

Health and Educational Trajectories in Elementary School for Racial and Ethnic Minority Children

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Abstract

This paper examines whether children's health conditions affect their academic achievement during the first six years of elementary school, a critical period for children's cognitive development. We document the co-occurrence of health and academic achievement trajectories, focusing on children of different racial, ethnic and immigrant status. Using data from the Early Childhood Longitudinal Study-Kindergarten Cohort we show that poor health conditions are associated with lower academic achievement throughout children's elementary school years and for children of all groups of interest. This association holds even when comparing children within the same schools, through a school-fixed effect model. Despite the detrimental effect of poor health, health plays a minimal role in accounting for racial and ethnic disparities in test scores. We discuss further extensions of this work, in particular the dynamic co-occurrence of health and achievement trajectories, dependent either on the persistence/variability of health *conditions* or on the persistence/variability of health *effects*.

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BACKGROUND

Health and Academic Achievement in the First Years of Schooling

Early childhood health status has been identified as a non-trivial contributor to stratification processes in that differential health statuses at birth and in childhood potentially introduce the individual to a lifetime exposure to ill-health and/or an inability to invest in human capital (Palloni and Milesi 2006). Studies have shown that the effects of poor early health on economic well-being work through education (Case, Lubotsky and Paxson 2002; Case, Fertig and Paxson 2005). In the burgeoning literature linking health to education, researchers have focused on three aspects of early health: prenatal and infant health, childhood physical health, and childhood mental health (Conley and Bennett 2000; Conley, Strully and Bennett 2003; Anderson, Johnston and Remley 1999; Currie and Hyson 1999; Case, Lubotsky and Paxson 2002; Crosnoe 2006; Needham, Crosnoe and Muller 2004; Currie 2005). Research in this tradition is limited in either the detail in which the processes are described or are limited in the time period in which the processes are observed. Our study addresses both of these limitations.

Early childhood is a critical period of intervention for at-risk individuals. The current study identifies ways in which children's early physical health impacts his or her reading and math achievement at the initial transition to school and through elementary school. We ground our study in the school transitions model which puts forth that social structural background differentiates children on early learning in large part through non-academic differences in child development (Alexander and Entwisle 1988). The recent incorporation of health into this model recognizes that physical and mental health characteristics are intertwined with other school transition related aspects of early child development (Crosnoe 2006). Although social structural background characteristics have been linked to health on the one hand and early schooling on the other, it is only recently that they have been considered in the same model.

Race, Immigrant Status, and Socioeconomic Status

Black and Hispanic children enter school substantially behind their White counterparts. While Blacks lose ground as they progress through school, Hispanic children make ground in test scores relative to Whites as they advance through school (Fryer and Levitt 2004). Racial disparities in health of American children are equally pervasive and may contribute to the racial and ethnic gaps in early school performance (Currie 2005). At school entry, Whites are in better general health and have fewer specific health complications than their disadvantaged minority peers (Crosnoe 2006). The contribution of health to math achievement and achievement growth in math is comparable to other components of the school transition model for Black children compared to whites (Crosnoe 2006). The Hispanic paradox suggests that Hispanic children have (paradoxically) better health than comparable counterparts with the same socioeconomic conditions. In general, the contribution of health to achievement trajectories for Latino/a children is less clear because many studies do not disentangle the race/ethnicity of children from their immigrant status. Immigrant status acts as a qualifier that strengthens or weakens racial/ethnic disparities in the impact of health on achievement (Crosnoe 2006).

Our study seeks to understand the intersection of different forms of disadvantage in the effect of health on early academic achievement. Our study pays particular attention to the extent to which race/ethnicity and immigrant status are intertwined with socioeconomic status. These interactions are central to understanding the relationship between health status and educational success. Relatedly, we address the question of whether health disparities can explain part of the achievement disparities among socioeconomically disadvantaged and advantaged children.

DATA

We use publicly available data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), the only nationally representative study that provides data on children's status at kindergarten entrance and their trajectory through the elementary school years. The sample consists of 21,260 children enrolled in about 1,000 kindergarten programs during the 1998-99 school year, including children from public and private kindergartens, as well as from full-day and part-day kindergarten programs. The sample includes children from different racial-ethnic and socioeconomic backgrounds, with oversamples of Asian children, private kindergartens, and private school kindergartners. So far, there are six waves of data available: Fall and Spring of Kindergarten, Fall and Spring of 1st grade, Spring of 3rd grade and Spring of 5th grade.

