Published in final edited form as:

Ann Am Acad Pol Soc Sci. 2017 November 1; 674(1): 27–58. doi:10.1177/0002716217730009.

Education Outcomes of Immigrant Youth: The Role of Parental Engagement

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Abstract

Using the 2009–2012 waves of the High School Longitudinal Survey, this article examines the role of parental engagement on academic achievement in the United States. Specifically, we examine the influence of parental engagement while also investigating the academic trajectories of racial/ethnic and immigrant groups, controlling for other standard factors. Results suggest that the progression of students' academic performance varies substantially by race/ethnicity and by immigrant generational status. After controlling for 9th grade test scores and family and other school-level characteristics, we find that first-generation immigrant youth generally have higher 11th grade test scores and lower probability of dropping out compared to native-born students who are second or third generation. Greater levels of parental engagement predict superior test scores and lower rates of dropout for youth of various racial and immigrant generation backgrounds, even in the presence of a variety of controls.

Keywords

immigrant minority youth; educational outcomes; parental engagement

The proportion of children in immigrant families in the United States has increased dramatically during the past two decades. The percent of children with one or more foreign-born parents has increased to account for approximately 25.5 percent of all children under age 18 in 2015 (Migration Policy Institute 2017). As more and more immigrants from Latin America and Asia have come to the United States and have settled in new immigrant destinations that previously had very little immigration besides traditional immigrant gateways, both the composition and geographic distribution of immigrants has become more diverse (Fischer 2010; Donato et al 2008; Iceland 2009; Lichter and Johnson 2009; Lichter 2012; Logan and Zhang 2010). The impact of increasing first and second-generation immigrant children on school systems is also felt by communities across a broader set of geographic contexts, particularly those new destinations in small-size cities or rural places that are adapting to absorb children from immigrant families (Fischer 2010). Consequently, the educational outcomes of children of recent immigrants has attracted increasing attention from social researchers, since educational attainment is so closely linked to perceived

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NOTE: This article and associated figures and tables have undergone disclosure review by the IES Data Security Office, U.S. Department of Education. Approval for dissemination was received on 10 May 2017.

upward immigrant mobility and assimilation (Alba and Nee 2009; Hirschman 2001; Portes and Rumbaut 2001; White and Glick 2009).

The original concerns of James Coleman, seen in the range of his work from the 1966 Coleman Report itself (Coleman et al. 1966), through the longitudinal analysis of the 1980s, are also manifest in our work. What has changed since that time is the composition of American schools, which now reflect the increasing diversity of the U.S. population, driven by immigration. In this article, our analysis and approach owes much to that of Coleman; in fact, we use a longitudinal U.S. educational dataset—the High School Longitudinal Study—a successor to the High School and Beyond study, the source for Coleman’s work in the 1980s on schooling and achievement (Coleman, Hoffer, and Kilgore 1982; Coleman and Hoffer 1989)

This new immigration and the varied performance of first- and second-generation students in U.S. schools further invigorates questions about the role of immigration and ethnicity in school achievement, and suggests a reexamination of the mechanisms through which families and schools translate resources from one generation to the next. To be sure, how immigrants do, and particularly how well the children of immigrants do in school or, in other words, whether they experience educational inequality, has sweeping consequences for educational policy and immigration policy in the United States and other immigrant-receiving nations.

Previous research has suggested various mechanisms for how race, ethnicity, generational status, and family resources may lead to disparate educational outcomes among children. Following the early Equality of Educational Opportunity study (Coleman Report) in 1996, there continued a long debate on how schools and family resources affect child well-being (Parcel, Dufer, and Zito 2010). The original Coleman Report (1966) argued for the importance of student background and family socioeconomic status in determining school achievement, whereas much prior discussion had emphasized inputs to the school environment itself. Coleman’s own later writing questioned the advisability of the phrase “equality of educational opportunity,” but did argue for refocusing the role of schooling to reduce inequality (Coleman 1975). Since that time many studies, including ours, have sought to determine the relative importance of various factors—family background, demography, student’s in-school performance, peer characteristics, school organization—in predicting achievement within and beyond school. Coleman is also noted for his early and extensive attention to social capital (Coleman 1988). In an oft-observed phrase, Coleman argued, “... social capital inheres in the structure of relations between actors and among actors” (Coleman 1988, S98). In our analysis, we give attention to the impact of “social capital” on educational outcomes while controlling for school-level characteristics, but in doing so, our approach concentrates on specific indicators of the parent-child relationship and parental school involvement (directly measured in the High School Longitudinal Survey [HSLS]) to capture elements of parental engagement.

