Abstract Title Page
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Title: Identifying the Channels Through Which Head Start Affects Long-Term Outcomes

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Abstract Body

Limit 5 pages single spaced.

Background / Context:

Description of prior research and its intellectual context.

Head Start is a federally funded preschool program for poor children designed to help close the gap between those children and their more advantaged peers before they begin public schooling. Studies have shown that participation in Head Start is associated with improved cognitive test scores, but that these effects quickly fade away for many Head Start children, particularly African-American participants (Currie and Thomas, 1995; HSNIS, 2005). Despite "test-score fadeout," many researchers have found beneficial long-term impacts of Head Start participation. Head Start significantly decreases participants' chance of repeating a grade or being diagnosed with a learning disability (Currie and Thomas, 1995). Garces, Thomas and Currie (2002), using PSID data and within-family variation in Head Start participation, find that Head Start has long-term beneficial effects on educational attainment and crime. Ludwig and Miller (2007) use a regression discontinuity design and multiple sources of data to exploit variation in technical assistance given to counties to develop their Head Start funding proposals. They find evidence of decreased rates of crime and mortality at the cutoff. Identifying off within-family variation in Head Start participation, Deming (2009) finds long-term benefits on high school graduation, health status, and labor market status, while Anderson et al. (2010) report a decreased probability of smoking as a young adult.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

Given that Head Start appears to have positive long-run impacts on its recipients, a natural and important next question to ask is: What are the channels through which Head Start improves these long-run outcomes? In other words, what skills, behaviors, attitudes or circumstances does Head Start influence that result in these long term benefits? One possible explanation is increased cognitive ability. However, as mentioned above, researchers have shown that cognitive test score gains due to Head Start participation fade away well before such long-term benefits are realized (Currie and Thomas, 1995; Deming 2009). Another possible explanation is that long run impacts are due to improvements in "non-cognitive skills" such as self-esteem, social skills and motivation. Given that Head Start curriculum aims to improve the "whole child" and families receive a host of health and social services, this is a reasonable but unconfirmed hypothesis. The purpose of this project is to determine the extent to which cultivating non-cognitive skills is a mechanism through which Head Start successfully improves long-term outcomes.

Setting:

Description of the research location.

This paper uses nationally representative data from the National Longitudinal Survey of Youth (NLSY) Mother-Child supplement. The children observed in this data attend Head Start in hundreds of different classrooms and Head Start centers throughout the United States.

Population / Participants / Subjects:

Description of the participants in the study: who, how many, key features or characteristics.

The NLSY began in 1979, following 12,686 young men and women ages 14-22. The Mother-Child supplement began seven years later, in 1986, and is a separate biennial survey of all

children born to female NLSY respondents. In addition to detailed demographic and family background characteristics of the mother, the Mother-Child supplement contains information about the child as he or she develops, including cognitive, socioemotional and physiological test results, information about child-parent interactions, and attitudes toward schooling, dating, friendship and substance abuse. A separate Young Adult questionnaire for children ages 14 and over addresses issues of schooling, training, work, delinquent behaviors, drug and alcohol use, and marriage and fertility. Thus I examine measures of non-cognitive characteristics separately for children ages 5-14 and 14-17. In my analysis, I refer to these groups as "children" and "adolescents." The data also contains information on whether the child ever attended Head Start and how old the child was when he or she first attended Head Start.

I restrict the data to those children who are 19 or older during 2006, the most recent wave of data available in the NLSY. Youth who are at least 19 during 2006 are at least 5 years old during the 1992 survey, so I categorize children as having attended Head Start if they had enrolled as of that survey year. Because virtually all Head Start participants in these data enroll by the time they are 5 years old, this strategy should avoid mislabeling children as not attending Head Start who later enroll. Finally, I keep only children in families with 2 or more age-eligible children, which is necessary for my research design. These restrictions all together yield a sample size of 4,493 children, which I refer to as the "base sample."

