Extended Abstract for the PAA 2014 Annual Meetings

The Effects of Childhood Health on Young Adult Education

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Introduction

This paper investigates the relationship between poor health in childhood and educational attainment in young adulthood. This topic is significant because it addresses an important unresolved question that is central to understanding the reciprocal relationship between socioeconomic status (SES) and health. In particular, through a better understanding of the effects of childhood health on educational attainment, we will advance our knowledge about how and why health disparities by SES emerge and about how SES and health status are transmitted across generations.

The association between SES and health is well established: individuals from disadvantaged backgrounds suffer from worse health and have higher rates of morbidity and mortality (Currie & Lin 2007; Smith 2004). Although prior studies have largely focused on the effects of SES on health in middle- and late-adulthood, there is a small, but growing, body of research that has examined health disparities in childhood and early-adult years (Currie et al. 2010; Palloni 2006; Smith 2009a). Despite the clear associations, firmly establishing the causal effects of SES on health has been elusive because of unobserved factors that shape both health and SES and because there may be important effects in the opposite direction—i.e., effects of health on SES. For example, the *health selection hypothesis* (Palloni 2006) contends that children born to low-SES families experience a range of physical and environmental stressors throughout the early lifecourse that impinge upon their health, which, in turn, limits their ability to acquire education and labor market skills during their youth as well as social and economic resources as adults.

This paper uses new data from the Transition into Adulthood (TA) supplement to the Panel Study of Income Dynamics (PSID) to examine how childhood health trajectories, from birth through childhood and adolescence, shape two key indicators of educational attainment: high school graduation and college attendance. The TA study follows an original cohort of 3,563 children who were born between 1985 and 1997 to PSID sample members, participated in the PSID Child Development Supplement (CDS), and have been interviewed as they entered early adulthood across four rounds of biennial data collection from 2005 to 2011.

The theoretical model that guides our empirical analysis is based on a lifecourse perspective, in which change and continuity in behaviors at later ages are contingent on both the patterning of experiences at earlier ages as well as contemporary macro-level events (Elder 1974). Our focus is on health status during infancy and childhood, which is hypothesized to shape early schooling experiences in a variety of ways. For example, low birthweight has been shown to stunt neurological development (Hack et al. 1995), which in turn may impede the

ability of children to process new information and perform cognitive tasks. Chronic physical conditions such as asthma may involve periodic doctor's office visits and ongoing treatments that may interfere with children's school attendance. Overweight youth may be socially ostracized from their peers and consequently less engaged in school. Youth with chronic physical conditions may be limited in their ability to perform basic motor functions required to complete their assignments and participate fully in school activities. Lastly, youth experiencing psychological/behavioral problems may be unable to focus on their assignments and/or control their impulses while in the classroom. We will examine these indicators in conjunction with measures gauging overall health.

Data

This paper uses data from PSID's Child Development Supplement (CDS) and Transition into Adulthood (TA) Study. TA is a continuation of CDS, which began in 1997 with a sample of up to two children aged 0–12 years per family in PSID households. In the initial wave of CDS, a total of 3,563 children and their caregivers were interviewed with a response rate of 88%. CDS-I completed interviews with the children's primary caregivers (PCGs; typically the mother), who reported about themselves and each of the sampled children. PCGs provided information about each child's health status and behaviors, family environment, education, child care, time use, sibling relationships, caregiver social and psychological resources, and absent parents. Information was also collected on the school environment, and achievement tests were administered to children three years of age and older. In CDS-II, fielded in 2002/2003, a total of 2,907 children aged 5 to 18 years and their caregivers were reinterviewed with a response rate of 91%. CDS-II continued the same measurement domains from CDS-I, but also collected information about children's psychological and social well-being, parental monitoring, future work and schooling expectations, religiosity, and spending and savings through interviews with the PCG and with older children themselves. CDS-III was fielded 2007/2008 and completed interviews with 1,506 children aged 10 to 19 years with a response rate of 90%. The survey measures in CDS-III were essentially identical to those in the previous wave.

The CDS-I sample included children in 2,389 eligible households from among the 6,792 households interviewed for the Core PSID in 1997. Core PSID interviews occurred every year from 1968 to 1996 and biennially thereafter. Between 1997 and 1999, an immigrant refresher added to the PSID sample a total of 441 families who had moved to the U.S. after 1968. PSID has achieved re-interview response rates of 96–98% in virtually every wave for the main sample. PSID respondents provide information about themselves, their spouse/partner, and all other family members.

The first wave of TA was fielded in 2005 with children from the CDS sample 18 years of age or older who had completed or left high school and were interviewed in CDS-I or CDS-II and had families still active in the most recent PSID panel. During TA-2005, 745 interviews were completed for a response rate of 89%. There were 1,115 interviews completed during TA-2007 for a response rate of 90%. In TA-2009, a total of 1,556 interviews were completed with a response rate of 92%. TA-2011 also achieved a response rate of 92% and completed a total of 1,909 interviews. CDS/TA provides a nationally-representative sample of individuals who had a parent or grandparent alive in the U.S. in 1968 or in families that immigrated to the U.S. between 1968 and 1997. CDS/TA weights are constructed from the original sampling probabilities (Heeringa & Connor 1999) and account for attrition (Gouskova et al. 2009).

