influence policy, especially in today's political climate. Although I do not specifically look at federally funded after school programs, these programs provide adult supervision to children who otherwise might be forced to care for themselves. In this case, demonstrating the benefits of adult care in the form of after school programs provides an argument for the continued funding of federal after school programs. Additionally, as many schools already have a variety of after school programs not covered by federal funding, and children have the option of attending a community or religious group in the after school hours, slightly higher funding towards these extant programs could increase the benefits received by the students with no startup cost.

The rest of this paper is organized as follows. Section 2 provides additional background on after school programs in general. Section 3 describes the data. Section 4 lays out the empirical framework, Section 5 presents the results and discussion, and Section 6 concludes.

2 Background

After school programs gained popularity over 35 years ago as a solution to support working parents (Yohalem, Pittman, and Edwards 2010). Since then, these programs have gained popularity, seeing increases both in enrollment and in demand. In the Afterschool Alliance's *America After 3PM* re-

port, they describe after school programs as "supportive and enriching environments" for children to attend after school lets out. These programs play a key role in helping working parents keep their jobs, as well as helping parents be more productive at work. Over 18% of elementary and middle school aged children participate in an after school program as of 2014, up from 11% in 2004.[1] Parents do not only perceive these programs as a safe environment for their children between when school gets out and when the parents get out of work, but also as enriching environments where their children can learn and grow as individuals (Afterschool Alliance 2014).

Support for these programs is widespread among parents regardless of political affiliation, geographic location, or race. However, participation and demand are higher for low-income households, as well as for minority groups. Additionally, despite the recent rise in participation rates, increases in demand have outpaced increases in supply, and over 40% of parents who do not have children enrolled in an after school say that they would enroll their children if they had an after school program available to them. Commonly reported barriers to participation are the cost of the programs, the lack of programs in the community, and the transportation costs associated with getting children to and from programs run separately from schools. As over 20% of children still remain unsupervised between 3 and 6 pm, work still remains to ensure that there are after school options for those who desire or need them (Afterschool Alliance 2014; Yohalem, Pittman, and Edwards 2010).

3 Data and Descriptive Statistics

The PSID began in 1968 with a nationally representative sample of over 18,000 individuals in over 5,000 families. These families, and their descendants, have been continuously tracked since then. In 1997, the PSID introduced the CDS, which tracked children who were between 0 and 12 years old in 1997. They collected an additional two waves of data, collecting data from this same

[1] Afterschool Alliance collects data on groups specifically defined as after school programs. Participation in these groups in this paper are most likely included in the school group and community group responses, as after school programs run through schools would show up as a school group, and other after school programs such as the Boys and Girls Club and 4-H should be included in community groups.

Table 1: After School Participation Statistics

Participation Rates		# of Participants in Multiple ASPs	
Any After School	46.22%	No ASP	1,116
School Group	18.99%	One	451
School Sports	34.80%	Two	306
Community Group	8.50%	Three	146
Volunteer Organization	7.86%	Four	45
Tutoring Group	2.94%	Five	10
Religious Club	10.65%	Six	1

cohort in 2001-2002 and 2007-2008. In the second and third waves, respondents were asked about daily behaviors, including time spent participating in activities outside of school. These activities were school groups such as student government, drama club, or any other club run through the school; after school sports; community groups such as the Boy Scouts or hobby clubs; volunteer organizations; tutoring clubs; and religious clubs. For each of the above activities, respondents were asked whether they had participated in the past year, and separately were asked how often they had participated. I define my after school participation variable as a dummy variable set to 1 if the respondent had indicated that they had participated in any of the above programs, and that they had participated in that program on at least a weekly basis. In my sample, just over 46% of respondents participated in an after school program. Full participation statistics are reported in Table 1. Of the respondents who participated in an after school programs, more than half participated in multiple programs. However, very few participated in more than three programs, and only one respondent participated in all six. As the participation was indicated for the past year, individuals participating in multiple programs did not necessarily participate in those programs simultaneously, and due to the structure of the survey, it is impossible to tell which participants did partake in multiple options at the same time.

There are many benefits to using the PSID in this paper. Most importantly, the PSID has a wealth of data on each individuals family background and links each respondent to their parents. This paper utilizes a family fixed-effects strategy, linking siblings who have the same mother in

order to compare within families. However, there are a number of costs. First of all, respondents are not randomly selected into after school programs, potentially leading to selection bias. Second, the broad definition of after school programs allows for a great deal of variation between programs, even if these programs are of the same type. This makes comparisons in program quality impossible. Third, the CDS was administered in waves, so there are six years between samples. Ideally, the survey would have been administered on a yearly basis, which would allow for more opportunities to compare participation differences over time.