Table 1 shows means and standard deviations of some of the maternal and familial characteristics of the children in the base sample, broken down by race and preschool status (Please insert Table 1 here). As expected, the base sample results in Table 1 show children who attend Head Start come from more disadvantaged families than those who attend no preschool: mother's permanent income, educational attainment and AFQT score are all lower, as is the educational attainment of the maternal grandmother. This motivates the use of family fixed effects, which I discuss in detail in the "Research Design" section, but very briefly, implies that I will be identifying the effect of Head Start off differences in Head Start participation among siblings within the same family. Hence my estimation sample will only include those children in families with at least two siblings who differ in their participation in Head Start, non-Head Start preschool, or no preschool. In Table 1 this sample is referred to as the "fixed effects subsample."

Limiting the sample to those families with children who differ in their preschool participation raises concerns about the external validity of the sample: the families with children who differ in preschool participation may be systematically different from the families with children that go to the same type of preschool. One way to address these concerns is to compare the base sample and fixed effects subsample across observable characteristics of the families. Comparing the first and second rows for each maternal characteristic in Table 1, we see that the trends in selection into Head Start are less stark, but very similar.

Intervention / Program / Practice:

Description of the intervention, program or practice, including details of administration and duration.

Head Start is designed to focus on the "whole child" and addresses a wide range of needs of disadvantaged youth. In addition to early childhood education, it provides a range of services including: nutritious meals and snacks; medical and dental check-ups; child development assistance and education for parents; speech and language therapy, occupational and physical therapy, special education, and mental health services for children with developmental delays or disabilities. Head Start is a nine month program and children can enroll either full- or part-time for no longer than two years. The program costs between $7,000 and $9,000 per child per year.

Research Design:

Description of research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).

In this quasi-experimental study, I attempt to eliminate selection bias is by including family fixed effects. The use of family fixed effects implies that I am looking within a particular family and comparing the outcomes of those children who attended Head Start versus those who did not. This eliminates all potential biases, both observable and unobservable, that are constant across the children within the family, such as characteristics of the mother and family that are time-invariant or at least determined before the children were born. The identifying assumption is that selection into Head Start within a family is uncorrelated with the unobservable determinants of the outcomes of interest. The estimating equation is:

$$Y_{ij} = \alpha + \beta HS_{ij} + \gamma Pre_{ij} + Z_j + \pi X_{ij} + \varepsilon_{ij} \qquad (1)$$

where i indexes child and j indexes family. Y_{ij} is the outcome of interest, HS_{ij} is a dummy that equals one if the child attended Head Start, and Pre_{ij} is a dummy that equals one if the child attended a non-Head Start preschool. Attending no preschool is the omitted group. Thus, β gives the mean difference in Y between those children who attend Head Start and those who attend no preschool. Similarly, γ gives the mean difference in Y between those children who attend a non-Head Start preschool and those who attend no preschool. Z_j is the family fixed effect, and X_{ij} is a vector of demographic characteristics. ε represents the individual error term. If $corr(\varepsilon_{ij}, Y_{ij} \mid X_{ij}, Z_j, HS_{ij}, Pre_{ij}) \neq 0$, then my estimate will be biased. Essentially, my estimates will be biased if after controlling for observables, there are differences between those children within a family who enroll in Head Start and those who do not, and these differences are associated with the outcome of interest.

Examples of threats to the validity of my estimates include if parents are selectively choosing which children to attend Head Start based on characteristics that are unobservable to me and have developed by age 3 or 4. The very young age of the children diminishes, but certainly does not eliminate this possibility. Parents could show favoritism, and choose to enroll their more able child, which would bias my results upward, since the Head Start participant would have had better outcomes than their sibling even in the absence of Head Start. On the other hand, parents could choose to equalize their children's life chances, and send their less able child to Head Start, thus biasing the results downward. While either is possible, Head Start is fully subsidized and effectively provides free childcare for poor parents. It seems unlikely that families would willingly enroll one child and not the other as long as they are income eligible.

