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# The Human Capital Agenda

## Asset Holding and Educational Attainment among African American Youth

William Elliott

School of Social Work, University of Pittsburgh

Kevin Kim

School of Education, University of Pittsburgh

Hyunzee Jung

School of Social Work, University of Pittsburgh

Min Zhan

School of Social Work, University of Illinois at Urbana-Champaign

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Washington University in St. Louis

# The Human Capital Agenda: Asset Holding and Educational Attainment among African American Youth

*This study extends previous analyses in several ways. First, in addition to parental wealth, the relationship between children's wealth and math and reading scores are examined. Second, we examine different mediating pathways that wealth may affect children's math and reading scores in a single path analysis model. The advantage of path analysis over traditional regression analyses, which are typically used in this area, is that researchers can get a glimpse of relationships among variables. While the focus of regression analysis is on the associations of predictors with outcome variables, path analysis provides a larger picture of the overall structure of relationships among variables in predicting the outcome variable. Furthermore, mediation can be tested more easily and extensively in path analysis compared to regression. Third, we examine whether different forms of wealth (net worth, homeownership, and children's savings for school) have different effects. Forth, we examine whether wealth (parental and/or children's) effects vary across racial groups.*

**Key words:** *academic achievement; children; youth; college savings; saving; path analysis; race; human capital*

Finding ways to increase the amount of education children have is a key component of any 21<sup>st</sup> century human capital agenda. Human capital is the stock of skills and knowledge people possess to perform labor and produce economic value (Becker, 1962, 1964; Sunstein, 1997). By investing in children's education, we are able to maximize their future earnings. For example, in 2005 median earnings and tax payments paid out to full-time, year-round workers, ages 25 and older, who did not complete high school was \$23,400 (College Board, 2007a). In comparison, young adults who complete high school received \$31,500 (College Board, 2007a). This is a difference of \$8,100 annually. The difference between young adults who do not complete high school and young adults with a four-year degree is even more drastic – a difference of \$37,500 (College Board, 2007a). These differences represent lost productivity for the individual and for society as a whole.

Differences in earnings coupled with increasing need for a more educated and diverse work force has led to an increased emphasis on creating a human capital agenda that aligns with 21<sup>st</sup> century realities. For example, Ozawa (1986) estimates that the percentage of nonwhites will reach 20.7 percent by 2030, up 6.2 percent from 1986. She suggests that these trends will result in a larger percentage of Caucasian elderly and a disproportionate percentage of nonwhite children living in America. As a result, there is a greater need for nonwhites to become increasingly more productive in upcoming years.

The No Child Left Behind Act, commonly known as NCLB, is the first major attempt at creating a new human capital agenda in this century. NCLB is the only national policy with the specific goal of

narrowing racial disparities in academic performance in elementary and secondary schools (Kim & Sunderman, 2005). It set forth the bold mandate that *every* child should be performing at or above grade level by the school year 2013–2014. Despite its focus on narrowing racial disparities, it has had mixed success (Bishop, Ferran, Bishop, & Moriarity, 2001; Braun, 2004; Hanushek & Raymond, 2004; Nichols, Glass, & Berliner, 2006; Rosenshine, 2003). With mixed success and a new administration being sworn in, NCLB is likely to undergo substantial changes in the near future. However, the increasing need for a more educated and diverse work force demands that any human capital agenda for the 21<sup>st</sup> century focus on narrowing racial disparities in academic performance.

In the last decade increased attention is being paid to the potential role that wealth may play in helping to shape this new agenda (see e.g., Conley, 1999; Orr, 2003; Shapiro, 2004; Williams, 2007; Yeung & Conley, 2008; Zhan, 2006). A reason for the increased focus on the role of wealth is because of the high costs associated with higher learning and the growing awareness of racial disparities in wealth holdings. For example, the total cost of attendance, which includes room and board, for an in-state student at a public four-year college for the 2007-08 school year is \$13,589 (College Board, 2007b). This is up 5.9 percent from the prior school year (College Board, 2007b). Four-year private college rates also rose by 5.9 percent in 2007-08, up to \$32,307 (College Board, 2007b). High college costs may dampen expectations and ultimately discourage children from performing in school (Elliott III, 2008) and eventually applying to or attending college (ACCSFA, 2002; Choy & Carroll, 2003).

African American children may be particularly susceptible to having their expectations lowered as a result of high costs. In a qualitative study on perceived barriers to college, Freeman (1997) held focus groups with high school age, African American students from five large urban cities. She finds that they identify lack of money as a key barrier to attending college.<sup>1</sup> Moreover, John Immerwahr (2004), who studied public attitudes about higher education in a national representative study, finds that 57 percent of American adults say many qualified high school graduates are unable to attend college due to a lack of resources. These numbers are even more staggering in the case of African Americans. An overwhelming 76 percent of African American adults believe college access is limited for financial reasons. Further, research suggests that African American children are more responsive to tuition increases and non-loan financial aid decreases than their Caucasian counterparts (Heller, 1997).

The inability to reach college due to high costs is not only a matter of perception; it is a matter of real life circumstances that African American children, who are far more likely to be low-income than their Caucasian counterparts, face. For example, Choy and Carroll (2003) find that during the 1999/2000 school year, low income students were faced with unmet need that was between \$4,000

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<sup>1</sup> Other key variables identified are lack of job opportunities after graduation, college never an option, loss of hope, and intimidation of going to a predominately Caucasian college (Freeman, 1997).

and \$9,300 per year, depending on the type of college they attended.<sup>2</sup> In addition, the Advisory Committee on Student Financial Assistance (ACSFSA) (2006), a group charged by Congress with enhancing access to postsecondary education for low income youth, estimates that over the next decade, two million college qualified students from low to moderate income households will be unable to attend any college at all due to high unmet need, while four million will be resigned to attending two-year colleges. According to Oliver and Shapiro (1995), high unmet need is largely the result of low asset accumulation by poor and minority families. Findings suggest that lack of financial resources maybe an important factor in understanding African American children's academic performance. Given this, it seems that finding ways to make school more affordable must be a part of the new human capital agenda if it is to be successful.

Children's Development Accounts (CDAs) have been introduced as a way to save for college and raise academic attainment among all groups of youth. CDAs may be an alternative to conventional savings accounts. Several countries, most significantly Singapore (see e.g., the Edusave & Baby Bonus programs) and the United Kingdom (The Child Trust Fund), have implemented CDA policies as a way to empower youth to take advantage of opportunities that may not be available otherwise (ASPIRE, 2004). While the United States has been slow to adopt a national CDA program into law, a number of asset-based policies for youth have been introduced in the U.S. Congress: (1) America Saving for Personal Investment, Retirement, and Education (ASPIRE) Act, (2) Young Saver's Accounts, (3) 401Kids, (4) Baby Bonds, and (5) Plus Accounts.<sup>3</sup> The ASPIRE Act is arguably the most far reaching of the policies that have been introduced in America, and best represents how CDAs have been described in the literature (M. Sherraden, 1991; Winnett & Lewis, 1995). This study should help inform CDA policies.