This dataset is well-suited for our purposes because it follows children as they enter formal schooling through the end of 5th grade and includes relevant measures for our analysis at six different time points, namely cognitive achievement, childhood health, school experiences, and a broad set of relevant covariates. Data on children's social background come from interviews with their parents or guardians at the different waves. Data on children's schools stem from interviews with teachers and school personnel at the different grades. Data on students' cognitive achievement come from children's assessments at each of the six waves. These assessments consisted of untimed one-on-one computer-assisted personal interviews in three cognitive domains, namely reading, mathematics, and general knowledge. We use data on students' performance in the reading and math assessments.

PRELIMINARY FINDINGS

Our first research question addresses the co-occurrence of health and academic achievement and in particular the association between current health conditions and current academic achievement. This question is descriptive at heart, but it is important to address as it lays the ground for the more complex understanding of the intersection of health and achievement trajectories. We estimate a separate regression model of the concurrent association between health and achievement for each of the time points available. Thus, we are able to show whether children who are in poor health in kindergarten exhibit lower levels of achievement that same school year and whether this concurrent association changes as children progress through school (i.e. whether the association between children's health and academic achievement in fifth grade is similar to that present in kindergarten). To estimate this set of associations we resort to weighted least square regressions, because estimates drawn from ECLS-K need to take into account the complex design of the study, including stratification and an oversample of Asian children and private kindergarten programs.

Figures 1 and 2 show that there are substantive gaps in reading achievement among children of different racial and ethnic background, and that these gaps increase as children progress through school. Similar to Fryer and Levitt (2004), we found that the explanatory power

of covariates decreases over time. Health directly affects achievement, such that children with worse health conditions exhibit lower test scores. Taking advantage of the ECLS-K design, which samples several children in each school, we carry out a school fixed effect model where all school characteristics are accounted for. We found that the negative association between health and academic achievement holds even when comparing children within the same schools.

Figures 1 and 2 also show that health plays only a minimal role in explaining racial and ethnic disparities in test scores. For instance, comparing White and Black children we found that childhood health conditions account for a non-trivial proportion of the black-white test score gap – approximately 20-30 percent. However, due to the sharp socioeconomic gradient in health, the contribution of health conditions *in addition* to the impact of socioeconomic conditions on test scores is small. Graphically, Figure 1 shows that when we only account for current health, estimates of the racial and ethnic achievement gaps decrease, but it is only after accounting for current health *and* socioeconomic background that we “explain” these gaps (i.e. the estimated gaps approximate the observed racial and ethnic achievement gaps only when we control for health and socioeconomic background). The pattern shown in Figure 2 below is consistent with the Hispanic paradox. Because Hispanic children are in good health standing, health explains less of the achievement disparity with non-Hispanic White children. In fact, the observed differences in achievement between non-Hispanic White and Hispanic children are explained to a lesser extent than differences between White and Black children when we account for socioeconomic background and current health conditions. The full paper will address how this process varies depending on the immigrant status of these children.

Also, the association between health and achievement does not vary systematically among children above and below the poverty threshold. Thus, we found no evidence to support a hypothesis of “double disadvantage”, which states that racial and ethnic minorities or children in poverty not only suffer from worse health but are also more affected by it.

ADDITIONAL RESEARCH QUESTIONS AND ANALYTIC STRATEGIES

Estimates of the co-occurrence of health and academic achievement are likely to confound the impact of current health with the impact of the student’s earlier health conditions, and/or his or her health trajectory. Furthermore, the chronicity of health conditions may be particularly consequential in the school setting. Specifically, the effects on the sensory, motor and intellectual capacities of better known disease processes, medications, and treatments may have serious consequences for school performance (Theis 1999). The combination of chronicity, absence, and side effects of illness and treatment are subtle but the cumulative effect is potentially damaging (Theis 1999). We aim to address these issues through following research questions and analytic strategies, where we capitalize on the longitudinal nature of ECLS-K.

First, we will identify the short- and mid-term impact of health on academic achievement using individual-fixed effect models as well as weighted least square regression models that include, as covariates, health at different time points. We plan to test whether the effect of health changes as children progress through school. Over the elementary school years, the effect of health may wane or strengthen, depending on the severity of the health condition, its diagnosis and treatment, and the school environment the child is in.

