Extended Abstract

Maternal Education and Parental Investments: A Child Health Perspective

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Parental education is a principal channel in the intergenerational transmission of inequality. More educated parents have access to a range of economic, social, and psychological resources, which they can draw on to promote their children's successful passage through the educational system and status attainment as adults. Importantly, this intergenerational process begins when children are young and the competencies that lead to success in school are first developing. For example, children's school readiness skills have been linked to later academic achievement and attainment, as well as higher wages and labor force participation. Yet, the early competencies critical for adult wellbeing not only include the domains of achievement, cognition, and psychosocial development—which have been the primary emphases of stratification research focused on intergenerational transmissions and the role of parental education—but also child (physical) health. Indeed, childhood health forecasts early cognitive development, adolescent school engagement and risk behavior, and higher rates of morbidity and mortality during adulthood, and as such, plays a central role in the intergenerational transmission of inequality.

Despite the significance of early child health for later status attainment and wellbeing, the processes through which maternal education affects early child health have not received a lot of attention. Thus, gleaning insights from the sociological research linking adult health with one's own education (and extending the existing body of developmental and economic research linking mothers' education to children's birth weight and gestational age), this study first examines the association between maternal education and their health investment behaviors that affect their children's health during early childhood, focusing on five main areas: preventative health, nutrition, physical activity, television watching, and smoke exposure.

A second important tenet of this study investigates how associations between maternal education and parenting health investment behaviors change along the early childhood developmental gradient; that is, are disparities in health behaviors most pronounced at older ages (i.e. pre-school and kindergarten) where prior research on non-health-related parental investments have found greater disparities, or are disparities in health-related investments largest where health needs may be more intensive, such as during infancy?

Method

Data and sample. We use the Early Childhood Longitudinal Study – Birth Cohort, a nationally-representative sample of U.S. children born in 2001. Parents of these children were interviewed when the child was 9 months, 2 years, 4 years (preschool), and 5 years (kindergarten). We limit our sample to all children who always lived with their mother from birth through kindergarten, whose mother was interviewed at each wave, and who participated in the 2006 kindergarten interview (the kindergarten interview where mothers were asked more detailed questions on several health behavior-related areas, allowing for consistency over the study period). This resulted in a final analytical sample of 4,750 children.

Measures. We examine five maternal health investment behaviors. First, *preventative health* is a dummy variable indicating whether children attended the minimum appropriate number of well-child check-ups between interviews (i.e. at least four pediatrician visits between birth and 9 months, at least two visits between 9 months and 2 years, at least two visits between 2 year and 4 years, and one visit between 4 and 5 years). Second, *nutrition* is a standardized z-score indicating deviation from the sample mean of an age-appropriate measure of better child nutrition practices (i.e. number of months breastfeeding at 9 months, no soda drinking at 2 years, and daily intake of fruit, vegetables, and limited consumption of soda and fast food among preschoolers and kindergarteners). Third, *physical activity* is a dummy variable indicating whether the child plays outside daily (at 2 and 4 years) and/or whether the child participates in any organized sports or dance lessons (at 2 and 4 years). Fourth, *television watching* is a continuous measure of the typical hours of television/DVDs the child watches on a weekday. Fifth, *smoke exposure* is a dummy variable capturing whether the mother smokes cigarettes and/or someone living in the child's home smokes inside.

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Our primary independent measure is *maternal education*, measured as four dummy variables indicating highest educational attainment: 1) less than high school diploma/GED, 2) high school diploma/GED, 3) Some college/associate's degree, and 4) college degree. A wide variety of *time-variant and -invariant controls* are incorporated in the models, including maternal employment, family structure, biological father's education, household income, maternal race/ethnicity, nativity, English proficiency, mother's health, number of siblings, maternal age, pregnancy risk factors, the child's sex, and whether the child was born at a low birth weight.

Analytic plan. We conducted a series of mixed random-effects models, examining trends in the association between maternal education and preventative care, nutrition, and smoke exposure (from 9 months through 5 years), and physical activity and television watching (from 2 years through 5 years). We included a series of interactions between maternal education and child's age to test whether the association between maternal education and parental health-related behaviors differ across the early childhood developmental gradient. Missing data was handled through multiple imputation and weights were used to account for sample attrition and the complex survey design.

Findings

Overall, we find that, net of controls, maternal education is associated with more advantageous health investment behaviors; that is, college-educated mothers are more likely to be attending the appropriate number of well-child check-ups, be meeting better nutritional guidelines, their children are less likely to be exposed to cigarette smoke in the home, more likely to be playing outside or participating in organized sports, and are watching less television.