### **Research on Asset Holdings, Income and Children's Educational Outcomes**

The majority of the research on wealth and children's academic performance has focused on parental wealth. Little attention is being given to children's wealth (i.e., wealth holdings in a child's name). Part of the reason could be due to the lack of variables that measure children's wealth in most of the available data sets. The Panel Study of Income Dynamics (PSID) and the Child Development Supplement (CDS) to the PSID provide one of the few opportunities currently available to examine this relationship. In addition to a lack of focus on children's wealth, little attention is being paid to the processes whereby parental wealth may influence children's academic performance. When researchers have examined the processes, they have largely ignored potential differences by race. In general, however, very little research has been conducted on the relationship between wealth (parental or children's) and children's educational outcomes. It is a relatively new field of inquiry.

<sup>2</sup> Unmet need is "the portion of college expense not covered by the expected family contribution (EFC) and student aid, including work-study and loans" (ACSFSA, 2002, p. 5).

<sup>3</sup> More information on these policies can be found at:  
[http://www.assetbuilding.org/resources/childrens\\_savings\\_accounts](http://www.assetbuilding.org/resources/childrens_savings_accounts)

While achievement research has given considerable attention to income (Axinn, Duncan, & Thornton, 1997; Brooks-Gunn & Duncan, 1997; Duncan, Yeung, Brooks-Gunn, & Smith, 1998), wealth has often been overlooked. However, recent research suggests wealth may have unique benefits in respects to children's educational outcomes that income does not (Conley, 1999; Shapiro, 2004). Considering wealth alongside income may provide a clearer understanding of how these different economic factors influence children's achievement. Therefore, in this study we will examine both wealth and income together.

### **Math scores**

Existing findings consistently show a positive association between parental wealth, especially liquid wealth (easily fungible; i.e., easily turned into cash) and children's math scores. For example, in a sample of African American and Caucasian children ages five to 14 from the National Longitudinal Survey of Youth (NLSY), Orr (2003) finds that liquid wealth (such as CDs, stocks, bonds, and savings accounts) has a positive association with students' math scores. She also finds some evidence that suggests as the wealth gap increases between African American and Caucasian children, the gap in test scores increase. Similarly, using a sample of African American and Caucasian children ages five to 12 in the NLSY data set, Zhan (2006) finds a positive association between parental wealth (net worth) and math scores. Williams (2007) uses data on children ages three to 12 from the PSID/CDS to investigate differences in academic outcomes based on race. She finds a positive relationship between parental wealth (liquid) and children's math scores. Further, her study shows that wealth is more important than income for predicting math scores among African American children. In contrast, both income and wealth are significant predictors of Caucasian children's math scores. In a recently published article, Yeung and Conley (2008), examine the association of parental wealth with the African American – Caucasian test score gap in a sample of three to 12 year old children drawn from the PSID/CDS. Contrary to Orr's (2003) findings, they find little evidence that parental wealth mediates the African American – Caucasian test score gap. However, they do find evidence of a strong association between liquid wealth (especially stocks and mutual funds) and school aged children's math scores.

In our search, we only came across one published article examining children's asset holdings and their academic outcomes. In this article, Elliott (2008) uses a sample of children ages 12 to 18 selected from the PSID/CDS. He finds that children who have savings of their own designated for school score higher in math than children who do not.

In sum, research consistently shows a positive association between parental wealth and children's math scores. There is also evidence that children's wealth may be positively associated with children's math scores. While all of the studies reviewed examine race and focus on racial difference, they typically control for race. Williams (2007) study is the only study that looks at African American and Caucasian children separately.

## Reading scores

The evidence is somewhat mixed with respects to findings related to the relationship between parental wealth and children's reading scores. Similar to the case of math scores, findings vary across racial groups. Phillips, Brooks-Gunn, Duncan, Klebanov, and Crane (1998), using data from Children of the National Longitudinal Survey of Youth (CNLSY), find that parental net worth is not associated with children's (age 5 to 6) reading scores. Despite this finding, the bulk of empirical evidence suggests that there is a weak but positive relationship between parental wealth and children's reading scores. For example, Zhan (2006) finds that parental wealth is positively associated with children's reading scores. However, there is some evidence that parental wealth effects may vary by race. Williams (2007) finds that parental wealth (stocks and bonds) is related to African American children's reading scores but is not positively associated with Caucasian children's scores. There is also evidence that it may vary by age. Yeung and Conley (2008) find a weak relationship between parental wealth and school aged student's reading scores among children eight or above and none during their preschool years.

In sum, the above research findings suggest that parental wealth may have a stronger association with children's math scores than it does with their reading scores. There is also evidence that suggests that wealth may have different effects across racial groups as well as age groups. In the following sections we will review findings on incomes association with children's achievement when controlling for wealth.

## Income

Phillips et al. (1998) find that income is a statistically significant predictor of children's reading scores while wealth is not. Zhan (2006) finds that income is a significant predictor of both reading and math scores. However, she finds that wealth has a stronger association than income when both are included. Similar to her findings on wealth, Williams (2007) finds that income varies across races. She finds that it is significant in relation to Caucasian children's readings scores but not African Americans. In the case of math, she finds that the association between income and math scores for both African American and Caucasian children are significant. In contrast to these findings, Orr (2003) and Elliott (2008) find that income is not a significant predictor of math scores. Yeung and Conley (2008) find that income is not a significant predictor of either math or reading scores except when it was included as a categorical variable (\$75,00 or higher compared to \$15,000 or under). In its categorical form, it was significant during preschool years, but not during school age years.

These findings present a mixed picture. It seems that, when wealth is included along with family income, in most cases wealth is a stronger predictor of both math and reading scores. In addition, it appears that income varies both by age and race. These findings suggest more research is needed that examines the different effects that income and wealth have on children's educational outcomes.

## Homeownership

For most Americans their home represents their most valuable asset (Shapiro, 2004). The association between homeownership and children's educational outcomes is well documented (see e.g., Aaronson, 2000; Boehm & Schlottman, 1999; Conley, 1999; Green & White, 1997; Harkness & Newman, 2003; Haurin, Parcel, & Haurin, 2002; Nam & Huang, 2008; Shapiro, 2004; Zhan & Sherraden, 2003). However, all but a few studies examining the effects of homeownership focus on the amount of education children obtain (i.e., high school complete, some college, four year degree). An example of one that does not focus on the amount of education is Haurin et al. (2002). They examine the relationship between homeownership and math and reading scores. Similar to research on net worth, he also finds that there is a stronger association between homeownership and math scores than readings scores and homeownership. Using NLSY data, Haurin et al. (2002) find children living in owned homes have higher math and reading scores. Zhan and Sherraden (2003), using data from the National Survey of Families and Households (NSFH), examine the relationship between children's homeownership and their grades. While they find that homeownership was not significantly related to high school completion, it was significantly related to mother's report of child's grades. More research is needed in this area.