I restricted my sample to 6-14 year old respondents to focus on the effects of participation among elementary and middle school students. These age groups were identified in Aizer (2004) and Dwyer *et al.* (1990) as being at risk for negative outcomes due to a lack of adult supervision. Although high school students may also see differences in noncognitive outcomes associated with participation in after school programs, they are less likely to depend on periods of adult supervision, so including high school students would potentially shift the focus away from parental supervision, or lack thereof. This yields a sample size of 2,075 individuals in 1,364 different families. Restricting the sample once more to only include families with multiple children in the sample that have variation in participation among these children yields a sample size of 581 individuals in 238 families.

The CDS includes a number of noncognitive outcomes: Children's Depression Inventory (CDI), Subjective Well-Being (continuous measure of flourishing), Global Self Concept Scale, Math Ability Self Concept, and Reading Ability Self Concept. The Children's Depression Inventory is a self-report inventory used by psychologists to measure childhood depression on a scale of 1-18, with large values representing higher levels of depression. The Subjective Well-Being measure was adapted from MacArthur MIDUS Youth, which includes measures of emotional, social, and psychological well-being. These are all combined into one score, entitled the continuous measure of flourishing, on a scale from 3 to 18, with higher scores representing positive outsomes. The Global Self Concept Scale, as well as the Math and Reading Ability scales, were constructed by PSID researchers by combining the results from a number of self concept questions asked on the

Table 2: Outcome Response Rates

	# of Responses	Response Rate
CDI	633	30.51%
Subjective Well-Being	806	38.84%
Global Self Concept	1,219	58.75%
Math Ability Self Concept	1,225	59.04%
Reading Ability Self Concept	1,224	58.99%

CDS. These questions ask the children to self evaluate themselves ("Do I do things well?" "How useful is math?") in order to get a sense of the children's confidence and abilities. The Global Self Concept Scale goes from low self concept as a 1 to high self concept as a 5, while the Math and Reading scales go from 1 to 7 (PSID 2010).

Unfortunately, response rates to the survey questions asking about these outcomes were low within my sample. Only 633 of the 2,075 recorded a CDI score, and the highest response rate was for Math Ability Self Concept, where only 1,225 responded. Since I look at each of these individually, I did not restrict my sample to only those who had responded to all of these survey questions. Full response rates are given in Table 2. Despite these low response rates, my final sample sizes are consistent with those reported in the literature.

Table 3 presents selected characteristics of the sample, both for the whole sample and for the subsample of families with multiple children and variation in after school participation that will be used for the family fixed effects regressions. Individuals who participate in an after school program have more positive scores in each of the outcome variables, both in the full sample and in the family fixed effects subsample. In general, these individuals have higher family incomes, as well as higher educational achievement for both parents (the only exception is that mothers of nonparticipants have slightly higher levels of education for the family fixed effects sample). Finally, participants are likely to be older and are marginally more likely to be female.

The family fixed effects subsample is fairly representative of the full sample. The patterns seen in the full sample regarding the differences in means between the after school program participants and nonparticipants are consistent in the subsample. In the outcome variables, the magnitudes

Table 3: Sample Summary Statistics: Means (and Standard Errors)

	Full Sample			Fixed Effects Subsample		
	All Sample	After School	No After School	All Sample	After School	No After School
Outcomes						
Children's Depression Inventory	3.348 (2.894)	3.335 (2.852)	3.395 (3.063)	3.273 (2.854)	2.952 (2.414)	4.415 (3.879)
Subjective Well-Being	12.970 (2.823)	13.201 (2.745)	11.951 (2.965)	13.178 (2.886)	13.411 (2.878)	12.189 (2.737)
Global Self Concept	4.073 (0.617)	4.104 (0.603)	3.963 (0.656)	4.070 (0.606)	4.113 (0.600)	3.926 (0.607)
Math Ability Self Concept	4.921 (0.928)	4.962 (0.907)	4.774 (0.989)	4.849 (0.860)	4.888 (0.882)	4.718 (0.772)
Reading Ability Self Concept	5.169 (1.024)	5.212 (1.019)	5.014 (1.027)	5.115 (1.028)	5.144 (1.048)	5.020 (0.957)
Family Background						
Family Size	4.307 (1.187)	4.271 (1.122)	4.339 (1.241)	4.492 (1.132)	4.550 (1.114)	4.435 (1.148)
Family Income	82,979 (85,139)	90,976 (103,085)	76,108 (65,199)	84,682 (79,630)	86,810 (78,747)	82,575 (80,573)
Father Years of Education	13.795 (2.206)	14.054 (2.164)	13.573 (2.218)	14.093 (2.091)	14.118 (2.113)	14.068 (2.073)
Mother Years of Education	14.252 (2.071)	14.390 (1.990)	14.133 (2.132)	14.422 (2.002)	14.356 (2.007)	14.486 (1.999)
Demographics						
Age	10.306 (2.507)	11.670 (1.694)	9.134 (2.499)	10.188 (2.526)	11.585 (1.665)	8.805 (2.473)
Female	0.495 (0.500)	0.508 (0.500)	0.485 (0.500)	0.515 (0.500)	0.522 (0.500)	0.507 (0.501)
African-American	0.268 (0.443)	0.264 (0.441)	0.272 (0.445)	0.201 (0.401)	0.204 (0.404)	0.199 (0.400)
Birth Weight	119.005 (20.873)	119.262 (20.805)	119.785 (20.983)	120.585 (19.701)	120.298 (18.594)	120.870 (20.766)
Sample Size	2,075	959	1,116	581	289	292