Our second aim was to examine whether the association between education and parental health investment behaviors changed over the early childhood developmental gradient. Table 1 displays the main and interaction effects of maternal education and child's age predicting the five key health investment behaviors. Overall, it appears that maternal education is moderated by child's age for three of the five outcomes: well-child check-ups, nutrition, and physical activity. Although maternal education is negatively correlated with smoke exposure and television watching (and child's age is also negatively correlated with television watching), there appears to be no moderation effect between maternal education and these health behaviors over the early childhood years.

Figures 1 through 3 illustrate the predicted probabilities and estimates for the three outcomes where maternal education was moderated by child's age. First, figure 1 displays the predicted probability of attending the appropriate number of well-child check-ups by maternal education. Here the disparity is largest among 9 month olds, where the appointment demands are also largest. Figure 2 displays the nutrition z-score estimates by education, showing again, that the disparity is largest among 9 month olds. This association appears driven largely by the differing uptake and persistent of breastfeeding among college-educated women. Finally, figure 3 displays the predicted probability of children participating in physical activities. The education disparity is largest at kindergarten age, which may be driven by the larger participation in formal organized sports among college-educated mothers.

Summary

This study provides further evidence that maternal education is an important signifier of early childhood health inequalities. Importantly, we extend prior research to examine how the association between education and early indicators of child health (i.e. maternal health investment behaviors) changes over early childhood, finding, overall, that education disparities tend to be most prominent during developmental periods when health demands may be most complex.

Going beyond the empirical significance of this project, the greater prevalence of health problems, particularly among children from disadvantaged families, has generated substantial concern among researchers, policymakers, and practitioners. Although policy efforts targeting disparities in young children's health tend to focus on children themselves, this study highlights how investments in the education of mothers can also benefit child health and help reduce social inequalities across generations.

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Tables and figures

Table 1. Mixed Random-Effects Models Predicting Maternal Health-Related Investments

	Well-child check-ups (1)	Nutrition (2)	Smoke exposure (3)	Physical activity (4)	Television watching (5)
Mat education (ref: college degree)					
No high school	-0.90***	-0.69***	3.82***	0.91***	0.30**
	(0.18)	(0.05)	(0.51)	(0.12)	(0.10)
High school	-0.70***	-0.60***	2.51***	0.47***	0.40***
	(0.16)	(0.04)	(0.46)	(0.10)	(0.08)
Some college	-0.49**	-0.33***	1.78***	0.34***	0.24**
	(0.16)	(0.04)	(0.47)	(0.10)	(0.08)
Child's age (ref: 9 months)					
2 years	-0.31*	-0.55***	-1.74**	n/a	n/a
	(0.15)	(0.04)	(0.62)		
4 years	-0.35*	-0.44***	0.00	1.18***	-0.36***
	(0.14)	(0.04)	(0.45)	(0.09)	(0.07)
5 years	1.51***	-0.42***	-0.26	1.22***	-0.47***
	(0.23)	(0.04)	(0.47)	(0.09)	(0.07)
Education and age interactions					
No high school X 2 years	0.85***	0.66***	0.54	n/a	n/a
	(0.21)	(0.06)	(0.66)		
High school X 2 years	0.68***	0.70***	1.31*	n/a	n/a
	(0.19)	(0.05)	(0.65)		
Some college X 2 years	0.46*	0.45***	0.94	n/a	n/a
	(0.20)	(0.06)	(0.67)		
No high school X 4 years	0.65**	0.64***	-0.01	-1.09***	0.35***
	(0.20)	(0.06)	(0.49)	(0.14)	(0.10)
High school X 4 years	0.22	0.56***	0.21	-0.77***	0.08
	(0.18)	(0.05)	(0.48)	(0.12)	(0.09)
Some college X 4 years	0.24	0.30***	0.05	-0.62***	0.08
	(0.20)	(0.06)	(0.50)	(0.13)	(0.10)
No high school X 5 years	0.17	0.71***	0.02	-2.87***	0.05
	(0.30)	(0.06)	(0.51)	(0.15)	(0.10)
High school X 5 years	-0.25	0.61***	0.55	-1.77***	-0.18+
	(0.28)	(0.05)	(0.49)	(0.12)	(0.09)
Some college X 5 years	-0.08	0.33***	0.21	-1.04***	-0.12
	(0.30)	(0.06)	(0.52)	(0.13)	(0.09)
Constant	2.64***	0.51***	-6.85***	-0.17	2.26***
	(0.25)	(0.07)	(0.70)	(0.18)	(0.15)
Observations	19,000	19,000	19,000	19,000	19,000
N	4,750	4,750	4,750	4,750	4,750

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Controlling for: maternal employment, family structure, biological father's education, pregnancy risk factor, household income, maternal age, maternal race/ethnicity, nativity, English proficiency, maternal health, siblings, child's gender and low birth weight status.