## Potential mediating role of expectations

In addition to investigating the impact of parental wealth on children's educational performance and achievements, some studies further examine whether this relationship operates through the impact of wealth on parental expectations. Their theoretical hypothesis is that parents with higher levels of wealth may perceive a brighter future for their children than those with less or no wealth. This in turn may positively affect parenting behaviors and investment, and thus affect children's educational attainment.

For example, Zhan and Sherraden (2003) find that among single-mother families, mothers' educational expectations partially mediate the association between mothers' savings and children's high school graduation. They also partially mediate the relationships between homeownership and children's GPAs. Zhan (2006) similarly reports that parental wealth mediates the relationship between net worth and children's math and reading scores. While these studies examine parental wealth and expectations, Elliott (2008) examines the relationship between children's wealth holdings and educational expectations. He finds that children's expectations mediate the relationship between children's wealth holdings (i.e., savings for school) and children's math scores.

In sum, CDAs, in the form of children's school savings, may open a path to "possible selves" or "visions of the self in a future state" that help to shape choices and behaviors (Oyserman & James, 2008, p. 2). A positive vision of the self in the future may help children choose actions that are difficult to make in the present, but advantageous in the long run (Kahneman & Tversky, 1979).

### Theory of Asset Effects

Based on assets theory (Sherraden, 1991) and previous research on parental wealth and children's education, we propose that children's savings, especially their school savings, may have two main effects on their educational outcomes. One is direct and mainly financial: owning savings may increase children's ability to solve school related problems such as buying books, paying fees for sports and other activities or for buying a computer, and in the long term, increase the means to afford college. Another effect is indirect and mainly attitudinal: savings and owning savings over a period of years may raise children's educational expectations (Elliott III, 2008; M. S. Sherraden, Johnson, Elliott, Porterfield, & Rainford, 2007), and raised expectations may lead to increased academic efforts and achievement (Cook, et al., 1996; Marjoribanks, 1984; Mau, 1995; Mau & Bikos, 2000; Mickelson, 1990). In other words, if children grow up knowing they have financial means to help pay for current and future schooling, they may be more likely to have higher educational expectations, which in turn help foster greater engagement and better preparation in academic pursuits that lead to better educational achievement. This attitudinal and behavioral effect could be as important as its monetary impact in affecting educational achievement.

It should also be noted, that we draw a distinction between children's aspirations and their expectations. Findings suggest that aspirations and expectations are distinct constructs and that expectations may be a more accurate predictor of behavior than aspirations (Cook, et al., 1996; Graboski, Call, & Mortimer, 2001; Mickelson, 1990). Aspirations are an expression of children's desires, whereas, expectations are what they think will actually happen. We suggest that aspirations come prior to expectations and that they are important for predicting whether children will have savings for school. However, they may be less important for explaining why children behave (score higher in math or reading) in certain ways.

Further, we propose that compared to parental wealth, children's savings may have a more direct and stronger influence on children's education, particularly on children's perceptions that they have the ability to pay for their schooling. This is based on an unpublished paper by Elliott, Jung, & Friedline (2008a). They examine whether children's wealth mediates the relationship between parental wealth and children's math scores. They find that children's conventional savings accounts fully mediate the relationship between parental wealth and children's math scores. However, the mediating relationship is moderated by wealth. That is, as wealth goes up, math scores go up. They suggest when children have direct control over wealth they are more likely to perceive that wealth can be used to augment their academic ability for solving school related problems. On the contrary, parental wealth can be used for other family members or for parental needs. Therefore, the child may perceive that their savings are more useful for solving problems.

Based on the same logic, in a separate study, Elliott et al. (2008b) suggest that children's savings designated specifically for school may be even more closely related to children's educational outcomes than parental wealth or conventional savings accounts owned by children. They find that



savings designated for school partially mediates the relationship between parental wealth and children's math scores. Moreover, in the case of children's school savings, wealth does not moderate the association between children's savings and math scores (i.e., math scores do not go up with increases in parental wealth). While money in a conventional savings account can be used for many different purposes unrelated to school, school savings has been specifically designated by the child for school.

A growing body of evidence in the field of behavior economics suggests people use mental accounting techniques to think about different pots of money in ways (Kahneman & Tversky, 1979; Lea, Tarpy, & Webley, 1987; Thaler, 1985; Winnett & Lewis, 1995) that support the proposition that money designated for school may be more closely associated with academic achievement than other types of savings. According to this line of research, money is not entirely fungible, and different accounts hold different purposes and meanings. These meanings affect how people deposit money into the accounts, and how they use the money (Winnett & Lewis, 1995). Therefore, when children have money designated specifically for college in a savings account, they are likely to think about the savings differently than other types of accounts. More specifically, having savings designated for school in a savings account, may have the important cognitive effect of encouraging the beneficiary to think more about school, ponder what it takes to perform well at school, and to picture him or herself doing well in school. Thus, school savings may further strengthen the relationship between children's wealth holdings and educational outcomes.

## Sample

### Data

This study primarily uses 2002 data from the PSID/CDS. The PSID is a nationally representative longitudinal survey of U.S. individuals and families that began in 1968. Data on employment, income, and marital status are collected annually with questions on wealth beginning in 1984. In 1997, a supplement is drawn from PSID interviews to collect a wide range of data on parents and their young children ages birth to 12 years.

In the 1997 sample, there are 3,563 children. The numbers are fairly evenly distributed across all ages. There are 1,642 Caucasian children and 1,455 African American children. There are also Hispanics, Asians, Native Americans, and "other" in the sample, but the counts are much smaller. In some cases, data are collected on more than one child per parental, but the maximum number of interviews per parental is limited to two children. Whenever there are three or more eligible children younger than age 13 in a parental, the CDS randomly selects two for interview (Hofferth, Davis-Kean, Davis, & Finkelstein, 1997).

## Sample

The analysis sample for this study includes African American and Caucasian children who were between the ages of 12 to 18 in 2002 and currently enrolled in a public school. These restrictions reduce the sample size to 1063. Sample is not weighted for comparison purposes. Although the PSID/CDS is a longitudinal data set, 2002 is the first year with data on children's school savings and expectations. Therefore, data used in this study is cross-sectional.

## Measures

There are both categorical and continuous variables used in the analysis. Variables are collected in 2002 or earlier depending upon when they are available in the PSID/CDS or whether a multiyear variable is being created (for e.g., income is a multiyear variable).

*Applied problem standardized score* is used as a proxy for children's math scores. Applied problem standardized score is measured in the PSID using the Woodcock Johnson (WJ-R), a well-respected measure (Mainieri, 2006). The test is administered by an interviewer and is arranged in order of difficulty. The WJ-R has a standardized scoring protocol that measures the children's math abilities in comparison to the national average for the children's age (Mainieri, 2006). Normed scores are used in this study. The normed scores are constructed based on children's raw score, or the number of correct items, and children's age (Mainieri, 2006).