Second, we will address the short- and mid-term effects of health that stem from the persistence of health conditions (rather than the persistence of the *effect* of health conditions, as we just mentioned above). We will test the literature that suggests that one incidence of being in poor health is not likely to have serious consequences for academic achievement but that, instead,

the combination of poor health over time may take its toll in a child's academic pursuits. By having longitudinal data on children's health and on children's achievement we are able to use structural equation modeling to examine whether poor early health indirectly affects achievement through its association with continual poor health.

Third, we will utilize structural equation modeling to model explanations for why health has negative impacts on early educational achievement. Although many studies conclude with calls for such research, few explicitly model mediating mechanisms. We test hypotheses that children in poor health exhibit higher rates of retention, absenteeism, and tardiness in school. Furthermore, the impact of poor health on an individual may be due to the differential effects of health on additional mechanisms, including the treatment of health conditions (diagnoses), and access to (and use of) health care service. Although most children in need are eligible for public health insurance, relative few are enrolled. When they are enrolled it is usually due to an urgent medical problem, so they often do not receive necessary preventative care or screening services (Currie 2005).

Finally, it is our primary concern in this paper to address how these processes work similarly or differently for disadvantaged and advantaged groups. Additionally, we will address how the lagged and chronic effects of being in poor health may contribute to inequalities between groups, and how the effects of mechanisms vary across groups.

IMPLICATIONS

Our study seeks to document the co-occurrence of health and educational trajectories in elementary school. Protecting health during childhood is important relative to other life course stages because poor health during children's early years is likely to leave a long-term imprint over the course of their life. Furthermore, early achievement has important implications for later life success in terms of high school completion, college entry, persistence in college, occupational success and, in turn, adult health and mortality. Examining the process through which early health may affect early achievement is a promising avenue for understanding the stratification of educational opportunities among children. In documenting this process, our study has important implications for policy. As others have noted, investing in children's health is economically valuable because it results in better educated and more productive adults (Belli, Bustreo, and Preker 2005). Our research will show the extent to which policies directed at improving the health of children in need may contribute to reducing racial and ethnic disparities in academic achievement across the life course.

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FIGURES

Figure 1: Achievement Gap in Reading between non-Hispanic Black and non-Hispanic White Children; Kindergarten through Fifth Grade, ECLS-K.

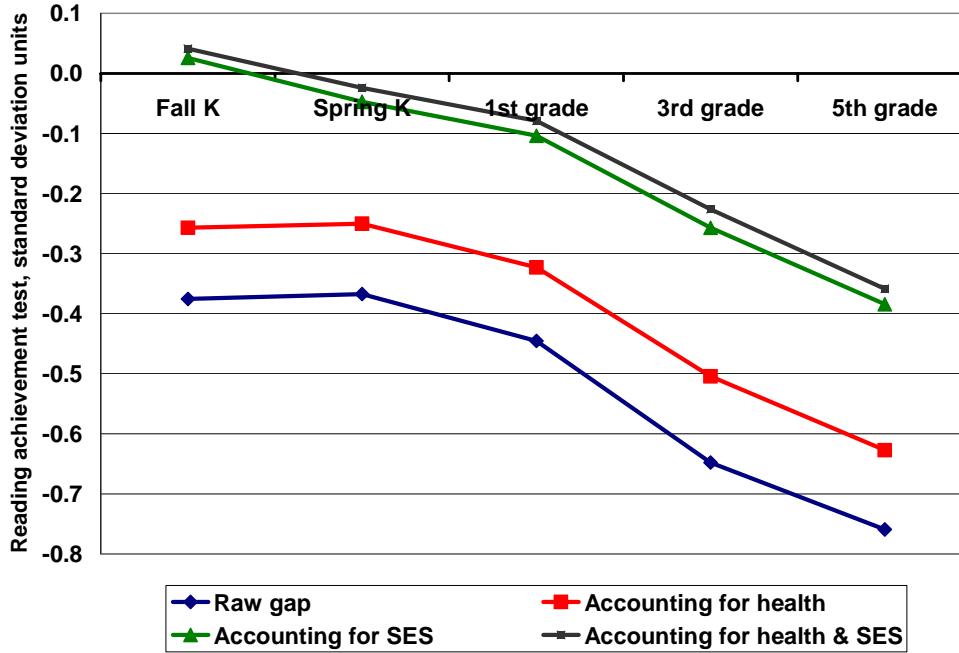


Figure 2: Achievement Gap in Reading between Hispanic and non-Hispanic White Children; Kindergarten through Fifth Grade, ECLS-K.

