What Skills Can Buy: Transmission Of Advantage Through Cognitive And Noncognitive Skills

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ABSTRACT

While income and wealth as *resources* undoubtedly contribute to the intergenerational transmission of social status, financial resources are at least partly endogenous to parents' cognitive and noncognitive skills. We argue that the advantages bestowed by these skills rather than material resources themselves are driving part of the observed relationship between parent financial resources and their children's educational attainment. Using the National Longitudinal Survey of Youth 1979 cohort and their children, we find that as much as half of the association between parent income and child baccalaureate college attendance and as much as a third of the association between parent income and child bachelor's degree completion reflects the contribution of parent skills. About thirty percent of the association between parent wealth and child baccalaureate college attendance and a fifth of the association between parent wealth and child bachelor's degree completion can likewise be traced to parent skills.

Introduction

Across time and place, children's outcomes are consistently tied to their parents' economic status (Reardon 2011). In the realm of education, children of affluent parents can expect not only to receive more years of education, but they are also likely to outperform their poorer peers and attend better schools (Alon 2009; Bowles and Gintis 1976; Reardon 2011; Shavit and Blossfeld 1993). Intuitively, it would seem that income and wealth contribute directly to achievement through expenditures on tutors, school tuition, residence in the catchment area of desirable schools, books, enriching extracurricular activities and cultural experiences (Hill and Duncan 1987; Lareau 2011; Orr 2003). However, the relationship between resources and student outcomes is almost surely in part spurious.

Income and wealth typically reflect more than just luck; the traits that help parents succeed in the labor market may also help their children succeed in school. As Jacob, et al. write, "whatever makes it difficult for parents to succeed in the labor market may also adversely affect the development of their children" (2014: 2). Mayer's (1997) examination of the effects of income supports this suggestion, noting that parents' underlying traits may be responsible for much of the effect of income on their children's outcomes. An individual's earnings are influenced by cognitive skills, including quantitative and verbal ability, and noncognitive skills, including personality traits, locus of control, self-concept and self-esteem (Almlund et al. 2011; Fletcher 2013; Gensowski et al. 2011; Groves 2001; Hauser 2010; Mayer 1997). This tie between skills and earnings suggests that cognitive and noncognitive skills may largely account for the observed associations between parental wealth and income and child educational outcomes.

If this is the case, it could be that the advantage of having affluent parents is attributable to parents passing these skills on to their children through a combination of social and biological

forces or even using their own skills to promote positive outcomes for their children. A parent's cognitive and noncognitive skills would thus not only predict their own income and wealth, but also their children's outcomes. Material resources, of course, are still likely to help children's outcomes to an extent, but the effect of these resources may be in large part confounded by ability. Thus far, many authors have ended their analysis at financial resources, not looking at these factors that may confound the effect of parent resources on child outcomes (for example, Alon 2009; Ermisch et al. 2012; Reardon 2011). In doing so, they miss this potentially important pathway for transmission of advantage from one generation to the next.

In this paper we document the degree to which parents' skills confound the relationship between their material resources and the educational attainment of their children. We hypothesize that the effects of parent cognitive and noncognitive skills will be substantial and that these skills are responsible for a significant part of the effect previously attributed to income and wealth. To examine this relationship, we first assess the baseline association of parent economic resources with their child's probability of college entrance and completion. From here, we look at the effects of parent cognitive and noncognitive skills on child outcomes, showing how much these skills confound the effects of parent income and wealth on child educational attainment. We also control for other likely confounders, such as parent educational attainment and demographic characteristics.

We use data from the National Longitudinal Study of Youth's (NLSY) 1979 cohort and their children (CNLSY), which allows me to take a two-generation approach. Using linear probability models to assess the effect of financial resources on a child's probability of attending college and completing a bachelor's degree, we evaluate the confounding effects of skills. find that as much as half of the association between parent income and child college attendance and

as much as a third of the association between parent income and child bachelor's degree completion reflects the contribution of parent skills. About thirty percent of the association between wealth and college attendance and a fifth of the association between wealth and bachelor's degree completion can likewise be traced to parent skills.

Literature Review

Financial Resources and Transmission of Advantage

The literature on transmission of advantage often focuses on parental income or wealth as central predictors of a child's educational or occupational success (for example, Aaronson and Mazumder 2008; Ermisch, et al. 2012; Orr 2003; Reardon 2011; Solon 2008). Given its focus on financial resources, this research typically suggests that material resources themselves are largely responsible for child outcomes. Parents with more income and wealth are simply better able to purchase the material, academic, and cultural goods that help their children succeed in the competition for educational achievement and credentials (Hill and Duncan 1987; Orr 2003). Not only do different endowments of economic capital affect parents' ability to purchase these resources, but parents' willingness to financially contribute to the cost of college varies by income as well (Steelman and Powell 1991). Beyond this, recent decades have seen a rise not only of income inequality but also of inequality in financial investments made in children across socioeconomic groups (Kornrich and Furstenberg 2013; Western et al. 2012). Although income and wealth as financial resources do not tell the entire story, they play a notable role in perpetuating the transmission of advantage from parents to children.