for both samples are comparable, as well as for the family background characteristics. However, the subsample is slightly more female and much more white/Hispanic than the full sample. Despite this, both the full sample and the fixed effects subsample see a higher percentage of African American participants that the base US population, suggesting a higher demand for after school programs in this group.

4 Empirical Framework

The goal of this paper is to ask whether participation in after school programs results in greater noncognitive outcomes among elementary and middle school aged children. The basic model to capture this effect would be indicate whether each outcome Y_i would depend on participation in an after school program, ASP_i, with a set of individual characteristics $\boldsymbol{X}_i$:

$$Y_i = \alpha_0 + \alpha_1 AS_i + \alpha_2 \boldsymbol{X}_i + u_i \tag{1}$$

where AS_i is a dummy indicating participation in an after school program, $\boldsymbol{X}_i$ includes characteristics such as age, dummy variables indicating whether an individual is female or African-American, and the individual's birth weight, and u_i is the error term.

However, participation in after school programs is not randomly assigned, which could lead to omitted variables bias if there are unobserved characteristics correlated with participation in after school programs. There is also the concern that differences in the measured outcomes actually drive participation in after school programs, instead of the other way around. A major concern is that differences in children's family backgrounds could affect both participation and the outcomes. To avoid this potential source of bias, I include family characteristics to $\boldsymbol{X}$ such as family size, family income, and mother's and father's years of education as these controls are likely to be correlated with participation in after school programs and the measured outcomes. However, there are many unobservable family characteristics that I am unable to explicitly control for. For example, the parenting style of a household would theoretically affect noncognitive outcomes in

the children, as well as impact the decision to participate in after school programs. To combat this potential source of bias, I also include family fixed effects to ensure that any time-invariant factors relating to family background are differenced out of the regression. Finally, I add a time fixed effect to capture the two different waves of data that were collected, resulting in the regression:

$$Y_{ift} = \beta_0 + \beta_1 AS_{ift} + \beta_2 \boldsymbol{X}_{ift} + \mu_f + \psi_t + \epsilon_{ift} \tag{2}$$

where Y_{ift} represents each outcome for an individual i in family f at time t, and AS captures participation in after school programs for that individual. $\boldsymbol{X}_{ift}$ represents the augmented vector of individual and family characteristics outlined above, and μ_f and ψ_t represent family and time fixed effects, respectively. I use a mother-specific effect as my family fixed effect, linking individuals who share the same mother. I use heteroskedasticity and autocorrelation-consistent (HAC) standard errors throughout. I then extend this model to look at long-term outcomes, that is, to see if participation in after school programs in 2001 has an impact on outcomes in 2007:

$$Y2007_{if} = \gamma_0 + \gamma_1 AS2001_{if} + \gamma_2 \boldsymbol{X2001}_{if} + \theta 2001_f + \varepsilon_{if} \tag{3}$$

where $Y2007_{if}$ is each outcome for individual i in family f in 2007, $AS2001$ and $\boldsymbol{X}_{if}$ are participation in an after school program and the characteristics vector for the individual in 2001, and $\theta 2001$ represents family fixed effects.