*Children's college aspirations* are measured by asking children twelve and older how far they would like to go in school. College aspirations are recoded into a dichotomous variable. The reference group consists of children who responded by answering they would like to attend school after high school to include vocational school or a two-year college.

*Children's college expectations* are measured by asking children twelve and older how far they thought they would actually go in school. College expectations are recoded into a dichotomous variable. The reference group consists of children who responded by answering they would attend school after high school to include vocational school or a two-year college.

*Children's school savings.* Information in the CDS is first collected on children's savings for future schooling in 2002 (PSID code Q2313B). Children are first asked whether they have conventional savings (yes/no). If they answer no, they are asked to skip to a different section of the survey and are not asked the follow-up question, whether they have designated a portion of this savings for future schooling (yes/no).<sup>4</sup> The skip pattern is used because children without savings have, for all practical purposes, stated that they do not have a portion of the savings set aside for their future

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<sup>4</sup> Questions on children's savings for college can be found in the following survey guide on page 45, Child CAPI Interview for Children Eight Years and Older at <http://psidonline.isr.umich.edu/CDS>.

schooling. To account for this, children who answered no to having savings are included in the number of children who do not have savings for future schooling and not as missing.<sup>5</sup>

*Parental income* is a continuous variable in the PSID summing total parental income from the previous tax year including all taxable income, transfer income, and social security income for anyone in the parental. Parental income is downloaded for 1997 and 2001. The 1997 income is inflated to 2001 price levels using the Consumer Price Index (CPI). After inflating parental income for 1997 to 2001 price levels, similar to Haveman and Wilson (2007), for each child we calculate a value of permanent income-needs of the family in which he or she lived during 1997 and 2001. The permanent income-needs of the family is calculated by taking the average family income for 1997 and 2001 divided by the national poverty line for a family of that size (Haveman & Wilson, 2007).<sup>6</sup>

*Parental wealth* (net worth) in the PSID is a continuous variable calculating parental wealth, summing separate values for a business, checking or savings, real estate, stocks, and other assets, subtracting out credit card and other debt. In this analysis, parental wealth does not include home equity. Parental wealth is averaged for 1999 and 2001 after 1999 parental wealth is inflated to 2001 price levels. Because parental wealth is skewed, we use the log form for the analysis.

*Homeownership* is measured in the PSID by asking heads of parents whether they own the house they live in or not. Homeownership is collapsed into: owns a home, and does not own a home.

### **Analysis plan**

A structural equation modeling (SEM) is performed on academic achievement predicted by child and parent characteristics for each race (Caucasian, African-American), academic achievement (reading, math), and household wealth (net worth, homeownership, child's savings for school). The amount of missing on the variables in the African-American sample is between 0 to 12.5%. For Caucasians, the amount of missing is 0 to 15.6%. The model is estimated using the Expectation-Maximization Maximum Likelihood (Jamshidian & Bentler, 1999) with the Yuan and Bentler (2000) correction for non-normality data with missing data. Jamshidian and Bentler (1999) method allows a model to be estimated without imputation and loss of subjects. Yuan and Bentler (2000) correction is similar to Satorra and Bentler (1994) with complete data. Dichotomous variable can be treated as continuous variable in SEM. There is no problem using a dichotomous independent variable (similar to multiple regression). There are problems associated with the use of dichotomous dependent variable, 1) non-normal errors, and 2) interpretation of parameters. First, the non-normal errors can be fixed by using either a correction for non-normality (like, Satorra-Bentler) or using an estimation method that do not assume normality (e.g., asymptotic distribution free). Second, even though an

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<sup>5</sup> The first author spoke with Donna J. Nordquist a research technician associate for the PSID about how to best handle the skip pattern (personal communication, July 23, 2008). The author was advised that those children who said "no" did not have savings and can be separated out, and the data used as part of the data for the follow up question (whether they have a portion of the savings for future schooling).

<sup>6</sup> In this manner parental size is controlled for.

interpretation of parameter (i.e., regression coefficient) is difficult, the strength of prediction is still valid. Moreover, since the aim of the current study is to test for mediation, it will not impact the results. The total and indirect effects are also adjusted for non-normality by using Yuan and Bentler (2000) corrected standard errors.

A saturated model is performed to test for mediation of school savings and college expectation between household wealth and academic achievement. Since the model is saturated, no model fit statistics (i.e., model chi-square, fit indices) will be reported. Mediation is present when total and indirect effects are significant but the direct effect is not. A partial mediation is present when total, indirect, and direct effects are significant.

## Results

Models examine the effect of parental wealth, income, and school savings on math scores among African American and Caucasian children separately. College aspirations and expectations were also investigated. Model 1 investigated net worth and Model 2 examined homeownership as parental wealth. The effects of parental wealth and income were examined with each other while college aspirations are held constant. The path model of net worth (model one) and that of homeownership (model two) are shown respectively in Figures 1 and 2. Analyses of the same path models predicting reading scores revealed that the effects of parental wealth, income, and school savings were mostly similar to the corresponding findings on math scores. Therefore, models were not presented, however, differences in findings on reading scores from those on math scores are presented (path diagram and coefficients are available upon request).

Description of the sample along with the correlation among study variables and their standard deviations are followed by detailed findings on the direct and indirect effects of parental wealth and income on children's math scores. Findings are reported for each racial group.

### Characteristics of the sample

Additional variables are included in Table 1 that are not included in the actual analysis to provide a richer description of sample characteristics. The percent of African Americans (46 percent) and Caucasians (54 percent) in this sample were fairly equal. There was a higher percent of African Americans than would be expected in the U.S. population because the PSID initially over-sampled low-income families. There were stark differences in the percent of people married between the races. Caucasian children's parents were almost two times more likely to be married than African American children. Moreover, Caucasian children lived in families with more education, higher levels of family income and higher levels of wealth. They were also much more likely to be living in an owned home than their African American counterparts. Caucasian children were also more likely to aspire to college, have higher math and reading scores, have school savings, and more saved for school.