There remains uncertainty about whether first- and second-generation individuals outperform or, instead, lag behind later-generation U.S.-born children in academic performance. Some researchers have found that children of immigrants, particularly some

subgroups of East and Southeast Asian immigrants, are doing as well as or even better than their U.S.-born counterparts despite their low initial socioeconomic status and language barriers (Glick and White 2004; Kao 1995; Kao and Tienda 2005; Kao and Rutherford 2007; White and Glick 2000, 2009). Other researchers have found that children of immigrants, particularly second-generation Hispanic immigrants from Caribbean origins, are disadvantaged in terms of both family resources and economic resources and thus are experiencing downward assimilation (Portes and Rumbaut 2001; Portes and Rumbaut 2006; Portes and Vickstrom 2015; Portes and Fernández-Kelly 2008; Haller, Portes, and Lynch 2011). Moreover, it is unclear to what degree the variation in educational outcomes among youth of differing race/ethnicity/generation groups is due to differential family social capital.

Coleman (1988) argues that family background can be divided into three components: financial capital, human capital, and social capital (Coleman 1988, 109). Coleman (1988) also suggests that parental social capital reflected through time and effort that parents spend on children, or social capital of the family defined as (strong) relations between children and parents is essential for transferring human capital of parents to children and that human capital such as parents' education is relevant to children's educational growth only when it is complemented by social capital in the family. Parcel and Menaghan (1993) and Parcel and Dufur (2001) also provide empirical evidence for the positive impact of family social capital on child well-being. However, there might be significant differences in parental practices among race/ethnic groups, as well as differences between immigrant and native populations (Kao 2004a). Children in immigrant families might experience different levels and forms of family social capital in terms of parental interaction and parental school involvement due to cultural differences or language proficiency of immigrant parents (Kao 2004a; Kao and Rutherford 2007).

Using the 2009 and 2012 waves of the HSLS, we examine the extent to which parental engagement impacts high school students' academic performance, and further the extent to which that impact varies by the race/ethnicity and generational status. In our approach, we consider the mediating effect of parental engagement on educational outcomes along race/ethnicity and immigrant generation lines. We consider the educational outcomes of high school dropout and standardized test score progression across waves of the survey. Parental engagement, which can be seen as a form of or linked to family social capital, is measured here through parental school involvement, parent-child communication, and parental participation in activities with students. This article refers to *first-generation students* as students who are born outside of the United States with foreign-born parents. *Second-generation students* refers to students who are born within the United States but with at least one foreign-born parent. *Third (or higher order)-generation students* refers to all students who are born in the United States to native-born parents. The use of two waves of the HSLS gives us the considerable advantage of longitudinal, nationally representative data—collected with the dedicated goal of measuring educational achievement—to investigate these issues.

Previous research has shown that the assimilation of immigrants and children of immigrants may not follow the same paths for all racial/ethnic groups. Parent engagement has long been identified as an important factor influencing educational achievement, but whether parental

engagement, in terms of parent-child interaction and school involvement, operates differently by race/ethnicity and generation status remains unclear (Kao 2004a; Kao and Rutherford 2007). Thus, we also extend previous research by examining whether there are systematic differences in levels of parental engagement among racial/ethnic/generation groups and whether such groups of students experience differential returns to levels of parental school involvement, parent-child communication, and parent participation in activities with students.