There are plausible reasons that do not directly involve parents' decisions as to why Head Start participation within a family could vary that would not bias my estimates. Head Start centers are chronically under-funded and are often oversubscribed, keeping waitlists for children hoping to receive a spot. While nationwide enrollment data is not available far enough back in time to overlap with the children in this sample, the Head Start National Impact Study (HSNIS) in 2002 described 85 percent of Head Start centers as oversubscribed and denying services to eligible children. If a local center is oversubscribed, it is possible that due to random chance, one sibling within a family could receive a spot and by the time the other child is Head Start age-eligible, the center could be full. This would provide me with an unbiased estimate of the effect of Head Start.

To formally address nonrandom assignment to Head Start within a family, I follow Deming (2009), creating a series of covariates that are determined prior to preschool attendance

and that vary across siblings. These include child characteristics such as age, gender, first born status and pre-treatment PPVT score. Also included are family and household characteristics such as family income, household composition and childcare arrangements. In addition to these covariates constructed by Deming, I include seven indicators of early child temperament, as measured by the "How My Child Acts" assessment given to mothers. Table 2 lists all covariates and compares Head Start participants to their siblings who attend no preschool (Please insert Table 2 here). I construct a summary index of these covariates and find that there is no statistically significant difference in this index between siblings who attend Head Start and those who attend no preschool. I control for all covariates in my estimation which will reduce any potential bias due to nonrandom selection into Head Start within a family. For example, a family could enroll one child in Head Start and then due to an increase in family income become ineligible by the time their next child is preschool age. Controlling for family income directly prior to preschool age will be helpful in reducing any bias induced by that scenario.

Data Collection and Analysis:

Description of the methods for collecting and analyzing data.

The data were collected via personal interview by the US Bureau of Labor Statistics. Please see the NLSY79 User's Guide for details about the methods for collecting the data (http://www.nlsinfo.org/nlsy79/docs/79html/79text/front.htm). In the context of the research design discussed above, I use OLS regression to analyze the data, with standard errors clustered at the family level.

Findings / Results:

Description of the main findings with specific details.

I estimate the impact of Head Start on a range of direct and indirect measures of non-cognitive traits, both for children ages 5-14 and adolescents ages 14-17. The two direct measures of non-cognitive traits for children are the Behavior Problems Index (BPI), which is a mother reported assessment of behavioral problems for children, and the Self-Perception Profile for Children (SPPC), which measures self esteem and is split into two scales – feelings of scholastic competence and general sense of self worth. For children ages 10-14, I construct two measures of delinquent behavior and drug and alcohol use. While these two measures do not directly assess personality traits, these behaviors can be thought of as proxies for such characteristics as motivation, respect for authority and self-esteem.

For adolescents ages 14-17, I use three direct measures of non-cognitive traits - the Rosenberg Self Esteem Scale, Pearlin Locus of Control Scale, and CES Depression Scale. Locus of control measures the degree to which a person believes that they can control the events that affect them. I also use two proxies for non-cognitive skills among adolescents ages 14-17. I construct a measure of risk aversion based off of 6 questions gauging attitudes toward risk-taking. I also create a variable for drug and alcohol use, which is similar to that of the younger children. For all of the child and adolescent non-cognitive measures, I standardize them within age group to have a mean of zero and standard deviation of one.

Tables 3 presents the effects of Head Start on non-cognitive characteristics of children ages 5-14 (Please insert Table 3 here). While Head Start has no statistically significant impact on the summary index of child non-cognitive traits, three of the five items in the index show significant gains. Head Start increases feelings of scholastic competence, and decreases delinquent behavior, drug and alcohol use (effect sizes are 0.130, 0.135 and 0.112, respectively). Note that the signs on delinquent behavior and drug and alcohol use are reversed as I orient the

variables so that positive equals "good." Non-Head Start preschools have no effect on any outcome. Some interesting patterns emerge by sex and race, with females and some extent non-blacks apparently seeing more effects than blacks and males.