In both models (2) and (3), the comparison is between individuals who participated in after school program and their sibling(s) who did not. This treatment ensures that differences in home environment between families do not drive outcomes. However, this improvement still has potential drawbacks. As mentioned earlier, the use of family fixed effects restricts the sample to only those families that have multiple children in the sample and that have variation in participation between these children. Also, there remains the issue of nonrandom selection: although I control for a number of individual characteristics, and although family background effects are differenced out through the use of family fixed effects, something must be driving the difference in participa-

tion between siblings. If this unobserved factor is also related to the outcomes, then there remains the potential for selection bias. Additionally, the use of family fixed effects assumes that within a family all siblings have the same opportunities and are treated equally. There are many ways that μ_f might not be fixed within a family. First, if the parents exhibit favoritism towards one sibling they may limit opportunities for after school participation for one, and it is not hard to imagine that the presence of favoritism could affect noncognitive measures such as depression and self concept scores. Second, differences in age may mean that family resources that change over time could affect the opportunities for participation available to the individuals. Third, one sibling participating in an after school program could have a spill over effect on the other(s). For example, if the younger sibling participates in an after school program, this may free up the older sibling from a potential responsibility to care for their younger sibling during the after school hours, which in turn could affect the noncognitive outcomes examined in this paper.

Despite these concerns, models utilizing family fixed effects represent the best possible identification strategy. As my data was collected in waves six years apart, it is impossible to use regression discontinuity models, and this gap complicates the use of individual fixed effects as individuals from the first wave will be much older and will be in middle school (at least) if they were in elementary school, and will be in high school or college if they were in middle school in the first wave. As the comparison in this case would be within each individual, the time gap means that some time variant individual characteristics that do not see major year-to-next changes would potentially see huge changes, substantially biasing the results.Ideally, my data set would include yearly responses, which would make the use of individual effects more feasible, and could potentially allow for regression discontinuity analysis. Additionally, I was not able to find any useful instruments in order to pursue an instrumental variable approach. Family fixed effects allow me to control for differences in family background as much as possible, providing the most insightful results.

5 Results and Discussion

Table 4 presents my empirical results for short-term outcomes. Each column reports the association of participation in an after school program with each noncognitive outcome discussed above. Standard errors are presented below in parentheses and take into account within-family correlations. The specific sample size for each outcome is presented in brackets below the standard errors. For fixed effects regressions, the first number represents the number of individuals from the family subsample who reported a value for the associated outcome, and the number in parentheses is the number of individuals from the family sample who both recorded a value for the outcome and who had a sibling also record a value. For example, 187 individuals in the family sample recorded a value for the Children's Depression Inventory, but only 20 families had both siblings record a value, giving us an effective sample size of 40. All the variation in each fixed effects regression was found in the siblings recorded in the parentheses.

The first column reports results of the regression recorded in equation (1) above, which simply regresses each outcome on after school participation with age, sex, race, and birth weight included as controls. These results indicate that participation in after school programs in associated with increases in scores measuring Subjective Well-Being, Global Self Concept, and Math and Reading Ability Self Concept at a statistically significant level, while participants report essentially equivalent levels of depression. As Subjective Well-Being has a range of 15 points, these results suggest an 8% increase in this score, while the results for Global, Math Ability, and Reading Ability Self Concept represent a roughly 3% increase. These results remain consistent when I add family background controls such as family size, family income, and parent's education, as well as year fixed effects, to the regression in column (2), with the exception that the significance of the increase in Subjective Well-Being decreases and the coefficient for Global Self Concept looses all statistical significance. The third column the sample is restricted to the family sample (the families with multiple children and variation in participation between siblings). With the exception of the Depression Inventory, the magnitude of the coefficient on after school participation remains consistent for each outcome, with modest but economically significant improvements in each score

Table 4: Relationship Between Participation in ASPs and Noncognitive Outcomes

Outcomes	Full Sample (1)	Family Controls (2)	Sibling Sample (3)	Fixed Effects (4)
Children's	-0.087	0.007	-1.339*	-2.122**
Depression	(0.299)	(0.129)	(0.808)	(0.960)
Inventory	[n=633]	[n=633]	[n=187]	[n=187 (40)]
Subjective	1.246***	1.008*	0.918***	1.426**
Well-Being	(0.266)	(0.576)	(0.329)	(0.613)
	[n=806]	[n=806]	[n=236]	[n=236 (76)]
Golbal	0.154***	0.120	0.183***	0.221**
Self Concept	(0.044)	(0.098)	(0.027)	(0.107)
	[n=1,219]	[n=1,219]	[n=375]	[n=375 (166)]
Math Ability	0.227***	0.202***	0.193**	0.272*
Self Concept	(0.065)	(0.060)	(0.080)	(0.139)
	[n=1,225]	[n=1,225]	[n=376]	[n=376 (168)]
Reading Ability	0.237***	0.194***	0.185***	-0.137
Self Concept	(0.068)	(0.030)	(0.039)	(0.158)
	[n=1,224]	[n=1,224]	[n=376]	[n=376 (168)]
Family Controls	N	Y	Y	Y
Year FE	N	Y	Y	N
Family FE	N	N	N	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

associated with participation at a statistically significant level. Additionally, there is a substantial decrease in Depression Inventory scores associated with participation. As Depression is measured on an 18 point scale, this decrease of 1.339 points represents a 7.4% decrease.