A note on the differences between income and wealth

Many regard income and wealth as similar indicators of financial well being, but the two measures are conceptually and analytically distinct (Conley 2001; Mayer 1997; Orr 2003; Pfeffer 2007). Income refers to the flow of money into a household and can vary substantially over time. It is relatively susceptible to shocks, so temporary periods of economic hardship are especially visible in measures of income taken at a single point in time. For this reason, permanent income is a more reliable measure of financial resources and other traits that accompany them (Rothstein and Wozny 2011). Wealth, on the other hand, encompasses all aspects of an individual's or a family's net worth measured at a given point in time. It provides a longer-term view of an individual's or family's stock of resources, which can accumulate over time and are often inherited across generations (Conley 2001). Along these lines, Orr (2003) shows that wealth captures underlying socioeconomic characteristics that contribute to a child's educational success in ways that income, educational, and occupation do not. This distinction between income and wealth is especially important for this paper, given that the degree to which skills predict income may differ from the degree to which they predict wealth.

Income and wealth also have unique relationships with cognitive and noncognitive skills. There is certainly overlap in the skills that produce income and those that produce wealth (cognitive ability, for example, promotes both) but the literature often looks at the two indicators separately and tends to identify different skills that drive the trends for each. For instance, skills promoting employability or on-the-job success, such as conscientiousness, extraversion, and an internal locus of control, are positively associated with income (Fletcher 2013; Groves 2005). The production of wealth, on the other hand, requires skills like forward-thinking, adequate financial literacy and numeracy, and dedication of time and energy to decisions regarding

investments and savings (Smith, McArdle and Willis 2010; Cole and Shastry 2009). Although income and wealth are typically strongly correlated (r=0.63 in our sample), they need not be mutually dependent because they can be derived from different sources. Two individuals with the same income may thus have notably different amounts of wealth. These differences in their endowments of each type of resources may be partially dependent upon their endowments of different types of cognitive and noncognitive skills.

Another distinguishing factor worth considering is that wealth may have a much looser tie to skills than income, given that it can simply be passed from one generation to the next. Keister and Moller write that "the bulk of the research on inheritance has demonstrated that inter-vivos transfers and bequests account for at least 50 percent… of the net worth of US families" (2000: 72). Inheriting a large sum of wealth does not necessarily require any particular skills. However, individuals who inherit wealth are also likely to inherit other characteristics, including skills, from their parents or grandparents. Thus, although beneficiaries may not have produced this wealth, they may well have similar wealth-producing traits to their forbearers who did. Income cannot be directly passed down in this way, so someone who inherits their wealth is not guaranteed a high income. Conversely, they may even have the opportunity to choose a less lucrative career than they would otherwise, given their inherited financial stability and opportunity to invest this wealth. Given these differences in the skills that produce wealth and income as well as the previous literature that distinguishes between the two, we treat them as conceptually separate in our analysis.

Cognitive and Noncognitive Skills and Financial Resources

As noted above, many authors end their analysis at financial resources, not looking at factors that may confound the effect of parent resources on child outcomes (for example, Alon 2009; Ermisch et al. 2012; Reardon 2011). Although they often acknowledge the possibility that other characteristics associated with parental financial resources may be partially driving these effects, such characteristics rarely serve as the focus of their analyses. This paper shifts the focus to these differentiating traits, specifically cognitive and noncognitive skills, noting that parents earning more income and accumulating more wealth are quite likely to systematically differ from those earning and accumulating less. As one may expect, both cognitive and certain noncognitive skills are positively associated with financial status (Fletcher 2013; Groves 2001; Gensowski 2011; Heckman et al. 2006). Educational attainment is also influenced by these skills, which then adds a strong indirect effect of skills to their direct effect on an individual's earnings.

Affluent parents have succeeded in the competition for education and financial resources where others have not and their degree of success may be attributable in part to their endowment of these skills or other underlying traits (Jacob et al. 2014; Mayer 1997). Given the wish that parents have for their children to succeed, affluent parents may be using these traits *in addition to their financial resources* to help give their children an extra advantage. Children may also benefit from their parents' skills because parents do pass these traits to their children through a range of social and biological pathways, which would help promote similar outcomes to their own (Anger 2012).

Cognitive Skills

Cognitive ability is positively correlated with earnings, although the strength of this correlation and the degree to which the effect is direct or mediated by educational attainment is unclear (Blanden et al. 2007; Cawley et al. 1997; Cawley et al. 2001; Hauser 2010; Heckman et al. 2006; Gensowski 2013). Fletcher (2013) finds that each additional standard deviation in cognitive skills is associated with a 12% increase in earnings. Similarly, Gensowski (2013) finds that, net of educational attainment, each standard deviation increase in cognitive skills is associated with an 18% increase in lifetime earnings. This positive association between cognitive ability and earnings supports the hypothesis that these skills may actually be at the root of the advantage that children of high-earning parents have in educational outcomes. A parent's ability to help with homework, clearly explain complex concepts that might be puzzling to a child, or perform other tasks dependent on their cognitive skills may actually be the more central to the heightened success of their children than the money they are able to invest in their child's development.