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Table 1. Characteristics of sample

Variable Name	Entire Sample (N=1063)		African American (n=487)		White (n=576)	
	Number/Percent	<i>S.D.</i>	Number/Percent	<i>S.D.</i>	Number/Percent	<i>S.D.</i>
Marital status						
Married	685 (64)	1.47	207 (43)	2.24	478 (83)	1.57
Not married	378 (36)	1.47	280 (57)	2.24	98 (17)	1.57
Home ownership						
Own	748 (70)	1.40	256 (53)	2.27	492 (85)	1.47
Do not own	315 (30)	1.40	231 (47)	2.27	84 (15)	1.47
Child sex						
Male	527 (50)	1.53	259 (53)	2.26	268 (47)	2.08
Female	536 (50)	1.53	228 (47)	2.26	308 (53)	2.08
Child's aspirations						
Desire to attend college	758 (83)	1.24	325 (76)	2.06	433 (89)	1.41
Do not desire	154 (17)	1.24	101 (24)	2.06	53 (11)	1.41
Child's expectations						
Expect to attend college	669 (72)	1.48	318 (73)	2.13	351 (70)	2.05
Do not expect to attend	266 (28)	1.48	119 (27)	2.13	147 (30)	2.05
Savings account						
Has account	370 (40)	1.62	112 (26)	2.14	258 (53)	2.62
Does not have account	544 (60)	1.62	314 (74)	2.14	230 (47)	2.62
Continuous Variables						
Variable name	Mean	<i>S.D.</i>	Mean	<i>S.D.</i>	Mean	<i>S.D.</i>
Head's education	13	.07	12.41	.08	13.69	.10
Permanent income	3.99	.16	2.31	.08	5.39	.26
Log of wealth	7.78	.14	6.37	.20	8.98	.18
Household size	4	.04	4	.07	4	.04
Child's age	15	.05	15	.08	15	.07
Grade	9	.06	9	.09	9	.08
Math scores	102	.53	94	.64	109	.69
Reading scores	103	.67	95	.88	109	.89
Amount school savings	\$299.07	33.87	\$133.02	30.47	\$463.93	59.30

Table 2: Correlation Matrix for Study Variables

	1	2	3	4	5	6	7	8
1 Net worth	1	.187***	.219***	.290***	.198***	.136**	.131**	.135**
2 Home ownership	.317***	1	.173***	.147**	.144**	.090*	.150**	.126**
3 Income	.380***	.430***	1	.140**	.171***	.108*	.145**	.118**
4 School savings	.185***	.118*	.164**	1	.209***	.163***	.300***	.099*
5 College expectations	.226***	.118*	.189***	.198***	1	.424***	.275***	.240***
6 College aspirations	.162**	.108*	.148**	.140**	.307***	1	.213***	.147**
7 Math achievement	.161**	.170***	.247***	.094	.183***	.294***	1	.544***
8 Reading achievement	.174***	.115*	.276***	.178***	.186***	.259***	.549***	1
<i>SD (Black)</i>	4.405	.500	1.752	.441	.446	.426	13.317	18.504
<i>SD (White)</i>	4.361	.353	6.282	.500	.457	.312	15.462	19.927

<sup>a</sup> Below the diagonal are black children and above the diagonal are white children.

<sup>b</sup> \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 2 contains a correlation matrix among study variables with their standard deviations. Parental wealth (net worth and homeownership) and income were correlated among themselves; more highly among African American children than among Caucasian children. For example, among African American children the correlation between income and homeownership was .430 ( $p < .001$ ).<sup>7</sup> Conversely, it was .173 ( $p < .001$ ) among Caucasian children. School savings were correlated with parental wealth and income in both racial groups. However, school savings was not correlated with math scores among African American children ( $r = .094$ ;  $p = .054$ ). Whereas, school savings and math scores were positively correlated among Caucasian children ( $r = .300$ ;  $p < .001$ ). Math scores were correlated with all other variables except with school savings among African American children. Reading scores were correlated with all other variables in both racial groups. Math and reading scores were highly correlated regardless of race:  $r = .549$  among African American children;  $r = .544$  among Caucasian children.

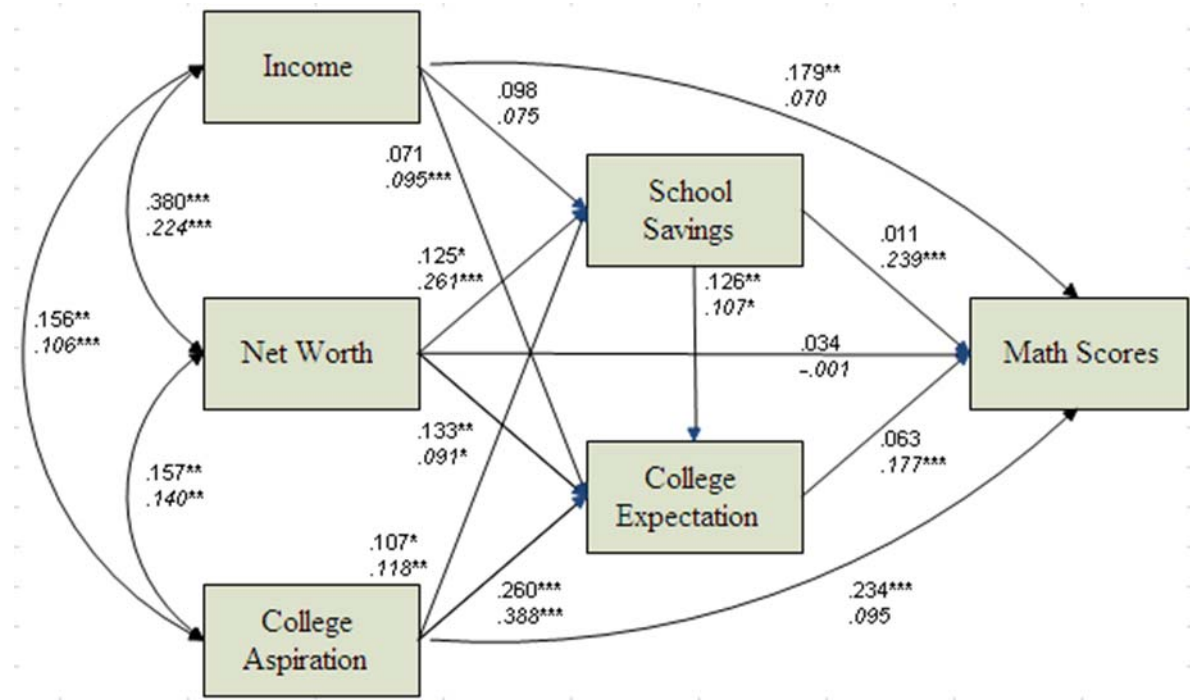
### Math scores

In brief, there were no direct effects of parental wealth (net worth or homeownership) on math scores regardless of children's race. The standardized coefficient for the direct path from net worth to math scores was .034 ( $p = .467$ ) among African American children, and -.001 ( $p = .988$ ) among Caucasian children (see Figure 1). The direct path from homeownership to math scores among African American children was .058 ( $p = .215$ ). For Caucasian children, it was .076 ( $p = .070$ ) (see Figure 2). However, among Caucasian children parental wealth (as net worth) was indirectly associated with math scores through school savings and college expectations. In contrast, among African American children, parental wealth was neither directly nor indirectly related to math scores.

The effects of school savings on math scores were different across race. School savings was related to Caucasian children's math scores directly [ $\beta = .239$  and  $.232$  ( $p < .001$ ) respectively in models one and two] as well as indirectly through college expectations ( $\beta = .019$  and  $.020$  ( $p < .05$ )). However, there were no corresponding associations among African American children. In the next section more detailed results are reported separately for Caucasian children and African American children.