Based on the design of the NSLY Child and Young Adult Supplement, respondents ages 5-14 are asked separate questions than those ages 14 and older. Thus, Table 4 shows effects of Head Start participation on non-cognitive characteristics for adolescents ages 14-17 (Please insert Table 4 here). There is no detectable impact of Head Start on the summary index of non-cognitive traits. Of Locus of Control, self esteem, depression, risk aversion and drug and alcohol use, the only trait that Head Start seems to alter is drug and alcohol use, which it decreases by 0.159 standard deviations. Non-Head Start preschools have zero effect on all outcomes. Examining impacts by subgroup also reveals essentially a zero impact of Head Start on the non-cognitive skills of adolescents.

Finally, Table 5 examines the link between the non-cognitive skills that Head Start alters and a summary index of long-term outcomes including educational attainment, labor market status, criminal history and health (Please insert Table 5 here). Column (1) shows results from OLS specifications, which undoubtedly suffer from omitted variables bias. As an attempt to reduce this bias, column (2) provides results from specifications in which I instrument for non-cognitive skills using the within-family differences in Head Start participation that I exploit earlier. Under the same identifying assumption that I make for my earlier analysis, the exclusion restriction will not be violated. The point estimates in columns (1) and (2) are consistently positive suggesting that the non-cognitive skills do have a positive impact on long-term outcomes. However, as seen in column (3), the F-statistic for the IV analysis is always lower than the traditional threshold of 10, indicating a weak-instruments problem. Thus, the results in Table 5 are only suggestive. Neither the OLS nor the IV estimation provide a satisfying measure of the effect of the non-cognitive skills altered by Head Start on long-term outcomes.

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Conclusions:

Description of conclusions, recommendations, and limitations based on findings.

I explore the hypothesis that it is improvements in children's non-cognitive skills that leads to the long-term benefits bestowed by Head Start. While a limitation of my study is that it relies on non-experimental comparisons of children within families, I find little evidence of within-family bias in type of preschool attendance. I show that Head Start participation has positive impacts on particular non-cognitive traits of children, but has little if any detectable impact on the traits of adolescents. These results are driven exclusively by gains by female Head Start participants, which is consistent with past research that early childhood interventions have more lasting effects on girls than boys (Anderson, 2008) and that girls in general have higher non-cognitive skills than boys (Jacob, 2002). I show suggestive but inconclusive evidence that these non-cognitive skills improve the long-term outcomes that Head Start has been shown to impact.

This paper attempts to explore *why* Head Start produces long-term impacts on its participants. I show that improvements in non-cognitive characteristics are a potential reason, and provide suggestive evidence that one of the channels is increasing children's feelings of scholastic competence. If true, the implications are important: while it might not be the lasting cognitive gains that directly benefit students, it is possible that temporary improvements leave children feeling confident about their academic skills, which helps them in the future. Thus, focusing on improving such skills during Head Start and other early-childhood interventions may be of crucial importance and policy-makers should not interpret "test score fadeout" as evidence to the contrary.

Appendices

Not included in page count.

Appendix A. References

References are to be in APA version 6 format.

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Appendix B. Tables and Figures

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Table 1: Familial and Maternal Characteristics, by Race and Preschool Status

		White/Hispanic			Black		
		Head Start	Preschool	None	Head Start	Preschool	None
		(1)	(2)	(3)	(4)	(5)	(6)
Permanent Income							
	Base Sample	30,990	60,679	40,163	26,742	38,230	28,980
		[22,950]	[41,677]	[26,741]	[17,651]	[23,375]	[20,158]
	Fixed Effects	32,041	47,860	41,266	28,302	34,017	27,825
	Subsample	[26,097]	[28,594]	[27,768]	[19,156]	[23,477]	[18,212]
Mother < High School							
	Base Sample	0.46	0.16	0.40	0.32	0.17	0.36
		[0.50]	[0.37]	[0.49]	[0.47]	[0.38]	[0.48]
	Fixed Effects	0.47	0.23	0.37	0.34	0.25	0.36
	Subsample	[0.50]	[0.42]	[0.48]	[0.48]	[0.44]	[0.48]
Mother Some College							
	Base Sample	0.23	0.45	0.24	0.35	0.52	0.31
		[0.42]	[0.5]	[0.43]	[0.48]	[0.50]	[0.46]
	Fixed Effects	0.18	0.34	0.24	0.40	0.47	0.34
	Subsample	[0.39]	[0.48]	[0.43]	[0.49]	[0.50]	[0.48]
Mother AFQT							
	Base Sample	-0.42	0.29	-0.16	-0.73	-0.47	-0.67
		[0.73]	[0.90]	[0.89]	[0.51]	[0.71]	[0.60]
	Fixed Effects	-0.41	0.05	-0.15	-0.73	-0.62	-0.73
	Subsample	[0.72]	[0.87]	[0.86]	[0.51]	[0.63]	[0.58]
Grandmother's Education							
	Base Sample	8.63	10.68	9.40	9.74	11.00	9.75
		[3.55]	[3.12]	[3.42]	[2.57]	[2.57]	[2.87]
	Fixed Effects	8.71	10.05	9.63	9.99	10.31	9.90
	Subsample	[3.43]	[3.41]	[3.39]	[2.45]	[2.57]	[2.72]
sample size		442	1,014	1,632	510	313	582
sample size - FE		287	435	633	248	178	310