In sum, this article aims to answer the following research questions: 1) What is the role of parental engagement in affecting educational performance (as measured by change in standardized math test scores from 9th to 11th grade and dropout status)? 2) Does the effect of this engagement on educational outcomes differ by race/ethnicity and generational status? Figure 1 shows key presumed determinants of educational outcomes, with attention to the pathways through which race/ethnicity and generational status might affect those outcomes. We aim to understand the links between race/ethnicity/generational status and educational performance as well as the distinct and mediating effect of parental engagement on educational outcomes.

Parental Engagement and Education Outcomes

Parental engagement as a form of social capital

The concept of social capital has gained broad currency throughout the research and policy worlds. At the same time, what exactly constitutes social capital has been broadly interpreted (Bankston and Zhou 2002a and 2002b; Kao 2004b; Kao and Rutherford 2007; Turney and Kao 2009; Portes 2014). What is more, the application of the concept of social capital to immigrant and minority populations, while quite relevant, also enjoys no singular interpretation. The concept of social capital is widely recognized to originate in the work of Bourdieu and of Coleman (Portes 2000a and 2000b; Kao and Rutherford 2007). Both Bourdieu's and Coleman's definitions of social capital focus on the benefits of ties between individuals, though there is significant variation (Bourdieu 1985; Coleman 1993; Portes 2000b). As summarized by Portes (2000b, 2), sociologists have focused on exploring three aspects of social capital: social capital as "a source of social control"; "a source of family-mediated benefits"; and as "a source of resources mediated by nonfamily networks." It is noteworthy that Coleman's own theoretical treatise admits a key role for family ties among the features of social capital (Coleman 1990, 300ff). What is more, Coleman's empirical work on educational achievement quite explicitly discussed family social capital, even going so far as to provide an example of immigrant families harnessing family social capital to help a child do well in school (Coleman and Hoffer 1987, 223).

As a likely consequence of these various interpretations, there is no standard measure of social capital. The concept has been operationalized with various measures, such as community level networks and interaction within families (Portes 2000b; Kao and Rutherford 2007). In studies of education outcomes, researchers have measured social capital using parent-school involvement (Kao and Rutherford 2007; Sun 1998; White and Glick 2000; Yan 1999), intergenerational closure (Carbonaro 1998; Morgan and Sørensen 1999; Kao and Rutherford 2007; Portes 2000b), the parent-child relationship (Muller and

Ellison 2001, Kao 2004a), intact families (White and Kaufman 1997), and networks in the community (Bankston and Zhou 2002a, Zhou and Kim 2006).

Our approach follows the reasoning of several scholars who suggest that parental engagement is likely to impact education outcomes, especially for children of immigrant families that are economically disadvantaged. For those groups faced with economic disadvantage, upward mobility and successful assimilation likely depends more on the availability of parental involvement and the wider set of social ties. Coleman (1988, 1991) argues that parent-child interactions and parental involvement help parents to transmit their human capital to children. The positive effect of parent-child interaction is also supported in other empirical work (Valenzuela and Dornbusch 1994; White and Glick 2000; Kao 2004a; Kao and Rutherford 2007). The type of educational outcomes and social capital measured also matters. For instance, parental involvement is found to have a positive impact on students' GPA and standardized test scores, continuation in high school, and enrollment in postsecondary education (Goyette and Conchas 2002; Sun 1999; Teachman, Paasch, and Carver 1997; White and Kaufman 1997; White and Glick 2000; Kao and Rutherford 2007). Yet Morgan and Sørensen (1999) found that a high level of intergenerational closure is negatively associated with gains in math test scores of students from 10th to 12th grades. McNeal (1999) found that parents' participation in PTO meetings in school is negatively related with children's science achievement though it seems to help with preventing dropout. Overall, previous studies provide mixed evidence on the impact of parental engagement on education outcomes, depending on both the type of parental engagement and the indicator of academic achievement used.