Column (4) reports the regressions modeled on equation (2), adding fixed effects to the previous regressions. I isolate families within each year to avoid accounting for differences in outcomes between each wave as the waves were recorded six years apart[2]. These results show that partici-

[2]In unreported regressions with individual fixed effects, the results suggested that the six year gap between waves produced large variations, making analysis unproductive (this is worded poorly but I am struggling to find a better way). Following this, I decided to remove any comparisons between years from my fixed effects regressions by generating new family identifiers for 2007 for families who responded in both years. However, including between year comparisons yields similar results. The sign of each coefficient is the same, and the magnitudes are similar, with the coefficients with between year comparisons slightly smaller. Standard errors are also larger in the between year

pation in after school programs is associated with more positive outcomes for all outcomes except Reading Ability. In addition, the coefficients on participation are larger for all these outcomes than in the pooled regressions, with after school participation associated with roughly 10% improvements in Depression and Subjective Well-Being and with roughly 4% improvements in Global and Math Ability Self Concept. However, participation was also associated with a decrease in Reading Ability Self Concept scores, although not statistically so.

The results are robust to the use of each individual type of after school program as the treatment variable in each regression as opposed to the composite indicator. The sign of each fixed effects coefficient remains the same, and the magnitudes are also comparable. An exception is that participation in a tutoring group is associated with a lower measure of Subjective Well-Being. However, this result is not statistically significant. Likewise, the coefficients for Reading Ability Self Concept vary in sign, but as in Table 4, these coefficients are statistically insignificant. These results are more completely discussed in Appendix A.

Next, I spilt up the family sample by age in order to check if results were different in different age groups, with the 6-10 year old group representing elementary schoolers and the 11-14 year olds representing middle schoolers. Results are reported in columns (1) and (2) of Table 5. Splitting up the sample by age has the side effect of splitting siblings pairs up if one sibling was aged 10 or below and the other was 11 or older. This resulted in severely limited sample sizes, especially for the 6-10 year old age group, and the results should be interpreted with this deficiency in mind. For the 6-10 year old age group, there were no sibling pairs who recorded values for both Depression and Subjective Well-Being. 9 sibling paris (18 individuals) responded to the three Self Concept scales. The results show the participation in after school programs among this sample was associated with an increase in Global Self Concept, no change in Math Ability Self Concept, and a decrease in Reading Ability Self Concept. For the 11-14 year olds, results were consistent with the results from the full fixed effects regression, with participation associated with improvements for all outcomes except Reading Ability. However, the association with Global Self Concept lost

comparison.

Table 5: Relationship Between Participation in ASPs and Noncognitive Outcomes (Age and Race Breakdown)

	Fixed Effects			
Outcomes	Ages 6-10 (1)	Ages 11-14 (2)	African-American (3)	White/ Hispanic (4)
Children's Depression Inventory	N/A (-) [n=9 (0)]	-1.234** (0.522) [n=178 (30)]	1.242*** (0.161) [n=41 (10)]	-1.941*** (1.117) [n=146 (30)]
Subjective Well-Being	N/A (-) [n=12 (0)]	1.292* (0.704) [n=224 (66)]	2.103*** (0.469) [n=54 (16)]	1.261 (0.771) [n=182 (60)]
Golbal Self Concept	0.459*** (0.153) [n=115 (18)]	0.236 (0.166) [n=260 (86)]	0.111 (0.192) [n=80 (36)]	0.268** (0.114) [n=295 (130)]
Math Ability Self Concept	-0.011 (0.160) [n=116 (18)]	0.386* (0.216) [n=260 (86)]	0.050 (0.251) [n=81 (38)]	0.375** (0.166) [n=295 (130)]
Reading Ability Self Concept	-0.424*** (0.076) [n=116 (18)]	-0.397 (0.246) [n=260 (86)]	-0.028 (0.242) [n=81 (38)]	-0.173 (0.198) [n=295 (130)]
Family Controls	Y	Y	Y	Y
Year FE	N	N	N	N
Family FE	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

all significance, and, although it is still statistically insignificant, the decrease in Reading Ability increased in magnitude.