<sup>7</sup> This is consistent with previous research using a multiyear income measure. Conley (1999) finds that income has a .45 correlation with net worth. However, Conley did not disaggregate by race.

Figure 1. Mediating pathways of net worth on children’s math scores through school savings and college expectations



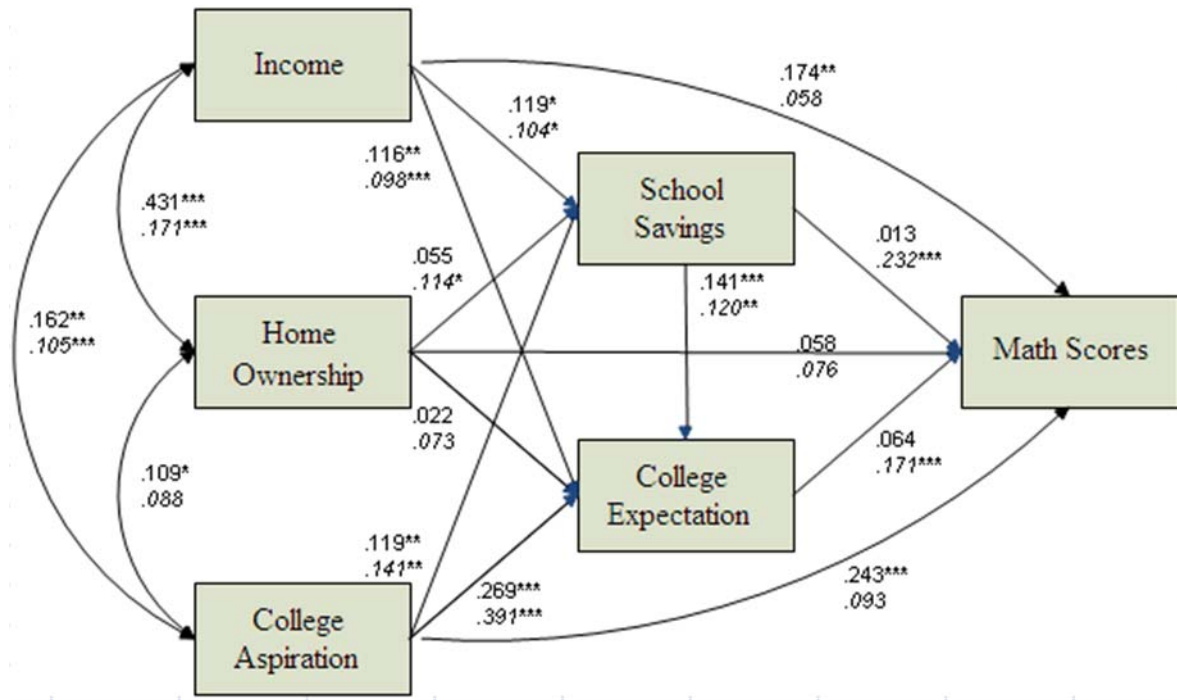
<sup>a</sup> White children are presented italicized and African American children non-italicized.

<sup>b</sup> For African American and white children respectively, R<sup>2</sup> of school savings is .054 and .107; R<sup>2</sup> of college expectations is .148 and .222; and R<sup>2</sup> of math scores is .134 and .152.

<sup>c</sup> \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.



Figure 2. Mediating pathways of home ownership on children’s math scores through school savings and college expectations



<sup>a</sup> White children are presented italicized and African American children non-italicized.

<sup>b</sup> For African American and white children respectively, R<sup>2</sup> of school savings is .043 and .054; R<sup>2</sup> of college expectations is .137 and .219; and R<sup>2</sup> of math scores is .139 and .158.

<sup>c</sup> \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

### Parental wealth—Net worth and homeownership and math scores

*Results for Caucasian children.* There was no significant prediction of Caucasian children's math scores by parental wealth: the regression coefficients for net worth and homeownership were  $-.001$  ( $p = .988$ ) and  $.076$  ( $p = .070$ ) respectively. Homeownership, however, was indirectly related to Caucasian children's math scores ( $\beta = .041$ ;  $p < .01$ ) through school savings and college expectations. The finding that there was no direct effect of homeownership suggests a full mediation. In contrast, net worth was not indirectly related to math scores.

There are three possible indirect paths through which homeownership maybe related to math scores: (1) homeownership to school savings to math scores, (2) homeownership to college expectations to math scores, and (3) homeownership to school savings to college expectations to math scores. We refer to the examination of results from each individual path as the disaggregated results in contrast to the total indirect or direct effects. A series of Sobel (1982) tests were used to examine each path of mediation.

First, school savings mediated the effect of homeownership on math scores. Given that there were no direct effects of homeownership, there was a full mediation by school savings (Sobel's  $z = 3.839$ ;  $p < .001$ ). Therefore, school savings mediated the effect of homeownership on Caucasian children's math scores. Second, there was no mediation of college expectations because homeownership was not related to college expectations.

Third, the indirect path from homeownership to school savings to college expectations to math scores may be inferred to be significant if (1) the indirect effect of homeownership on college expectations through school savings and (2) the indirect effect of school savings on math scores through college expectations were significant. This relationship did not exist for homeownership since school savings did not mediate the effect of homeownership to college expectations (indirect effect  $\beta = .014$   $p = .057$ ). However, there was a partial mediation through college expectation in the path from school savings to math scores (indirect effect  $\beta = .020$ ,  $p < .05$ ). Given that the former mediation, the indirect effect of homeownership on college expectation through school savings was marginally significant, we may expect this mechanism to mediate the association of homeownership to Caucasian children's math scores in future studies. That is, it may be that living in an owned home increases the likelihood that Caucasian children will possess school savings, which increases their college expectations, which again improves their math scores.

In sum, homeownership was related to Caucasian children's math scores only indirectly through school savings while net worth predicted their math scores neither directly nor indirectly. School savings mediated the effect of homeownership to Caucasian children's math scores. The mediation of school savings occurred solely but potentially involving college expectation as well. That is, school savings function as a single full mediator, but are likely to mediate the effect of parental wealth to college expectation so that college expectation may be the final mediator in the path.

*Results for African American children.* Parental wealth was neither directly nor indirectly related to African American children's math scores. Betas for the direct path from net worth and homeownership to math scores were .034 ( $p = .467$ ) and .058 ( $p = .215$ ). Indirect effects of net worth ( $\beta = .011$ ;  $p = .212$ ) and homeownership ( $\beta = .003$ ;  $p = .565$ ) were also not significant. No mediation was evident given the findings that potential mediators (school savings and college expectations) were not associated with math scores. They were also unrelated to the independent variable, homeownership, in the Model 2. Four preceding variables of math scores, net worth, homeownership, school savings, and college expectations, were not associated with math scores among African American children. This suggested that parental wealth was neither directly nor indirectly related to math scores among African American children.