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Figure 1. Predicted Probabilities: Well-child check-ups

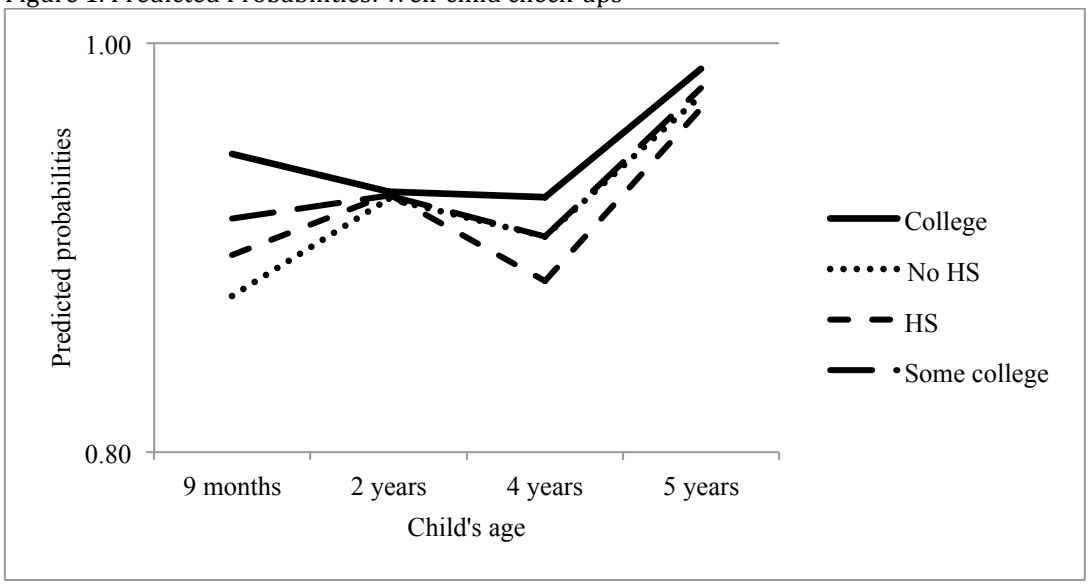

Figure 2. Estimates: Nutrition Z-Scores

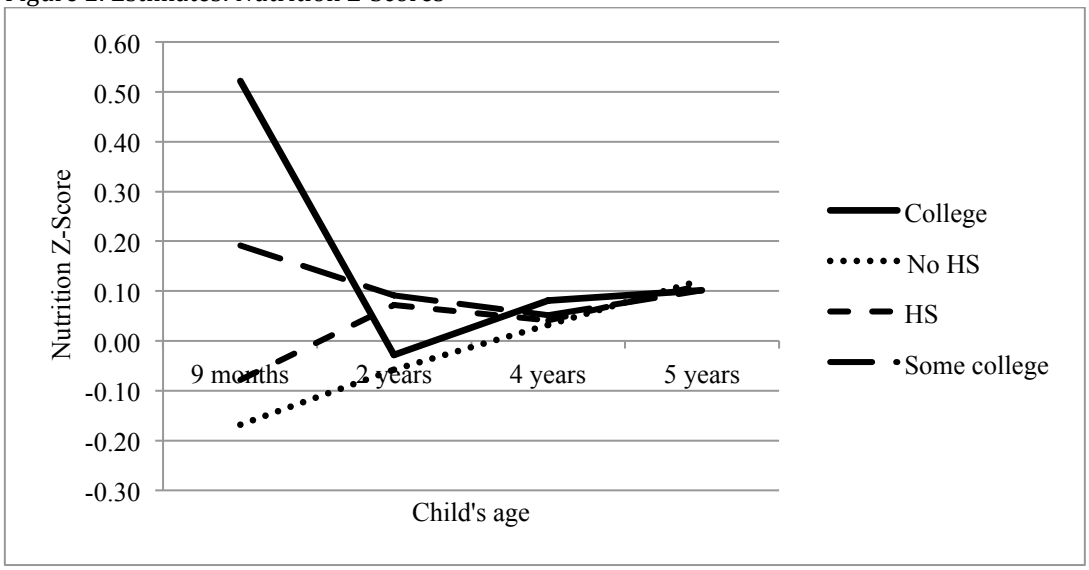

Figure 3. Predicted Probabilities: Physical Activity