Still, it is important to note that the effect of cognitive skills on earnings is at least partially explained by educational attainment and occupational characteristics. For instance, Hauser (2010) finds that individuals with higher cognitive ability receive more schooling and given this tendency, the effect of cognitive ability on earnings disappears entirely when controlling for educational attainment. The same applies for wealth accumulation. Cawley et al. (2001) add that returns to education may be difficult to separate from returns to cognitive ability. They find that "measured cognitive ability and schooling are so highly correlated that one cannot separate their effects without imposing strong, arbitrary parametric structure in estimation which, when tested is rejected by the data" (2001: 420). In terms of the magnitude of a combined effect

of cognitive ability with education and experience, Cawley et al. (1997) find that these attributes account for up to a third of variation in wages. Either way, cognitive ability is still positively associated with higher earnings, so parents with higher earnings are not only better able to help their children financially, but their sharper intellect is also likely to help their children gain an edge in terms of outperforming their peers in school.

Noncognitive skills

Noncognitive skills are broadly and inconsistently defined throughout the literature. Some researchers focus on central personality traits (e.g. the Big Five) while others use the term to refer to a broader set of attributes including locus of control and self-esteem (for examples of the range of definitions of noncognitive skills, see Borghans, et al. 2008; Fletcher 2013; Gensowski 2013; and Groves 2001). There is, however, a general consensus that certain traits, particularly those relating to motivation, conscientiousness, extraversion, and individual control, tend to be associated with higher earnings (Fletcher 2013; Gensowski et al. 2011; Groves 2005; Mayer 1997).

In Mayer's (1997) discussion of traits likely to generate income, she includes diligence, honesty, good health, and reliability. Bringing to light the potential spurious effect of financial resources, her analyses suggest that these skills improve life chances, even independently of the income that they often generate. Studies using the Big Five personality traits to assess noncognitive skills provide further support that such traits are strongly associated with earnings, finding that a standard deviation in extraversion and conscientiousness increase earnings by 5-6% and 3-6%, respectively, while noting that each standard deviation in neuroticism corresponds with a 5-9% decrease in earnings (Fletcher 2013). Moving beyond the direct effect of skills on income, Gensowski et al. (2011) also acknowledge a mediating effect of education similar to that

seen with cognitive skills. They find that these positive effects of extraversion and conscientiousness have an indirect effect by way of education in addition to their direct effect on earnings.

A measure of unobserved cognitive and noncognitive skills: GPA

Although it is not typically considered a measure of skill, high school grade point average (GPA) is reflective of numerous cognitive and noncognitive traits predicting success both in school and on the labor market. Grades do reflect cognitive ability and ability to master the material, but noncognitive skills also explain much of the variation (Farkas 2003). In fact, Farkas finds that the effect of work habits on grades is as much as twice the size of the effect of coursework mastery. Personality traits such as effort, conscientiousness and self-discipline are also important predictors of variance in GPA. Henke, Chen and Goldman (1999) provide evidence that teachers do consider these other factors when determining grades, possibly even seeing them as more important than achievement. Using a 1994-1995 nationally representative sample of high school teachers, they find that 97% of teachers reported that effort was either very or extremely important for assigning grades. Absolute levels of student achievement, on the other hand, were only reported as very important by 76% of teachers. Tying this back to the role of social origin, these work habits and characteristics related to high grades often translate into particular status-related cultural traits that are rewarded by teachers (DiMaggio 1982). Given its ability to capture this wide range of skills that may otherwise be difficult to individually measure, GPA is a good proxy for a broader range of traits.

Data

I use data from the National Longitudinal Survey of Youth 1979 cohort (NLSY) and their children (CNLSY). The NLSY cohort includes data from a nationally representative sample of 12,686 men and women who were between ages 14 and 22 at the time of their first interview in 1979 (National Longitudinal Surveys 2014). From 1979 through 1994, interviews were conducted annually. Since then, participants have been interviewed biennially. Starting in 1986, the women in the cohort have also completed biennial interviews about their children. Children under the age of 15 receive an abbreviated survey and their mothers are responsible for reporting much of the information about the child. Children above age 15 participate in a "young adults" survey, which is similar to the surveys their mothers have completed since 1979 in terms of style and range of topics.

Data with this two-generation design are particularly useful for our purposes, given that we examine the relationship between parental characteristics and child educational outcomes. The current ages of participants and their children are advantageous as well. Many of the women in the 1979 cohort are old enough to have children who are old enough to have attended or graduated from college.[1] However, many children are still close to the age at which they would have graduated from college, so we are able to look at trends that are still relatively up to date. It is also important to remember that we directly observe characteristics of mothers but not fathers of children in the sample unless otherwise noted.