Notes: Means and standard deviations [in brackets] are presented for the full sample and for the fixed effects subsample, which consists of families where at least one, but not all siblings participated in Head Start or other preschools. Permanent Income is the average of family income over the years available in the data, in 2006 dollars. AFQT scores are age normed according to the age distribution in the NLSY sample and then standardized to be mean zero and have a standard deviation of one.

Table 2: Sibling Differences in Pre-Treatment Covariates, by Preschool Status					
	Head Start	Other Preschool	Control Mean		Sample Size
	(1)	(2)	(3)		(4)
Attrited	0.007 (0.010)	-0.012 (0.012)	0.037	[0.188]	1,719
Child Characteristics					
Male	0.001 (0.039)	0.030 (0.036)	0.504	[0.500]	1,605
Age in 2006 (in yrs)	-0.238 (0.277)	-0.661*** (0.230)	24.311	[3.401]	1,605
Firstborn	-0.044 (0.048)	-0.117*** (0.043)	0.387	[0.487]	1,605
PPVT Score, Age 3	3.229 (2.636)	-4.098 (2.592)	25.396	[14.706]	440
Log Birthweight	0.042** (0.016)	-0.004 (0.015)	4.704	[0.243]	1,535
Very Low BW (<3.31 lbs)	-0.018* (0.010)	0.002 (0.007)	0.018	[0.134]	1,535
Regular Doctor's Visits, Age 0-3	-0.114 (0.082)	-0.130** (0.061)	0.393	[0.489]	724
Ever been to Dentist, Age 0-3	0.023 (0.071)	-0.030 (0.061)	0.275	[0.447]	688
On Private Health Insurance, Age 0-3	0.070 (0.048)	0.031 (0.032)	0.510	[0.476]	726
On Medicaid, Age 0-3	0.000 (0.041)	-0.009 (0.031)	0.310	[0.444]	725
Child Illness, Age 0-1	0.006 (0.036)	-0.051 (0.033)	0.512	[0.500]	1,500
Preexisting Health Limitation	0.003 (0.014)	-0.033** (0.015)	0.043	[0.203]	1,537
Breastfed	-0.041* (0.023)	0.025 (0.020)	0.332	[0.471]	1,554
Premature Birth	-0.017 (0.029)	0.016 (0.027)	0.212	[0.409]	1,500
Fearfullness, Age 0-1	1.612* (0.970)	1.397 (1.031)	10.179	[4.344]	378
Positive Affect, Age 0-1	0.816 (0.579)	0.392 (0.618)	12.821	[2.615]	383
Difficulty, Age 0-1	-2.088* (1.165)	0.031 (0.940)	32.000	[5.160]	373
Negativity, Age 0-1	1.074 (1.441)	1.115 (1.419)	24.323	[6.726]	373
Friendliness, Age 0-1	-0.186 (0.761)	0.077 (0.598)	14.914	[2.835]	382
Compliance, Age 2-3	-0.272 (0.563)	0.404 (0.549)	21.705	[4.352]	664
Insecure Attachment, Age 2-3	0.146 (0.839)	-0.700 (0.586)	19.773	[4.607]	670
Family and Household Characteristics					
Mother in HH, Age 0-3	0.020 (0.022)	0.003 (0.021)	0.904	[0.295]	1,537
Father in HH, Age 0-3	0.040 (0.031)	0.042* (0.021)	0.649	[0.443]	1,072
Grandmother in HH, Age 0-3	-0.012 (0.020)	-0.038** (0.015)	0.191	[0.313]	1,542
Log HH Income, Age 0-3	-0.007 (0.039)	0.018 (0.032)	10.121	[0.723]	1,505
Log HH Income, Age 3	0.005 (0.063)	0.087* (0.045)	10.119	[0.810]	1,292
HOME Score, Age 3	-0.754 (2.765)	1.077 (2.314)	37.124	[26.365]	719
Maternal Childcare, Age 0-3	0.012 (0.019)	-0.028 (0.017)	0.689	[0.401]	1,596
Relative Childcare, Age 0-3	-0.003 (0.017)	0.026 (0.016)	0.181	[0.332]	1,596
NonRelative Childcare, Age 0-3	-0.010 (0.016)	0.003 (0.014)	0.130	[0.281]	1,596
Mom's Avg Hrs Worked, Yr before birth	-4.134* (2.418)	0.914 (1.533)	26.014	[12.507]	538
Mom's Avg Hrs Worked, Age 0-1	-2.141 (2.205)	1.031 (1.417)	32.571	[11.728]	525
Weight change during pregnancy	0.743 (0.987)	-0.763 (0.852)	29.635	[14.506]	1,463
Mom Smoked Before Birth	-0.015 (0.026)	-0.004 (0.020)	0.377	[0.485]	1,515
Mom Drank Before Birth	0.002 (0.019)	-0.020 (0.017)	0.087	[0.283]	1,605
Pre-Treatment Index	0.048 (0.054)	0.017 (0.050)	-0.023	[1.014]	1,605

