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The importance of family income in the formation and evolution of non-cognitive skills in childhood☆

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ABSTRACT

Little is known about the relationship between family income and children's non-cognitive (or socio-emotional) skill formation. This is an important gap, as these skills have been hypothesized to be a critical link between early outcomes and adult socioeconomic status. This paper presents new evidence of the importance of family income in the formation and evolution of children's non-cognitive skills using a recent US panel dataset that tracks children between grades K-5. Findings suggest an important divergence in non-cognitive skills based on family income that accumulates over time and does not seem to be explained by children's health status differences.

> "Genius is 1 percent inspiration and 99 percent perspiration." Thomas Edison

1. Introduction

Parental socio-economic status is an important determinant of a child's future socio-economic status (SES), and the pathway to this link is thought to be some combination of genes (inheritance), parental time investments in the child weighted by the quality of that time, access to marketed goods and services, community resources and other aspects of the home environment. The intermediate outcome of this combination of factors is a variety of forms of human capital, and ones most frequently studied are health and cognitive development (years of schooling and test scores, for example). Numerous papers have been written on poor-non-poor gaps in health and school performance among children but far fewer on non-cognitive gaps by SES, even though evidence is accumulating that these non-cognitive skills may also be critically important as determinants of future success.

Beginning primarily with work by Case, Lubotsky and Paxson (2002), economists and other social scientists have focused on the childhood origins of the large differences in health and economic status during adulthood. This work showed that the relationship between family income and child health grows stronger as children age, likely in part due to the cumulative effects of living in low-income households who face associated stress, more frequent health shocks and limited access to health care. This research has spawned a large set of papers that show that these empirical relationships can be found across countries with very different welfare and health systems as well as across time periods (Currie & Stabile, 2003; Condliffe & Link, 2008; Khanama, Nghiemb & Connelly, 2009; Propper, Rigg & Burgess, 2007; See Fletcher and Wolfe (2014) for review).

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A relatively less studied but related question is whether similar patterns exist in other areas of childhood development, such as so-called "non-cognitive" (socio-emotional/personality) skills. As opposed to cognitive skills, which are measured by scores on tests such as reading, math, history or science as well as IQ tests, non-cognitive skills are both more difficult to measure and there is less agreement on which ones are important.[1,2] The limited agreement on both the conceptualization of non-cognitive skills and inconsistent measurement may contribute to the lack of attention by economists.

The limited study of non-cognitive or socio-emotional skills is a potentially important omission since socio-emotional skills may be a critical factor in predicting a range of important adult outcomes. This domain of skill formation has also become the subject of intense study in economics in recent years.[3] For example, work with the NLSY (Heckman, Sixtrud & Urzua, 2006) found that locus of control and self-esteem were likely critical in determining years of schooling.[4,5] In a recent overview paper, Brunello and Schlotter (2011) suggest that non-cognitive skills are important as determinants of these skills but also of cognitive skills more generally and cite evidence of the importance of this under-researched area of human capital. They also stress the very limited knowledge of the *determinants* of non-cognitive skills and raise (but do not answer) the question of whether these are malleable and might respond to interventions.

The objective of this paper is to increase our knowledge of the ways in which family socio-economic status, in particular income, influences the acquisition of non-cognitive skills as a child grows up. We study this issue for a particular set of non-cognitive skills; a priori we have no expectation that the tie from parental income to non-cognitive skills will be similar, much less the same, across all non-cognitive skills. In supplementary analysis (see Appendix Table A), we also attempt to ascertain the links from non-cognitive skills to cognitive skills and/or whether non-cognitive skills appear to be influenced by earlier cognitive skills in order to further understand the importance and determinants of the various non-cognitive measures in the data.

Increasing our understanding of the factors critical in explaining the formation of socio-emotional skills during childhood and also whether the divergence in these skills is in part due to family resources is our focus. Evidence on this question may provide clues on whether policies that increase the resources of low income households may have positive effects on children's socio-emotional development, though the descriptive results in this paper serve only as a first step in this direction.

This paper contributes to the literature by providing some of the first evidence of the magnitude of differences by family income in socio-emotional skills at Kindergarten and how these differences change as children age. We do this by using a recent panel study from the US that tracks a national sample of children between Kindergarten and 5th grade to examine the associations between family income and a broad set of measures of children's socio-emotional skill development. The panel nature of the data allows measures of permanent family income to be assessed and the sampling structure of the data allows the inclusion of neighborhood measures of human capital, including income. The rich set of survey questions enables us to separate the potential direct effects of family income on skills with the indirect effects that might operate through children's health. In particular, we hypothesize that children growing up in homes with greater income will 1) have higher socio-emotional (non-cognitive) skills and 2) that these effects will accumulate over time such that the tie between family income and each socio-emotional scale variable will increase as the child ages. The results from the analysis suggest important deficits in socio-emotional skills at school-entry for children from low-income households that grow as children age. The deficits are apparent for all measured skills and each skill has a unique trajectory over time, though by 5th grade the original differences by family income have often doubled or tripled in size. The results suggest a potential window of opportunity for intervention to reduce disparities in socio-emotional skills is early in life, potentially prior to school age.

2. Background literature

Although there is a substantial body of work in psychology and other allied disciplines exploring aspects of the determinants and consequences of non-cognitive skills, much less research exists within economics. What is available is relatively recent and has focused on the consequences of non-cognitive skills, typically on labor market outcomes or schooling outcomes. In contrast, virtually no research in the economics literature has focused on understanding the determinants of non-cognitive skills or their evolution using panel data. Broadly, consequences of poor non-cognitive skills have been found in several areas of the labor market, including job performance, wages, and occupational choice, as well as in educational outcomes for children of all ages. Additionally, some economics research has attempted to understand the potential complementarities between non-cognitive skills and cognitive skills in

[1] For adults, economists have tended to use a five-factor model related to personality psychology: conscientiousness, emotional stability, agreeableness, extraversion and autonomy (Nyhus & Pns, 2005). These overlap but are not entirely identical to the big five among psychologists who use "OCEAN"; openness to experience, conscientiousness, extraversion, agreeableness and neuroticism (similar to emotional stability). See John (1990).

[2] For children, while there is some overlap (independence for example), there is somewhat more emphasis on maturity, learning skills, motivation, attention, patience, and the ability to act appropriately (externalizing and internalizing behaviors)(see ter Weel 2008 and related papers in the symposium covered by the 2008 volume of the *Journal of Human Resources*).

[3] Heckman stated..." the preoccupation with cognition and academic smarts as measured by test scores to the exclusion of social adaptability and motivation causes a serious bias in the evaluation of many human capital interventions." (Heckman, 1999).

[4] Their results suggest that going from the 25th to 75th percentile in the distribution of non-cognitive skills is associated with a 25 percentage point increase in the probability of having graduated college by age 30.

[5] Fletcher (2013) shows evidence that the personality trait of extroversion is positively related to labor market outcomes. A recent paper (Savelyev, 2012) also documents the importance of one particular non-cognitive skill, conscientiousness, as a determinant of life expectancy for men.