



Family socioeconomic status, family health, and changes in students' math achievement across high school: A mediational model



Ashley Brooke Barr

The State University of New York at Buffalo, 402 Park Hall, Buffalo, NY 14260, USA

ARTICLE INFO

Article history:

Received 12 March 2015

Received in revised form

4 June 2015

Accepted 22 June 2015

Available online 27 June 2015

Keywords:

Adolescence

Academic achievement

Family

Health problems

Socioeconomic status

ABSTRACT

In response to recent calls to integrate understandings of socioeconomic disparities in health with understandings of socioeconomic disparities in academic achievement, this study tested a mediational model whereby family socioeconomic status predicted gains in academic achievement across high school through its impact on both student and parent health. Data on over 8000 high school students in the U.S. were obtained from wave 1 (2009–2010) and wave 2 (2012) of the High School Longitudinal Study of 2009 (HSL:09), and structural equation modeling with latent difference scores was used to determine the role of family health problems in mediating the well-established link between family SES and gains in academic achievement. Using both static and dynamic indicators of family SES, support was found for this mediational model. Higher family SES in 9th grade reduced the probability of students and their parents experiencing a serious health problem in high school, thereby promoting growth in academic achievement. In addition, parent and student health problems mediated the effect of *changes* in family SES across high school on math achievement gains. Results emphasize the importance of considering the dynamic nature of SES and that both student and parent health should be considered in understanding SES-related disparities in academic achievement. This relational process provides new mechanisms for understanding the intergenerational transmission of socioeconomic status and the status attainment process more broadly.

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Socioeconomic status (SES) plays a fundamental role both in the status attainment process and in the production of health disparities. In fact, the intergenerational transmission of SES and the health-wealth gradient are so strong that Palloni and colleagues (2009) have referred to them as “regularities” of modern societies (p. 1574). Despite the persistence and co-occurrence of these regularities, the literature examining the intergenerational transmission of SES and the status attainment process has been largely disconnected from that examining socioeconomic disparities in health and well-being. This disconnect has been problematized over the past decade (Haas, 2006), with Palloni et al. (2009) referring to the absence of health in the status attainment literature “a serious error of omission” (p. 1574) and Basch (2011) arguing that health disparities might provide the “missing link” (p. 593) in understanding the persistent and growing achievement gap between lower-SES students and their higher-SES peers. Hence, SES-related health disparities have been implicated in the status

attainment process generally and in the specific mechanisms undergirding this process (e.g. academic achievement).

Efforts to understand the intersections between SES, health, and educational outcomes are critical for understanding reciprocal relations between different forms of inequality – economic, health, and academic – across the life course (Basch, 2011; Haas, 2006; Palloni, 2006; Palloni et al., 2009). The current study answers the call for a more cohesive examination of the role that health plays in the status attainment process. More specifically, it aims to enhance our understanding of how family SES might disrupt or enable student learning through its impact on parent and student health. It posits that family health crises are one avenue whereby low or declining family SES diminishes student achievement in high school, as measured by changes in standardized math scores.

In testing this core proposition, this work builds upon the existing literature in three key ways. First, it focuses not only on how student health affects academic achievement but also on how the deterioration of health among parents or caregivers might spill over to affect their children's achievement. Hence, consistent with the work of Boardman et al. (2012), it extends the health-

E-mail address: abbarr@buffalo.edu.

achievement link beyond one of individual effects, thereby underscoring the social foundations of academic achievement and expanding the mechanisms underlying the intergenerational transmission of socioeconomic status and the status attainment process. Second, in line with recent theoretical developments in the social stratification literature (Mollborn et al., 2014), this work emphasizes the dynamic nature of family SES, thereby offering insight into the ways in which both initial levels and *changes* in family SES impact family health and math achievement gains.

Lastly, this work focuses on changes in achievement across high school, a potentially critical juncture in the life course when students are expected to be laying the groundwork for college and, ultimately, future careers. Slowed or declining academic achievement at this stage in one's education might yield substantial trajectory-altering implications for adulthood (Altonji et al., 2012). Further, health problems among students' parents may become more prevalent and may begin to manifest themselves in more noticeable ways at this stage in the life course, when caregivers are entering middle-age (Geronimus et al., 2006).

1. Background

1.1. Family SES and academic achievement

Family socioeconomic status is one of the strongest and most robust predictors of academic achievement and, ultimately, educational attainment. In fact, Sirin (2005) notes that family SES is “probably the most widely used contextual variable in education research” (417). The SES-achievement gap is evident not only in youths' performance on standardized tests (Duncan and Magnuson, 2011), but also in years of completed schooling and degree attainment (Bailey and Dynarski, 2011).