### **Income and math scores**

The effect of income on children's math scores also differed across race. Income was directly associated with math scores among African American children while indirectly among Caucasian children. The indirect effect occurred through college expectations.

*Results for Caucasian children.* There was no direct effect of income on Caucasian children's math scores. In model 1 with net worth held constant, the regression coefficient for the direct effect of income was .070 ( $p = .145$ ), and in model 2 with homeownership controlled, the regression coefficient was .058 ( $p = .203$ ). However, income was indirectly associated with Caucasian children's math scores through school savings and college expectations together when examining total indirect effect before disaggregation of paths. The indirect effects of income were .036 ( $p < .05$ ) and .043 ( $p < .01$ ) for models 1 and 2 respectively.

However, once the paths were disaggregated, the only significant mediation occurred through college expectations at the  $p < .001$  level (Sobel's  $z = 3.449$  and  $3.342$  in models one and two respectively). Income strengthens Caucasian children's college expectation level, which increases math scores. Given the lack of direct effect of income on math scores, there was a full mediation. The other two indirect paths from income to math scores were not significant. In model 1 with net worth controlled, income had no relation to school savings, so indirect paths involving school savings were not significant. In the model 2 with homeownership controlled, school savings was not a mediator – Sobel's  $z$  of  $1.866$  ( $p = .062$ ). The other mediating path involving both school savings and college expectations was not significant due to the lack of mediation of school savings in the path from income to college expectations ( $\beta = .012$ ,  $p = .099$ ).

*Results for African American children.* Income was directly, but not indirectly associated with African American children's math scores in contrast to Caucasian children. The path coefficients for the direct path from income to math scores were significant at  $p < .01$  level with  $\beta = .179$  and  $.174$  for models 1 and 2 respectively. No indirect effects of income existed in both models [ $\beta = .006$  ( $p = .297$ ) in model 1;  $\beta = .010$  ( $p = .190$ ) in model 2] because potential mediators (school savings and college expectations) were not related to African American children's math scores.

### College aspirations and math scores

College aspirations were only indirectly associated with math scores among Caucasian children. Conversely, they were only directly associated with math scores among African American. Among Caucasian children, school savings and college expectations act individually mediated the effect of college aspirations to math scores. The mediating path from college aspirations to school savings to college expectations to math scores was significant only in the homeownership model (model two).

*Results for Caucasian children.* College aspirations were only indirectly related to Caucasian children's math scores. The direct path from college aspirations to math scores were not significant,  $\beta = .095$  ( $p = .081$ ) and  $\beta = .093$  ( $p = .085$ ) in models 1 and 2 respectively. However, indirect effects were significant at the  $p < .001$  level in both models with  $\beta = .099$  and  $.103$ . Disaggregation of the total indirect effects into the three possible mediating paths reveals that school savings and college expectations function as a mediator individually in both models. College aspirations were related to higher likelihood of school savings' possession, which in turn improves math scores [Sobel's  $z = 2.375$  ( $p < .05$ ) in model one and  $= 2.769$  ( $p < .01$ ) in model two]. At the same time, college aspirations were positively related to math scores through its positive association with college expectations [Sobel's  $z = 3.681$  and  $3.557$  ( $p < .001$ ) in models 1 and 2]. The third possible mediating path, that is, from college aspirations to school savings to college expectations to math scores may be significant only in the homeownership model based on the finding that the two involved pathways were significant; one, the indirect effects of college aspirations on college expectations through school savings ( $\beta = .017$ ;  $p < .05$ ) and the other, the indirect effect of school savings on math scores through college expectations ( $\beta = .020$ ;  $p < .05$ ). In the net worth model (model one) the former path was only marginally significant ( $\beta = .013$ ;  $p = .068$ ); therefore, the pathway from college aspirations to math scores through school savings and college expectations was unsupported.

*Results for African American children.* College aspirations were only directly related to math scores among African American children ( $\beta = .243$ ;  $p < .001$  in both models). There were no indirect effects [ $\beta = .019$  ( $p = .136$ ) and  $\beta = .020$  ( $p = .118$ ) in models 1 and 2 respectively]. The absence of indirect effects arose from the lack of association between possible mediators (school savings and college expectations) and math scores among African American children.

### Reading scores

As stated in the opening of the results section, analyses of the same path models predicting reading scores revealed that the effects of parental wealth, income, and school savings were mostly similar to the corresponding findings on math scores. Therefore, only differences in findings between math

and reading scores are presented in this section (path diagram and coefficients are available upon request).<sup>8</sup>

First, school savings were directly related to reading scores among African American children while there was neither direct nor indirect effect of school savings on Caucasian children's reading scores. Second, the mechanism through which homeownership was related to reading scores among Caucasian children differed from that in the models on math scores. That is, school savings did not mediate the effect of homeownership on reading scores for Caucasian children. Third, only in the homeownership model was income related to African American children's reading scores, directly and indirectly. There was only a direct effect of income on math scores among African American children. The indirect effect occurred through school savings, so that the effect of homeownership was mediated by school savings to African American children's reading scores. Fifth, college aspirations were related to African American children's reading scores directly and also indirectly. There was no indirect relationship in the case of math scores. However, not a single disaggregated mediating path among the three was significant by itself despite the total indirect effects being significant.

### Discussion

This study adds to the small but growing body of research on wealth and children's educational outcomes by providing a better understanding about the relationship between parental wealth (net worth and homeownership), children's school savings, family income, children's college expectations and math and reading scores. Moreover, we add to the existing knowledge by examining how these relationships vary between African American and their Caucasian counterparts.

More specifically, we found that the correlation between wealth and income is higher for African Americans than for Caucasians. On the one hand, a higher correlation between wealth and income may suggest that income takes a more important role in the habit or practice of saving for African Americans. On the other hand, a lower correlation suggests that Caucasian people may be more likely to value wealth and try to invest more in wealth despite insufficient levels of income. These results are consistent with previous research. For example, Schreiner and colleagues (2001) find that African Americans save less than their Caucasian counterparts. In either the case of African Americans or Caucasians, however, wealth and income are not highly correlated. This suggests that family income is not a good proxy for family wealth. Moreover, it suggests that both African Americans and Caucasians value wealth even if unequally.

However, we find that there are no direct effects of parental wealth (net worth or homeownership) on children's math or reading scores regardless of race. Previous research is mixed on this topic. Some researchers find that illiquid forms of wealth such as net worth and homeownership are not significantly associated with children's reading and math scores (Elliott III, 2008; Orr, 2003; Yeung

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<sup>8</sup> Findings that are the same as in math achievement are not reported.