Finally, I split up the sample by race to see if outcomes are different for African-American children as opposed to white or Hispanic children. As African-Americans only make up 20% of the sample, sample sizes are once again limited, and results should be interpreted accordingly. For African-American children, participation is associated with an increase in Depression, which is a departure from the results reported so far. However, participation in still strongly associated with an increase in Subjective Well-Being. Participation is not significantly associated with any of the Self Concept scores, although the signs for each coefficient are consistent with the previously reported data. For white/Hispanic children, the coefficients are consistent with previous results both in magnitude and sign, although they are only statistically significant for Depression and Global Self Concept.

In summary, the results suggest that participation in after school programs is associated with improvements in Depression, Subjective Well-Being, Global Self Concept, and Math Ability Self Concept, with no significant effect on Reading Ability Self Concept. However, the limited sample sizes in the fixed effects regressions should serve as a reminder that further research is required to ensure that these results are not a sampling anomaly.

I also investigated how participation in after school programs recorded in 2001 (the first wave of data in my sample) affected outcomes in 2007 (the second wave). Results are reported in Table 6. As above, I begin with a basic model regressing each outcome in 2007 on participation in 2001, with controls for age, sex, race, and birth weight, with results shown in column (1). The signs of each coefficient suggest that participation is associated with long-term improvements in each outcome, once again with the exception of Reading Ability, although this is only statistically significant for Math Ability. The inclusion of the family background controls outlined above does not change the results.

In column (3), I limit the sample to the family sample. However, this limitation includes only those in the family sample who both reported participation (or lack of participation) in 2001, while

Table 6: Relationship Between Participation in ASPs in 2001 and Later Noncognitive Outcomes

Outcomes	Full Sample (1)	Family Controls (2)	Sibling Sample (3)	Fixed Effects (4)
Children's Depression Inventory (2007)	-0.336 (0.452) [n=229]	-0.246 (0.456) [n=229]	-3.083** (1.347) [n=34]	-3.180** (1.359) [n=34 (14)]
Subjective Well-Being (2007)	0.517 (0.385) [n=314]	0.417 (0.391) [n=314]	3.095*** (0.861) [n=40]	3.463** (1.643) [n=40 (24)]
Global Self Concept (2007)	0.077 (0.077) [n=329]	0.054 (0.079) [n=329]	0.248 (0.236) [n=43]	-0.155 (0.122) [n=43 (28)]
Math Ability Self Concept (2007)	0.349*** (0.130) [n=334]	0.353*** (0.132) [n=334]	0.629 (0.478) [n=44]	1.229** (0.511) [n=44 (28)]
Reading Ability Self Concept (2007)	-0.101 (0.141) [n=334]	-0.115 (0.143) [n=334]	0.629 (0.555) [n=44]	0.842* (0.459) [n=44 (28)]
Family Controls	N	Y	Y	Y
Family FE	N	N	N	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

also recording values for outcomes in 2007. This means that individuals who aged out of the CDS before 2007 are not included. This results in a small sample for each outcome, with the largest sample being only 44 individuals (22 sibling pairs). Once again, interpretation of these results should keep this limited sample in mind. In this subsample, participation is associated with large improvements in every outcome. Participation is related to roughly 20% improvements in Depression and Subjective Well-Being at a statistically significant level, and is related to a 9% improvement in Math and Reading Ability Self Concept and a 4% increase in Global Self Concept, although none of these coefficients are statistically significant.

Finally, in column (4), I use the family fixed effects model outlined in equation (3) above. Once again, my sample size is limited, but I see results indicating that participation in after school

programs is associated with large long-term improvements in every outcome except Global Self Concept, with participation associated with a 24% improvement in Subjective Well-Being, a 17% improvement in both Depression and Math Ability, and a 12% improvement in Reading Ability.

The sample was too small for regressions separating the sample by age and race to yield any meaningful results[3].

The above results suggest that there may be long-term benefits to after school participation, but that further research, with a larger sample and more frequent surveying, is required to ensure the validity of these results.

6 Conclusion

The research on after school programs has shed very little light on the effects of participation in these programs. Published results are nonconclusive, and often contradict other papers. Additionally, the effect of participation in after school programs on noncognitive outcomes has not been examined. This paper uses nonexperimental data collected through the PSID and the CDS and controls for differences in family background by including family fixed effects.