Although there has been little debate concerning the presence or strength of the SES-achievement link, two uncertainties remain. First, family SES has conventionally been treated as static rather than dynamic. That is, family SES at one point in time, particularly in childhood, has been used to predict a variety of educational outcomes (A. Case and Paxson, 2011; Duncan et al., 2010; Heckman, 2006). Such work either assumes family SES to be relatively stable or assumes an importance of baseline levels of SES independent of any change that may occur. Recent developments, however, suggest that the temporal elements of SES may be central to understanding mechanisms of inequality (DiPrete and Eirich, 2006; Mollborn et al., 2014). It is unclear, then, the extent to which initial levels of family SES impact trajectories of academic achievement, independent of change in family SES, or the extent to which *changes* in family SES, independent of baseline levels, matter in the achievement process. Understanding both processes is an important step for fleshing out the limits and prospects of social mobility.

Second, there are a multitude of potential mechanisms underlying the SES-achievement link. SES-related disparities in the resources that enable or restrict opportunities to learn and thereby affect child development have probably garnered the most attention in the literature to date (Brooks-Gunn and Duncan, 1997; Brooks-Gunn and Markman, 2005; Duncan and Magnuson, 2012). Others locate SES-related disparities in academic achievement not only in material resources but also in class-based differences in family processes, including parent–child interactions (Brooks-Gunn and Duncan, 1997; Phillips, 2011), parental expectations (Davis-Kean, 2005), and the cultural capital that families cultivate (e.g. Lareau, 2003). More recently, scholars have emphasized the role of SES-related disparities in health and well-being in limiting students' learning capacity (Currie, 2005, 2009; Heckman, 2007, 2008) and in maintaining their attendance and focus at school (Morrissey et al., 2014).

1.2. The mediating roles of parent and student health

Just as family SES has been central to research on academic achievement and other educational outcomes, perhaps one of the most consistent findings within the health literature is the presence of a health-wealth gradient (Braveman et al., 2010; Umberson et al., 2014). The persistent inverse relationship between SES and a variety of health problems, including morbidity and mortality, across time and place (Masters et al., 2015) has bolstered the claim that SES is a *fundamental cause* of health disparities (Link and Phelan, 1995; Phelan et al., 2010). The fundamental cause perspective argues that SES is not merely a confounding variable or a contextual variable in which more proximal factors (e.g. health behaviors) operate, but it is a primary driver of health through an ever-changing set of mechanisms.

As was the case with research on the SES-academic achievement gap, researchers examining links between SES and health have primarily examined SES at one point in time, focusing heavily on the lasting health effects of low SES in early childhood (A. Case and Paxson, 2011; Duncan et al., 2012; Duncan et al., 2010). There is limited and inconsistent evidence regarding how positive and negative *shifts* in socioeconomic circumstances affect health. Hallerod and Gustafsson (2011), for instance, found that a change in income or occupation among adults was associated with a change in health. Others, however (e.g. Starkey and Revenson, 2015), failed to find significant associations between changes in family SES and changes in health.

Despite lingering uncertainties, links between family SES and health and family SES and academic achievement are heavily theorized in the literature, and their associations, at least in the cross-section, are well-established and robust. By comparison, much less is known about how health may hinder or enhance academic achievement, although burgeoning evidence suggests that not only student but also parent health matters for student achievement.

1.2.1. Student health and academic achievement

Recent research implicates student health disparities as a key culprit in race and class differences in several academic outcomes, including school readiness, academic achievement, and educational attainment (Basch, 2011; A. Case and Paxson, 2006; Crosnoe, 2006), as well as adult socioeconomic outcomes (A. Case and Paxson, 2010, 2011). The links between health and academic outcomes have been posited to be both direct and indirect. Health problems can directly limit students' cognitive development, thereby impacting academic abilities (Heckman, 2007). Poor student health may also affect academic achievement indirectly through absenteeism and socioemotional well-being. For instance, students with chronic health problems, like dental carries or asthma, tend to miss more school than students without such health problems (Currie, 2005; Seirawan et al., 2012) and show higher rates of internalizing (e.g. depression, anxiety, and social withdrawal) and externalizing problem behaviors (Gortmaker et al., 1990). More recently, Gable et al. (2012) reported that obese children have more strained relationships with peers and higher rates of internalizing behaviors, which helped to account for lower math achievement among obese children relative to their non-obese peers.

1.2.2. Parent health and academic achievement

As Boardman et al. (2012) note, our understanding of health and academic achievement is largely limited to intragenerational effects, as the role of parents' health in disrupting or enabling student learning has yet to be widely considered. When students are in high school, however, their parents are likely approaching middle-age,

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