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[1] See Tables 1 and 2 in Appendix A for the age distributions of children and mothers in 2010.
[2] See Appendix B for calculations and further discussion of the index of dissimilarity.
[3] The Rotter Locus of Control Scale and the Pearlin Mastery Test ask very similar questions, but because they are not highly correlated enough to seem to measure the same construct, we include both in the model. Change over time may contribute partially to this difference, but using data

One widely known limitation of this dataset is that older children, including those of college age, were born to young mothers and are therefore disadvantaged relative to the general population. To assess the degree to which this biases our sample, we calculate an index of dissimilarity comparing mother's age at first birth in our analytic sample with the CDC's data on mother's age at first birth.[2] We find that the index of dissimilarity is only 11.2% for our analytical sample for college attendance, suggesting that although the two samples do differ in the age distribution of mothers, they are relatively similar. The index is somewhat higher for our sample restricted to those who had attended a baccalaureate college, at 21.4%. However, in this sample, mothers are actually slightly older than the general population. This is aligned with the fact that they are likely more advantaged, given that their children all attended college. Thus, although CNLSY is often described as a disadvantaged population, we believe the sample is similar enough to the general population for results to be generalized.

Variables

To assess whether or not a child has ever attended a baccalaureate college, we create a dummy variable, defining "any college" as having reported attending a college classified by IPEDS as a four-year college. We exclude individuals under age 20 from our sample, as much of that age group is unlikely to have had the opportunity to attend college. By age 20, it is likely that many individuals that will ever attend college have begun their enrollment. According to Bozick and DeLuca (2005), about 16% of those who will attend college do not begin their enrollment during the same calendar year in which they graduated. However, more recent analyses using the 2013 wave of High School and Beyond indicate that attending a four-year college later in life is more prevalent than Bozick and DeLuca suggest. We will not be able to

[2] See Appendix B for calculations and further discussion of the index of dissimilarity.

look at these late-attendees with our sample, but approximately two years after high school graduation, we should still capture the majority of students who enter college in the traditional time frame. A second dummy variable shows whether an individual who entered a baccalaureate college ultimately completed at least a bachelor's degree. Here, we exclude respondents that were still enrolled between 2006 and 2010 and had not reported completing their degree by 2010. In doing this, we give college attendees enough time to complete their degree within a minimum of six years following enrollment.

Our initial models look at the baseline effect of household income and wealth on college attendance and completion. To measure income and wealth, we take the natural logarithm of a household's income and wealth in real 2010 dollars. We account for families that have either zero or negative income or wealth by using constant substitution, assigning permanent income and wealth of $500 for those falling into this group and including a dummy variable indicating which cases are assigned. To calculate these measures of financial resources, we take the average of the non-missing values for each indicator during the five years leading up to and including the year that the child was sixteen years old. We choose this age because it is likely to be a time when children would be making decisions that influence college attendance. Long-term measures also provide better estimates of a family's economic status than those taken at a single point in time, given variation resulting from random shocks. Along these lines, Pfeffer (2007) and Rothstein and Wozny (2011) show that wealth and permanent income, respectively, have much larger effects on child outcomes than does income as measured at a single point in time. By using permanent measures, we aim to more accurately capture levels of these resources in the long-term, not only at a given point in time.

In the next set of models, we add measures of mother's cognitive and noncognitive skills. We use the Armed Forces Qualifying Test (AFQT) percentile score to assess cognitive skills. The test was given to all participants in 1980, so we assume that one's position in the relative ranking of cognitive ability has not changed since then. To appropriately account for age and simplify interpretation, we use the standardized residuals from a regression of AFQT percentile score on age rather than AFQT percentile score itself in our model.

As previously mentioned, noncognitive skills are very broadly defined in the literature. NLSY provides data on mother's locus of control, self-concept, and self-esteem, so we include standardized measures of these three scales in the analyses.[3] Different question batteries were administered at different points in time. The Rotter Locus of Control Scale was given in 1979, the Pearlin Mastery Test was given in 1992, and the Rosenberg Self-Esteem Scale was given in 1980. However, all three skills are measured before individuals have presumably amassed the bulk of their financial resources, so it is unlikely that they are simply caused by, not predictive of, the income and wealth that their skills will help them generate. Thus, although scores on these scales do vary over time, the score at this point in life, before individuals have established themselves in the labor force, is meaningful for our analysis. We also include mother's high school GPA to proxy numerous unmeasured cognitive and noncognitive skills, especially conscientiousness. To measure GPA, we use an average of all reported science, math, reading, and social studies grades from 1981 high school transcripts.

From here, we add measures of mother's educational attainment to the model. To model the added benefit for each additional year of education in addition to the advantage of gaining a

[3] The Rotter Locus of Control Scale and the Pearlin Mastery Test ask very similar questions, but because they are not highly correlated enough to seem to measure the same construct, we include both in the model. Change over time may contribute partially to this difference, but using data from High School and Beyond, we find that the two scales are not even highly correlated when assessed in the same year.

degree or passing a particular threshold, we use a continuous variable for number of years as well as a set of dummy variables for each degree or threshold. For the set of dummy variables for levels of education, we divide years of schooling into the following categories: less than 12 years, 12 years, 13 to 15 years, 16 years, and more than 16 years. The lowest category serves as the reference group, so all coefficients represent the difference between children with parents who did not complete high school and parents who completed the level indicated by the variable net of years of education and cognitive and noncognitive skills. This addition of educational attainment to our models allows me to assess the degree to which the effects of skills are mediated by educational attainment, as Hauser (2010) suggests may be the case.