I find that participation in after school programs has positive short-term effects on a number of noncognitive outcomes, namely Childhood Depression, Subjective Well-Being, Global Self Concept, and Math Ability Self Concept. These effects are sizable – participation is associated with 3-10% improvements in each of these outcomes. I also find that these improvements last into the long-term, with participation associated with continued improvements on these measures, as well as on Reading Ability Self Concept, as recorded six years after initial participation in after school programs.

However, utilizing family fixed effects led to limited sample sizes. As extreme outcomes are more likely to be observed in limited samples, there is a chance that the results found in this paper are a result of a sampling anomaly and are not representative of the entire population. Additionally,

[3]The regressions that actually had enough variation to report any results usually relied on between one and four sibling pairs, resulting in a max sample of 8. Therefore, I decided against reporting these results.

data in this sample were collected in waves, meaning that there were six years in between observations from the same individual. More consistent data would allow for a more thorough examination of the intertemporal effects of participation in after school programs. It would also open the door for more detailed analysis such as utilizing individual fixed effects. Finally, this paper uses nonexperimental data, and as such is limited by potential selection bias, although many of these biases have been removed by the utilization of techniques such as family fixed effects. Despite this, the use of family fixed effects still relies on a number of assumptions about the sample. First, we must assume that there are no unobserved individual differences between siblings that drive differences in participation in after school programs. Second, we must assume that within each family, siblings are treated equally, as differences in treatment could affect both noncognitive outcomes as well as after school participation. Finally, we must assume that there is no carryover where one siblings participation affects outcomes for the other.

After school programs are very widespread – almost every school has them, and they exist independently in surrounding communities. Linking these programs to improvements in noncognitive outcomes that have been shown to affect later life outcomes such as schooling decisions, labor market outcomes, and criminal activity would suggest that funding for these programs should continue, if not increase. As evidenced by the current administration's desire to cut funding for federally run after school programs, these programs are continually in danger of losing finding, and research showing the efficacy of such programs could shore up that danger, leading to better outcomes for children nationwide.

The above limitations open the door to further research, and the potential policy implications speak to the importance of determining the effects of after school programs on noncognitive outcomes. Other nationwide surveys may have more complete data, allowing researchers to overcome many of the above issues while maintaining a nonexperimental method. Additionally, a researcher with the ability to run an experimental trial looking at these noncognitive outcomes could also avoid many of the limitations of this paper.

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A Examining Different Types of After School Programs

I ran regressions that included participation in each specific type of after school program (such as school groups or sports) as the treatment variable, replacing the composite indicator for general after school participation. For each type of after school program, I report results from the OLS regression with full individual and family controls and year fixed effects, as well as the family fixed effects model described in equation (2). Results for school groups, school sports, and community groups are reported in Table 7.

For school groups, the OLS model suggests that participation is associated with significant positive outcomes all each outcome except the Children's Depression Inventory, where I find a small, insignificant increase in depression. In the fixed effects specification, the coefficient on depression switches sign and grows in magnitude, consistent with the positive association with

Table 7: Relationship Between Participation in Individual ASPs and Noncognitive Outcomes I

	School Groups		School Sports		Community Groups	
Outcomes	Family Controls (1)	Fixed Effects (2)	Family Controls (3)	Fixed Effects (4)	Family Controls (5)	Fixed Effects (6)
Children's Depression Inventory	0.126 (0.164) [n=633]	-1.317 (1.473) [n=187 (40)]	-0.126** (0.064) [n=633]	-1.484* (0.803) [n=187 (40)]	-0.243 (0.257) [n=633]	-3.684** (1.716) [n=187 (40)]
Subjective Well-Being	0.553** (0.280) [n=806]	0.639 (1.069) [n=236 (76)]	0.441 (0.571) [n=806]	0.190 (0.702) [n=236 (76)]	0.588*** (0.106) [n=806]	1.293 (1.044) [n=236 (76)]
Global Self Concept	0.155*** (0.035) [n=1,219]	-0.062 (0.156) [n=375 (166)]	0.074 (0.107) [n=1,219]	0.205* (0.118) [n=375 (166)]	0.106*** (0.003) [n=1,219]	0.413 (0.258) [n=375 (166)]
Math Ability Self Concept	0.217*** (0.34) [n=1,225]	0.278 (0.222) [n=376 (168)]	0.156** (0.075) [n=1,225]	0.133 (0.160) [n=376 (168)]	0.190*** (0.014) [n=1,225]	0.302 (0.202) [n=376 (168)]
Reading Ability Self Concept	0.357*** (0.087) [n=1,224]	0.013 (0.228) [n=376 (168)]	0.044 (0.54) [n=1,224]	-0.170 (0.176) [n=376 (168)]	0.136* (0.073) [n=1,224]	0.142 (0.230) [n=376 (168)]
Family Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	N	Y	N	Y	N
Family FE	N	Y	N	Y	N	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