& Conley, 2008). Williams (2007) finds that net worth is a significant predictor of math scores in the aggregate. However, when she breaks the sample down by race, it is not a significant predictor of math or reading scores. In contrast, Zhan (2006) finds a positive relationship between net worth and children's math and reading scores. Haurin et al. (2002) also find a positive relationship between homeownership and children's math and reading scores. A reason for differences in findings may be in part, to the use of different data sets. Haurin et al. and Zhan use data from the NLSY. Yeung and Conley (2008) suggest that findings based on NLSY data may not be generalizable because they, "... over represent children of relatively young mothers in early years and have considerable missing data on family wealth" (p. 306).

In addition to direct effects of parental wealth, we also were concerned with the role that children's wealth (school savings) may play. We proposed that children's savings is more likely to be directly related to children's math and reading scores than parental wealth. We find evidence that supports this proposition. While parental wealth was not directly associated with children's math or reading scores, in the case of Caucasian children, we find that school savings is directly related to math scores. Further, we find school savings is directly related to African American children's reading scores. The general finding that children's savings has a more direct and stronger influence on children's achievement is consistent with findings by Elliott et al. (2008a, 2008b). However, they did not examine how the relationship may vary across race. Moreover, they did not examine reading scores.

We also proposed children's school savings may act as a mediator between parental assets (net worth and homeownership) and children's math and reading scores. We find some evidence that supports this proposition. For Caucasian children, school savings was a full mediator between homeownership and children's math scores but not reading. This is in line with Elliott et al. (2008a) findings that children's savings acts a full mediator, however, it contradicts their findings of partial mediation in relation to children's school savings (Elliott III, et al., 2008b). In the case of African American children, the opposite is true. School savings does not mediate the relationship between parental assets and African American children's math scores. Therefore, whether school savings mediate the relationship between parental assets and children's math or reading scores may vary based on the race of the child and the type of wealth (i.e., moderated mediator).

Moreover, there is modest evidence that supports the proposition that higher parental wealth increases the likelihood of children possessing school savings, which increases their expectation for attending college, which improves their math and reading scores. However, it is only supported in the case of Caucasian children. Further, this particular pathway is stronger in the case of homeownership, than it is in the case of net worth.

This study treated aspirations and expectations as separate and distinct constructs. It was proposed that children with a positive aspiration for college would be more likely to possess savings for college and that expectation for college would be more likely to be directly related to children's

behavior (math and reading scores) than aspiration. There is some evidence, in the case of Caucasian children, to support the proposition that college aspiration is associated with possessing school savings. Results suggest, in the case of Caucasian children, college aspiration is associated with children possessing school savings. Conversely, it is not associated with African American children possessing school savings. However, it is far less clear whether aspirations or expectations are more likely to be directly related to children's behavior. While mixed, results appear to indicate that expectations are more likely to guide Caucasian children's behavior. Conversely, aspirations appear to play a larger role in African American children's behavior. More research is clearly needed to fully understand this process.

In addition to wealth, we also wanted to investigate the relationship between income and children's math and reading scores. The effect of income on children's math and reading scores also vary across race. Income is directly associated with math scores among African American children in both models (net worth and homeownership). However, in the case of reading, income was directly related only in the homeownership path. It was indirectly related to African American children's reading scores through school savings. These findings contradict Williams'(2007) findings that income is not a significant predictor of African American children's math and reading scores. In the case of Caucasian children, we do not find a direct effect of family income on either their math or reading scores. This also contradicts Williams'(2007) findings that income is statistically significant predictor of both math and reading for Caucasian children. We did find an indirect relationship between income and Caucasian children's math and reading which worked through school savings and college expectations together.

### **Limitations**

A limitation of this study is the lack of longitudinal data. As a result, we cannot assess whether math and reading scores change over time. Another limitation is that we could not completely control for the fact that characteristics of parents and children with wealth may differ in important ways from those with little or no wealth. As a result, we cannot rule out other causes for why children with wealth score higher than children with no wealth. Another limitation is that model fit of the data could not be obtained. Having model fit statistics allows examining the extent to which the tested path model fits the data and is valid in reference to the data. Moreover, when a certain path was significant in both groups, we could not report whether or not the coefficients were significantly different across racial groups. Future studies may want to use Multi-sample structural equation modeling (MSEM). In addition, both Sobel (1982) and Baron and Kenny (1986) tests can underestimate indirect effects because they assume that a sampling distribution of an indirect effect is normal, and indirect effects are seldom normally distributed. Shrout and Bolger (2002) have recommended bootstrapping be used instead. Bootstrapping does not make any assumption of distribution such that potential errors due to the non-normality of its standard errors may be prevented.

These are a few limitations that the reader should consider as he or she attempts to understand the practical significance of these findings. Moreover, the reader should recognize that it is not the authors' claim that wealth is the most important factor for understanding children's math and reading scores. Rather we claim that it is an understudied factor that is beginning to be mentioned more often as a part of a strategy for creating a 21<sup>st</sup> century human capital agenda. Therefore, more research is needed to determine the importance of wealth in understanding achievement.

### **Implications**

Despite the possibility of alternative explanations, findings of a positive relationship between parental and children's wealth and children's math and reading scores lend support for policies that promote wealth accumulation as part of a larger strategy for human capital development. Along with approaches that focus on increasing income and parental assets, policies (like CDA policies) that focus on increasing children's wealth should perhaps be given more consideration. In addition to the direct effects associated with children's school savings, there are also important indirect effects. It may be that higher net worth increases the likelihood of children possessing school savings, which increases their expectations for attending college, which improves their math and reading scores.

While researchers are paying more attention to the role of parental wealth in determining children's outcomes, less attention has been given to children's wealth. Models that attempt to explain children's outcomes and do not include children's wealth may be underspecified. Further, while race shows up in much of the literature on wealth and educational outcomes, these findings suggest that more research may be needed on how the relationships between wealth (parental and children's), college expectations, college aspirations, and children's math and readings scores vary across race. It may not be enough to simply control for race all the time. Researchers may also need to use separate samples of African Americans and Caucasians to gain a better understanding of how wealth effects differ across race.

### **Future Directions**

Future research may want to include liquid forms of household wealth. Liquid forms of wealth may allow children to purchase items like school clothes, books, or a computer, for example, which may more directly impact children's math performance. Researchers may also want to include additional pathways. For example, some previous research suggests that cultural capital may be an important pathway for understanding how parental wealth influences children's outcomes (see e.g., Orr, 2003; Yeung & Conley, 2008). In addition, researchers may want to examine whether findings vary across different wealth levels. It may be that as wealth levels among African American children go up, outcomes more closely mirror Caucasian children's. Lastly, researchers may also want to test whether wealth effects vary by gender.



## Conclusion

Results suggest that indirect effects of children's school savings may be equally important as its direct effects for children's educational outcomes. That is, savings and owning savings over a period of years may raise children's educational expectations, and raised expectations may lead to increased academic efforts and achievement. However, the processes by which both parental and children's wealth holdings influence children's outcomes appear to vary based on type of wealth (parental – net worth or homeownership or children's school savings), race of child (African American or Caucasian), and by academic domain (math or reading). More research is needed to fully understand these complex relationships.

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