Finally, we add measures of child skills. The data available on noncognitive skills are indicators of self-concept and self-esteem, both of which we standardize. Unlike mothers, children are given these tests frequently, so we take the average of the available scores during the years children were thirteen to sixteen years old. We also add an indicator of cognitive skills, the Peabody Individual Achievement Test (PIAT), which we standardize on age. The inclusion of child skills allows me to assess the degree to which children's own cognitive and noncognitive skills mediate the effect of their parents' financial resources. We also present the correlations between parent and child scores on skills where indicators of both are available. In all of our models, we include child race and gender as controls.

Methods

We use two sets of linear probability models to evaluate our hypotheses. The first assesses baccalaureate college attendance; the second assesses completion of a bachelor's degree conditional on attendance. Both outcome variables are dummy-coded, so results are interpreted

as the increased or decreased probability that a child will attend college or earn a bachelor's degree given initial college attendance, based on that particular trait. We cluster our observations by mothers to provide more accurate standard errors. We use the custom weights provided by CNLSY to properly weight our sample. To address item nonresponse, we use multiple imputation using chained equations. Table 3 lists the means and standard deviations of each variable in the analysis. Tables 4 and 5 show the results of models predicting college attendance and completion of a bachelor's degree, respectively.

Results

Results from the attendance models

Our findings suggest that skills account for as much as half of the association between parent income and college attendance. In our initial model, shown in Table 4, we estimate that a 100% increase in income would increase the probability that a child will attend college by 9.2 percentage points (±2.8 percentage points). With the incorporation of mother's skills into the model, the association is nearly halved, now predicting only a 4.8 percentage point (±2.8 percentage point) greater probability of attendance. The inclusion of mother's education and ultimately child characteristics attenuates the association even further. In the final model, the effect of a 100% increase in income diminishes to only 3.2 percentage points (±2.8 percentage points). Across all of the models, the estimates are statistically significant.

The association of wealth with attendance is smaller than that of income in the first model, where a 100% increase in wealth predicts a 4.4 percentage point (±1.4 percentage point) increase in the probability that a child attends college. More interestingly, wealth's association is not as strongly attenuated as income's association by the inclusion of skills in the model,

declining by about 30% to a 3.1 percentage point (±1.4 percentage point) increase. It retains much of this magnitude through the final model, where a 100% increase in income predicts a 2.4 percentage point (±1.4 percentage point) increase in the probability of attendance. As with income, the estimates are statistically significant across all four models. These findings suggest that although both income and wealth's benefits are partially attributable to mother's skills, the benefits associated with income are more strongly driven by skills than are those associated with wealth.

In terms of the effects of mother's skills, GPA has a large magnitude even when conditioning on cognitive ability. For each point of mother's GPA, the first model accounting for skills predicts that children have a 7.3 percentage point (±3.2 percentage point) greater probability of attending college. Even after factoring in mother's educational attainment and child skills, a point of GPA still predicts a 5.5 percentage point (±3.0 percentage point) higher probability of attendance. Of the measures of specific skills, cognitive ability has the largest effect in the initial model, with each standard deviation predicting a 6.8 percentage point (±2.8 percentage point) increase in the probability of attending college. However, this association decreases to 4.4 percentage points (±2.8 percentage points) with the inclusion of mother's education and ultimately to 3.7 percentage points (±3.0 percentage points) with the inclusion of child skills. Among noncognitive skills, mother's locus of control has the largest effect throughout all of the models, even after child skills are incorporated, with each standard deviation predicting a 1.4 percentage point (± 2.0 percentage point) increase in probability of attendance. Each standard deviation in both mother's self-esteem and self-concept predict a 0.4 percentage point (± approximately 2.2 percentage point) increase in a child's probability of

college attendance in this final model. However, none of these measures has a statistically significant effect in any of the models.

Results from the completion models

In the models predicting completion, skills account for close to a third of the association between parent income and bachelor's degree completion. As seen in Table 5, a 100% increase in household income predicts a 9.1 percentage point (±5.8 percentage point) increase in the probability of completion in the initial model. When skills are included, the association drops to 6.2 percentage points (±5.6 percentage points). Controlling for mother's education and child skills further attenuates the estimate, showing that a 100% increase in income is associated with a 5.5 percentage point (±5.6 percentage point) greater probability of completion. As in the attendance models, wealth has a somewhat smaller effect than income and the confounding effect of skills is not as pronounced. The initial prediction of a 4.7 percentage point (±2.6 percentage point) increase in the probability of completion upon doubling wealth decreases by just under one-fifth in the second model, where a comparable increase in wealth predicts only a 3.9 percentage point (±2.6 percentage point) increase in the probability of completion. The estimate retains much of its magnitude through the final model. This suggests that skills account for a smaller portion of the relationship between both income and wealth and college completion than they do for attendance, although skills still account for a notable portion of these effects.