Notes: Each row is a separate regression of the pre-treatment covariate on indicators for Head Start, other preschools, and a family fixed effect. Columns (1) and (2) give the coefficients on the indicators for Head Start and other preschools. Standard errors, in parentheses, are clustered at the family level. Column (3) gives the mean value of each covariate for those children who attended no preschool. Column (4) gives the sample size for each covariate. Missing values are due to variation in questions across years and some children being older than 3 at the time of the mother's first interview. * = significant at the 10 percent level. ** = significant at the 95 percent level. *** = significant at the 99 percent level.

Table 3: Effects of Head Start on Child Non-Cognitive Traits

	Head Start	Other Preschools	Head Start Effect by Race and Sex:			
			Black	Non-Black	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Child Non-Cognitive Index	0.067	-0.001	0.016	0.107*	-0.017	0.144**
	(0.045)	(0.036)	(0.065)	(0.063)	(0.060)	(0.063)
			p=[0.314]		p=[0.057]	
Behavioral Problems Index (BPI)	-0.044	-0.010	-0.060	-0.031	-0.084*	-0.006
	(0.033)	(0.029)	(0.045)	(0.046)	(0.043)	(0.049)
			p=[0.662]		p=[0.242]	
SPPC - Scholastic Competence	0.130**	0.005	0.114	0.129	0.149*	0.113
	(0.062)	(0.057)	(0.091)	(0.085)	(0.090)	(0.082)
			p=[0.906]		p=[0.765]	
SPPC - Self Worth	0.049	0.030	0.022	0.070	-0.061	0.150*
	(0.061)	(0.052)	(0.093)	(0.079)	(0.082)	(0.084)
			p=[0.697]		p=[0.059]	
Delinquent Behavior	0.135*	0.041	0.227**	0.044	-0.047	0.290***
	(0.071)	(0.056)	(0.098)	(0.098)	(0.102)	(0.090)
			p=[0.170]		p=[0.011]	
Drug and Alcohol Use	0.112*	-0.086	0.056	0.163*	0.068	0.149*
	(0.061)	(0.053)	(0.086)	(0.086)	(0.093)	(0.081)
			p=[0.382]		p=[0.517]	