Measures and Methods

Our analysis will draw on the rich and comprehensive measures of childhood health that are available from the three waves of CDS. Information on *birthweight* and *prematurity* were obtained from parents. *Chronic health conditions* were obtained from reports on whether the child had ever been diagnosed with each of a series of chronic conditions and limitations. We examine individual common conditions, such as asthma, but also create composite indicators of chronic conditions. *Body mass* measures are constructed from measurements of the child's height and weight and the child's age and sex, and include continuous measures as well as categorical indicators (e.g., underweight, normal, overweight). *Psychological/behavioral problems* are measured by two subscales of the Behavioral Problem Index based on a checklist of parent-reported behaviors, which independently measure externalizing and internalizing behaviors. Finally, o*verall health* is measured by parents' subjective evaluation and older children's own-assessment of the child's health overall (e.g., excellent, very good, etc.). With the exception of the birth outcome measures, repeated measures of these variables from each wave of CDS allow us to examine health trajectories over childhood as well as their onset and duration.

We employ (1) covariate adjustments; (2) sibling fixed effects to examine the effects of childhood health on young adult educational attainment.

Covariate adjustment, or a basic multiple regression modeling approach, is useful for establishing a baseline set of findings and for assessing results from the subsequent modeling approaches. In particular, the later modeling approaches will, in essence, relax several key assumptions that underlie the covariate adjustment model. This model relies on the comprehensive set of control variables—from among the large set of moderating variables in $\boldsymbol{x}$ available in the CDS/TA database—to control for background factors that are associated with child health trajectories and educational attainment in young adulthood. For example, the basic bivariate regression model in Eq. 1, below, shows the observed relationship between y_{ij}^{k}, which represents the *k*th measure of educational attainment in young adulthood for the *j*th individual in the *i*th family, and h_{ij}^{l}, which represents the *l*th child health indicator of interest for the same individual:

$$y_{ij}^{k} = \alpha + \beta_1 h_{ij}^{l} + \varepsilon_{ij} \ . \qquad (1)$$

This observed relationship reflects the total effect of the child health indicator on socioeconomic attainment. However, observed individual, family, contextual, and period factors may be associated with both child health and the attainment outcome. These observed factors are explicitly controlled in the following model:

$$y_{ij}^{k} = \alpha + \beta_1 h_{ij}^{l} + \gamma \boldsymbol{x}_{ij} + \varepsilon_{ij} \ . \qquad (2)$$

This model should, in principle, provide a clearer estimate of β_1, the parameter of interest. However, a major limitation of this model is its inability to control for *unobserved* factors that are associated with both health and educational attainment. For instance, certain families may systematically devote more resources to promoting the health of their children and invest more in the children's learning activities that thereby lead to higher educational attainment in young adulthood. Without controlling for these unobserved factors, β_1 in Eq. 2 will be biased.

Family fixed-effects models provide a useful approach to controlling for unmeasured family factors that affect both child health and young adult educational attainment that are unaccounted for the covariate adjustment approach. A family fixed-effect specification involves rewriting Eq. 2 as follows:

$$y_{ij}^{k} = \alpha + \beta_1 h_{ij}^{l} + \gamma \boldsymbol{x}_{ij} + v_i + u_{ij}, \quad (3)$$

where the error term from the previous model, ε_{ij}, is decomposed into two components: a fixed family-specific factor, v_i, and a child-specific error term, u_{ij}, that is assumed to be uncorrelated with the explanatory variables. Estimation of this model typically involves transforming Eq. 3 to difference out the family fixed effect, which also eliminates any correlation between the family fixed effect and the explanatory variables in the model.

Although the family fixed-effects model specification has certain attractive features and has been used for much previous research examining the effects of child health on young adult educational attainment (e.g., Smith, 2009b), it also has some limitations. First, the focus on, and calculation of, between-sibling differences exacerbates the effects of measurement error. Second, family fixed-effects provide no means to control for unshared, child-specific factors; and, because we have only one outcome per child, there is no possibility of including child fixed-effects. Third, family environments may change across children because, for instance, siblings tend to differ in age by several years and hence health transitions that occur at specific ages—birth outcomes, most obviously—will necessarily occur under different family circumstances thereby limiting the types of shared family factors for which the fixed effects provide a control. Lastly, parents may change their behavior due to their child's health, and family fixed effects are unable to provide any type of control for these reverse causal effects. For instance, a child's serious chronic health condition may lower family SES because of the cost of treatment or because a parent may choose to stop working and stay home with the child. We will conduct a number of sensitivity analyses to investigate how our results may be influenced by some of limitations identified here.

Preliminary Results and Remaining Steps

We have obtained a complete set of preliminary results for the analysis described in this extended abstract. Some key findings are as follows:

- The effects of family SES on educational attainment not altered by controlling for child health.
- There are significant effects of child health on subsequent educational attainment.
  - For HS-graduation, there are strong deleterious effects of: (1) mother rating of child health (in middle childhood); (2) asthma; and (3) BPI-externalizing behaviors.
  - For college attendance, there are strong negative effects of BPI externalizing behavior in middle childhood & teen years.

In the next two months, we will refine and finalize the analysis. We plan to have a draft manuscript for uploading to the PAA website well in advance of the deadline.

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