As seen in the models predicting college attendance, mother's GPA has a substantial effect on child outcomes and its effects are even greater for predicting completion. In the first model accounting for skills, each point of mother's GPA predicts a 9.2 percentage point (±5.6 percentage point) increase in the probability that her child completes their bachelor's degree.

Even in the final model, which accounts for both child skills and mother's educational attainment, each grade point still predicts an 8.0 percentage point (±5.8 percentage point) increase in a child's probability of completion. Mother's cognitive ability, unlike in the attendance models, has essentially no effect on completion. Across the three models, estimates of cognitive ability's effects are small and statistically insignificant. The effects of mother's self-concept, self-esteem, and locus of control are moderately larger than they were in the attendance models, but none are statistically significant after including controls. Still, mother's self-esteem and self-concept have the strongest relationships with completion throughout the final model, where each standard deviation predicts a 2.4 percentage point (±3.8 percentage point) and a 1.7 percentage point (±3.6 percentage point) increase in the probability of completion, respectively. Locus of control has a negligible negative effect.

Correlations of parent and child skills

As seen in our multivariate analyses, the effects of mother's skills on her child's educational attainment are not driven by child skills. In fact, correlations of parent and child skills are not particularly strong (see Table 6). The highest correlation is that of cognitive skills, at around 0.31. Neither self-esteem nor self-concept is strongly correlated, both around 0.1. These low correlations suggest that mother's skills themselves, not just the transfer of skills from mothers to children, are helping their children succeed in school.

Discussion

In this paper, we explore the possibility that parent skills account for part of the association of family financial resources with child educational outcomes. Our findings support

this hypothesis and suggest that the literature thus far has overemphasized the influence of money itself. Parent cognitive and noncognitive skills, which are predictive of financial resources, are a driving force behind resources' effects on children's success in education. Our analyses show that mother's skills account for close to half of the effect of income on college attendance and nearly a third of the effect of income on bachelor's degree completion. Wealth's association with child outcomes is not as strongly confounded by mother's skills. Still, the models indicate that almost a third of association with attendance and just under a fifth of the association with completion is attributable to skills.

Given these findings, researchers studying the association of family background with a child's educational attainment should give a greater attention to the confounding effects of skills on those of resources. Characteristics beyond financial resources certainly help promote positive outcomes for children of the affluent. Parents with high endowments of financial resources are not only using their money to help their children succeed, but they are using their skills as well. Our findings show that while these skills are associated with a high income and wealth, the skills themselves help children succeed beyond the effect of money alone.

An interesting aspect of these patterns is that skills seem to operate more strongly through income than wealth. The confounding effects of these skills is consistent with the previous literature on earnings, which suggests that some of the particular skills we include in our analysis, such as cognitive ability, locus of control and conscientiousness, are especially predictive of a higher income (Fletcher 2013; Mayer 1997). It is also worth noting that conscientiousness, which is reflected in high school GPA, and cognitive ability are commonly associated with income in the literature and in our analyses, they are both also predictive of child educational outcomes. Wealth, on the other hand, is more reflective of long-term family status,

which does not necessarily directly reflect parent skills and may be more directly tied to grandparent or great-grandparent skills. Because income may be directly wedded to individual characteristics and skills than is wealth, it makes sense that income's association with child educational attainment is operates more strongly through skills. However, we may be underestimating the confounding effect of mother's skills on the effect of wealth, given that the skills we included in our model are more similar to those that the literature identifies as especially predictive of income rather than wealth.

Also of note is that the associations of income and wealth with child outcomes are relatively similar in the baseline attendance and baseline completion models, but skills have less of a confounding effect on resources for completion than they do for attendance. This may be due to the fact that children are typically no longer in as close contact with their parents at the time of college completion as they were at the time of college attendance and thus cannot receive the full benefit of their skills on a regular basis. When they are preparing to attend college, their parents are around and can use their own skills to help their children navigate the application process or school system and complete their schoolwork. By the time they reach college, children do not have as ready access to their mother's resource-producing skills that had previously given them an advantage. They do, however, still have access to financial resources and can receive the benefits of financial resources themselves from afar, given that college students often remain financially dependent upon their parents. Given these changes in the relationship between parents and children from the time children are eligible to attend college to the time children are eligible to complete their degree, these differences in the confounding effect of skills make sense.