Notes: All coefficients are effect sizes. The unit of observation is child-year. Sample sizes vary across dependent variables. All regressions include family, age-at-test and year fixed effects, and all pre-treatment covariates. Race and sex subgroups are obtained by interacting the Head Start and other preschools dummies with indicators for each group. In brackets under each subgroup analysis is the p-value from the test that the effects are the same across both groups. Standard errors, in parentheses, are clustered at the family level. * = significant at the 10 percent level. ** = significant at the 95 percent level. *** = significant at the 99 percent level.

Table 4: Effects of Head Start on Adolescent Non-Cognitive Traits

	Head Start	Other Preschools	Head Start Effect by Race and Sex:			
			Black	Non-Black	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Adolescent Non-Cognitive Index	0.040	-0.077	0.092	-0.044	-0.048	0.118
	(0.069)	(0.058)	(0.097)	(0.090)	(0.094)	(0.090)
			p=[0.292]		p=[0.175]	
Locus of Control	0.078	-0.018	0.060	0.062	-0.017	0.160
	(0.073)	(0.067)	(0.103)	(0.097)	(0.104)	(0.100)
			p=[0.991]		p=[0.217]	
Self Esteem	0.070	-0.096	0.099	-0.003	-0.022	0.151
	(0.074)	(0.067)	(0.101)	(0.100)	(0.104)	(0.100)
			p=[0.453]		p=[0.224]	
CESD Depression Scale	0.025	-0.084	0.044	-0.007	-0.012	0.058
	(0.065)	(0.062)	(0.086)	(0.091)	(0.085)	(0.094)
			p=[0.674]		p=[0.579]	
Risk Aversion	-0.074	-0.082	-0.010	-0.186	-0.240**	0.077
	(0.081)	(0.067)	(0.103)	(0.115)	(0.109)	(0.111)
			p=[0.237]		p=[0.033]	
Drug and Alcohol Use	0.159*	-0.013	0.172	0.144	0.169	0.146
	(0.084)	(0.079)	(0.116)	(0.110)	(0.122)	(0.105)
			p=[0.855]		p=[0878]	

Notes: All coefficients are effect sizes. The unit of observation is child-year. Sample sizes vary across dependent variables. All regressions include family, age-at-test and year fixed effects, and all pre-treatment covariates. Race and sex subgroups are obtained by interacting the Head Start and other preschools dummies with indicators for each group. In brackets under each subgroup analysis is the p-value from the test that the effects are the same across both groups. Standard errors, in parentheses, are clustered at the family level. * = significant at the 10 percent level. ** = significant at the 95 percent level. *** = significant at the 99 percent level.

Table 5: The Assocation Between Non-Cognitive Skills and Long-Term Outcomes

		OLS	IV	1st Stage F-Statistic
		(1)	(2)	(3)
Full Sample				
	SPPC - Scholastic Competence	0.074***	1.439*	7.08
		(0.016)	(0.754)	
	Delinquent Behavior	0.064***	1.534*	5.42
		(0.019)	(0.867)	
Non-Black Only				
	Child Non-Cognitive Index	0.079***	1.404	5.36
		(0.015)	(0.861)	
Female Only				
	Child Non-Cognitive Index	0.058***	1.929*	6.84
		(0.016)	(1.036)	
	SPPC - Self Worth	0.057***	1.460**	7.81
		(0.016)	(0.688)	

Notes: The dependent variable is a summary index of long-term outcomes. Both the dependent and independent variables are standardized to be mean zero and have a standard deviation of one. IV estimates use Head Start participation as an instrument for the non-cognitive skill and are estimated using Two Stage Least Squares (2SLS). Column (3) reports first stage Cragg-Donald F-statistics. See Table 3 for first-stage estimates. Standard errors, in parentheses, are clustered at the family level. * = significant at the 10 percent level. ** = significant at the 95 percent level. *** = significant at the 99 percent level.