participation found in the paper. However, each coefficient loses all significance. In columns (3) and (4), I find that participation in school sports are also generally associated with positive outcomes. In particular, the fixed effects results in column (4) finds very similar results to the general specifications reported earlier in this paper. Additionally, the coefficients on both the Depression Inventory and the Global Self Concept Scale are significant. Columns (5) and (6) report results for community groups and show that participation is associated with positive outcomes across the board. Notably, the fixed effects models suggests participation in a community group is significantly associated with a large 3.684 point decrease in depression. While the signs and magnitudes of the rest of the fixed effects show positive outcomes, these results are not statistically significant.

Table 8 reports the results for participation in volunteering organizations, tutoring groups, and religious clubs. Once again, results are largely consistent with those seen earlier in this paper. Although volunteering is associated with significant positive outcomes, these results lose statistical significance in the fixed effects model. Additionally, the sign on the Math Ability coefficient switches, and the other two self concept measures have their magnitudes drop towards zero. For tutoring groups, the OLS results reported in column (9) suggest that participation is associated with negative outcomes, and the coefficients on the self concept measures were significant. However, once family fixed effects are used, these results mirror the results from the general after school regression with one exception: participation in a tutoring group is still associated with a decrease in Subjective Well-Being. However, this result, as well as the fixed effects results for the self concept measures, is statistically insignificant. Notably, participation is significantly associated with a large decrease in depression. Participation in religious clubs is associated with a positive change in each outcome in both the OLS and family fixed effects models. Additionally, these results are significant for each coefficient in the OLS regression and for the Depression Inventory, Subjective Well-Being, and Math Ability Self Concept in the fixed effects specification. The magnitude of the decrease in levels of depression associated with participation is quite large, with the 4.438 decrease representing an almost 25% reduction in depression.

In summary, separating out each type of after school program leads to results consistent with the results reported in the main body of this paper. Participation is generally associated with positive outcomes. These results are most substantial with regards to the Children's Depression Inventory, which saw significant results in the family fixed effects specification for four of the six types of after school programs. While not as consistently statistically significant, Subjective Well-Being, Global Self Concept, and Math Ability Self Concept outcomes were associated with positive outcomes with magnitudes consistent with those reported earlier in this paper in five of six types of after school programs. Finally, Reading Ability was both negatively and positively associated with participation depending on the type of after school program, and saw no statistically significant results in any of the fixed effects models. This is consistent with the general results, which found

Table 8: Relationship Between Participation in Individual ASPs and Noncognitive Outcomes II

	Volunteer Orgs.		Tutoring Groups		Religious Clubs	
Outcomes	Family Controls (7)	Fixed Effects (8)	Family Controls (9)	Fixed Effects (10)	Family Controls (11)	Fixed Effects (12)
Children's Depression Inventory	-0.493*** (0.089) [n=633]	-2.736 (1.987) [n=187 (40)]	0.377 (0.458) [n=633]	-3.717** (1.596) [n=187 (40)]	-0.285*** (0.031) [n=633]	-4.438** (2.103) [n=187 (40)]
Subjective Well-Being	1.186*** (0.241) [n=806]	1.112 (0.676) [n=236 (76)]	-0.582 (0.393) [n=806]	-1.052 (0.925) [n=236 (76)]	0.806*** (0.193) [n=806]	2.221** (0.943) [n=236 (76)]
Global Self Concept	0.168*** (0.025) [n=1,219]	0.062 (0.218) [n=375 (166)]	-0.029*** (0.003) [n=1,219]	0.366 (0.462) [n=375 (166)]	0.128*** (0.016) [n=1,219]	0.204 (0.223) [n=375 (166)]
Math Ability Self Concept	0.319*** (0.037) [n=1,225]	-0.277 (0.226) [n=376 (168)]	-0.124** (0.058) [n=1,225]	0.510 (0.332) [n=376 (168)]	0.247*** (0.008) [n=1,225]	0.657** (0.289) [n=376 (168)]
Reading Ability Self Concept	0.249** (0.110) [n=1,224]	0.047 (0.298) [n=376 (168)]	-0.046*** (0.012) [n=1,224]	-0.155 (0.269) [n=376 (168)]	0.121*** (0.003) [n=1,224]	0.514 (0.349) [n=376 (168)]
Family Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	N	Y	N	Y	N
Family FE	N	Y	N	Y	N	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

insignificant results in relation to Reading Ability.