Conclusion

Overall, this analysis shows that the effect that parental financial resources themselves have on child outcomes tends to be overstated in the literature. Financial resources do matter, but individuals with high levels of these resources tend to have a set of skills that help their children beyond the influence of their money. Although mother's skills do not account for the entire association between household financial resources and child educational outcomes, a notable portion otherwise attributed to these resources is tied to mother's cognitive and noncognitive skills. The advantages of income, in particular, seem to be substantially driven by mother's skills. Additionally, this confounding effect is especially marked for college attendance. Our findings suggest that researchers trying to understand the pathway from parent resources to child educational outcomes should reconsider the traditional model and shift their focus to skills and other characteristics that directly predict both resources and child outcomes.

Our findings support evidence from previous studies, including Mayer (1997) and Jacob et al. (2014), suggesting that financial resources alone are not responsible for the disparities in child outcomes. Aligned with Heckman et al. (2006), we also find that skills, both cognitive and noncognitive, are quite important for outcomes and that parent skill levels are important for helping their children succeed. Together, these findings suggest that interventions promoting the development of skills in parents and children coupled with transfers of financial resources may be more effective for minimizing the intergenerational persistence of inequality than interventions focusing on either money or skills alone. Working with parents to help them navigate the education system and working with children to help them develop high levels of

cognitive and noncognitive skills early in life would likely be effective in helping children from all backgrounds achieve more equal outcomes.

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Appendix A

Table 1. Distribution of child ages in 2010 for college attendance sample (using child weights)

Child Age in 2010	Frequency	Percent
20	397	9.53
21	449	10.78
22	320	7.68
23	363	8.71
24	339	8.13
25	364	8.73
26	331	7.94
27	289	6.94
28	347	8.32
29	266	6.39
30	240	5.76
31	139	3.34
32	109	2.62
33	98	2.35
34	53	1.28
35	36	0.87
36	14	0.32
37	7	0.18
38	3	0.08
39	1	0.02
40	0	0.01
Total	4168	100

Table 2. Distribution of parent ages in 2010 for college attendance sample (using child weights)

Parent Age in 2010	Frequency	Percent
46	334	8
47	440	10.56
48	461	11.07
49	511	12.27
50	532	12.75
51	578	13.87
52	631	15.14
53	681	16.34
Total	4168	100

Table 3. Means and Standard Deviations (using child weights)

	College Attendance		BA Completion given Attendance	
	Mean or Percentage	Std. Deviation (where appropriate)	Mean or Percentage	Std. Deviation (where appropriate)
Attended a Four-Year College	48.4%			
Completed a Bachelor's degree if Attended			68.39%	
Financial Resources				
Log of Income	3.90	0.95	4.20	0.80
Income ≤ 0	0.50%		0.08%	
Log of Wealth	3.45	2.39	4.24	2.12
Wealth ≤ 0	12.85%		6.97%	
Mother's Cognitive and Noncognitive Skills				
High School GPA	2.28	0.89	2.595	0.85
Standardized AFQT score residual	0.37	1.04	0.75	1.02
Standardized Self-Concept Scale	0.13	0.99	0.26	0.95
Standardized Self-esteem Scale	0.13	0.99	0.35	1.01
Standardized Locus of Control Scale	0.12	1.02	0.31	1.04
Mother's Education				
Years of school completed by parent	13.54	2.46	14.37	2.56
Less than High School (<12 years)	10.04%		5.12%	
Completed High School (12 years)	34.08%		26.50%	
Some college (13-15 years)	33.21%		32.82%	
Completed college (16 years)	12.21%		17.34%	
More than college (>16 years)	10.46%		18.22%	
Child's Cognitive and Noncognitive Skills				
Standardized PIAT score residual	0.24	0.96	0.528	0.91
Standardized Self-esteem Scale	-0.04	1.01	0.092	0.99
Standardized Self-concept Scale	0.01	0.99	0.19	0.94
Race				
Hispanic	8.81%		6.13%	
Black	21.53%		15.75%	
Non-Hispanic Non-Black	69.66%		78.12%	
Male	48.07%		46.48%	
N	4168		1040	

Table 4. Models predicting baccalaureate college attendance

	Financial Resources	+ Mother's Skills	+ Mother's Education	+ Child's Skills
Financial Resources				
Log of income	0.092***	0.048***	0.036**	0.032**
	(0.014)	(0.014)	(0.014)	(0.014)
Income ≤ 0	0.272***	0.154*	0.103	0.120
	(0.095)	(0.090)	(0.087)	(0.091)
Log of wealth	0.044***	0.031***	0.029***	0.024***
	(0.007)	(0.007)	(0.007)	(0.007)
Wealth ≤ 0	0.064*	0.033	0.015	0.016
	(0.033)	(0.033)	(0.033)	(0.033)
Mother's skills				
High School GPA		0.073***	0.059***	0.055***
		(0.016)	(0.016)	(0.015)
Standardized AFQT score		0.068***	0.044***	0.037**
		(0.014)	(0.014)	(0.015)
Standardized Self-Concept score		0.012	0.010	0.004
		(0.010)	(0.010)	(0.010)
Standardized Self-esteem score		0.015	0.008	0.004
		(0.011)	(0.011)	(0.011)
Standardized Locus of Control score		0.017	0.014	0.014
		(0.010)	(0.010)	(0.010)
Mother's education				
Highest grade/year completed by mother			0.005	0.003
			(0.011)	(0.011)
Completed High School			0.012	0.011
			(0.037)	(0.038)
Some College			0.045	0.046
			(0.053)	(0.054)
Completed College			0.141*	0.142*
			(0.077)	(0.080)
More than College			0.191*	0.199*
			(0.100)	(0.102)
Child's skills				
Child's standardized PIAT score				0.049***
				(0.011)
Child's standardized Self-esteem score				0.021
				(0.015)
Child's standardized Self-concept score				0.042***
				(0.014)
Race				
Hispanic	-0.093***	0.005	-0.011	-0.014
	(0.025)	(0.026)	(0.026)	(0.026)
Black	-0.000	0.075***	0.042*	0.037
	(0.022)	(0.024)	(0.024)	(0.024)
Male	-0.038**	-0.046***	-0.044***	-0.047***
	(0.017)	(0.017)	(0.016)	(0.016)
Constant	-0.011	-0.007	-0.022	0.043
	(0.048)	(0.055)	(0.124)	(0.125)
Observations	4,168	4,168	4,168	4,168

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

Table 5. Models predicting bachelor's degree completion given attendance

	Financial Resources	+ Mother's Skills	+ Mother's Education	+ Child's Skills
Financial Resources				
Log of income	0.091***	0.062**	0.054*	0.055*
	(0.029)	(0.028)	(0.028)	(0.028)
Income ≤ 0	0.516	0.438	0.409	0.482
	(0.398)	(0.435)	(0.444)	(0.458)
Log of wealth	0.047***	0.039***	0.036***	0.033***
	(0.013)	(0.013)	(0.013)	(0.013)
Wealth ≤ 0	0.121	0.100	0.080	0.077
	(0.080)	(0.078)	(0.079)	(0.078)
Mother's skills				
High School GPA		0.092***	0.082***	0.080***
		(0.028)	(0.028)	(0.029)
Standardized AFQT score		0.002	-0.012	-0.017
		(0.025)	(0.026)	(0.026)
Standardized Self-Concept score		0.021	0.019	0.017
		(0.018)	(0.018)	(0.018)
Standardized Self-esteem score		0.031*	0.024	0.024
		(0.018)	(0.019)	(0.019)
Standardized Locus of Control score		-0.005	-0.006	-0.005
		(0.017)	(0.017)	(0.017)
Mother's education				
Highest grade/year completed by mother			-0.009	-0.008
			(0.020)	(0.020)
Completed High School			0.085	0.073
			(0.085)	(0.087)
Some College			0.146	0.129
			(0.111)	(0.113)
Completed College			0.225	0.199
			(0.147)	(0.149)
More than College			0.235	0.209
			(0.188)	(0.191)
Child's skills				
Child's standardized PIAT score				0.069***
				(0.023)
Child's standardized Self-esteem score				-0.006
				(0.029)
Child's standardized Self-concept score				0.009
				(0.032)
Race				
Hispanic	-0.071	-0.020	-0.032	-0.033
	(0.048)	(0.049)	(0.049)	(0.048)
Black	-0.102**	-0.065	-0.090*	-0.074
	(0.042)	(0.046)	(0.047)	(0.048)
Male	0.031	0.016	0.018	0.017
	(0.030)	(0.029)	(0.029)	(0.029)
Constant	0.096	0.001	0.065	0.051
	(0.108)	(0.116)	(0.227)	(0.227)
Observations	1,040	1,040	1,040	1,040

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

Table 6. Correlations of mother and child skills

Skill	**Correlation**
Cognitive ability	0.33
Self-concept	0.11
Self-esteem	0.10

Appendix B

To calculate the index of dissimilarity, we use the Center for Disease Control and Prevention's data on age of mother at first birth for all races in 1970-1990, the years during which children in our sample were born. We compare this with mother's age at first birth in our analytic sample from CNLSY. We use the following equation to calculate the index: $I_D=0.5*\Sigma|Proportion_{CDC} - Proportion_{CNLSY}|$. In Tables 1 and 2, we show the calculations for our college attendance sample (those 20 or older in 2010) and our college completion sample conditional on college attendance using child weights.

Table 1. Sample for College Attendance Models

Mother's age	$Prop_{CNLSY}$	$Prop_{CDC}$	Index of Dissimilarity
10-14	0.000598	0.007808	0.00721
15-19	0.128413	0.27685	0.148437
20-24	0.359221	0.358504	0.000717
25-29	0.395962	0.241732	0.15423
30-34	0.115806	0.089322	0.026483
			I_D=11.18%

Table 2. Sample for College Completion Models

Mother's age	$Prop_{CNLSY}$	$Prop_{CDC}$	Index of Dissimilarity
10-14	0	0.007808	0.007808
15-19	0.100019	0.27685	0.176832
20-24	0.342073	0.358504	0.016431
25-29	0.426089	0.241732	0.184357
30-34	0.13182	0.089322	0.042497
			I_D=21.40%