Varied levels of parental engagement and parenting styles by race/ethnicity and immigrant status

Previous studies not only suggest that parental engagement could impact education outcomes, but they also find that there are significant differences in parental practices among race/ethnic groups, as well as differences between immigrant and native populations. Many studies suggest that minority students, particularly minority first- and second-generation students, have lower access to parental social capital compared to white third- and higher generation students with native born parents (Sui-Chu and Willms 1996; Kao and Rutherford 2007). But at the same time, there is controversy on whether minority immigrant children indeed have less access to social capital, or they in fact possess more ethnic-specific social capital (Bankston and Zhou 2002a; Fuller and Hannum 2002; Kao 2004b; Lee and Zhou 2015; Zhou and Kim 2006). Zhou and Kim (2006) argue that ethnic social structures, namely ethnic supplementary education in the Chinese and Korean immigrant communities and the associated ethnic social environment are important factors contributing to the educational success of Asian immigrant children. Lee and Zhou (2015) suggest that high educational attainment among second-generation Asian students is partly due to a specific "success frame" that put great emphasis on getting into elite universities and obtaining higher education. Also, this kind of success frame is reinforced within Asian communities through supporting environments and resources such as college preparation courses and tutoring that might lead to better academic outcomes among Asian students. Lee and Zhou argue further that hyper-selectivity, the very high degree of selection for favorable

educational characteristics compared to those left behind, characterizes contemporary Asian immigration (Lee and Zhou 2015, 6). While Lee and Zhou concentrate on the case of Asian-origin persons, and while they argue that hypo-selectivity may operate for migrants from Mexico, some degree of positive selectivity for success, even across unobserved characteristics, may operate among several immigrant subpopulations. Both Sui-Chu and Willms (1996) and Kao (2004a) found that Asian parents have lower levels of involvement in school than whites, but they do not have significantly lower levels of school-related discussions. While direct measurement is not possible, one might speculate that those parent-child discussions convey the success frame, even when direct parental engagement in school itself is somewhat muted. Once again, the literature provides mixed evidence about whether immigrant and minority groups are disadvantaged in terms of levels of parental engagement, depending on the form of parental engagement being measured.

More pertinent to our current investigation, we know less about whether parental engagement has a more powerful mediating impact on education outcomes for one immigrant and/or minority group over others. Researchers have started to examine whether particular parenting practices are contributing to the seemingly remarkable academic performance of immigrant children, especially those of Asian origin, given their generally less advantaged socioeconomic status.

Although the literature on parenting styles is vast and there are numerous dimensions of parenting practices, in this article we focus on three aspects of parenting styles that are frequently used in literature and can be operationalized readily in the 2009–2012 HLLS: 1) Parent *school involvement* (as measured by participation in school meetings and events); 2) parent-child interaction (measured as parent *extracurricular participation* in activities with their child); and 3) parent-child *communication* (as measured by discussions about school work, college, or careers; or personal problems with their child). These three indicators of involvement are all expected to help translate parental aspiration and resources into student education outcomes. Direct involvement in school programming both shows support for the value of education itself (joining a school fundraiser) and provides a conduit for information about student performance (PTO meetings). Direct communication between parent and child is beneficial for students' academic outcomes (Muller 1998; Glick and White 2004; Kao 2004a). Through open communication with parents, children can learn essential social skills to deal with problems at school or in relationships with peers. Kao (2004a) also argues that frequent discussion about school or college helps parents to communicate to children their educational aspirations. If parental aspiration is to positively influence academic performance, then discussion between parent and child is most likely essential for that aspiration to be realized. Interaction through participation matters as well. This aspect of parental engagement, such as attending museums or school science fairs, is shown to have a positive impact on students' educational outcomes by providing a supportive environment (Muller 1993).

Variation in parenting styles such as parent-child communication, parent participation in activities with students, and parental aspiration has been observed among racial groups and by generational status. Valenzuela and Dornbusch (1994) suggest that cultural differences in parenting style may account for some of the racial and ethnic disparities in educational

achievement. Immigrant parents are often found to have high educational aspirations for their children compared to their native counterparts (Glick and White 2004; Kao 1995; Kao and Tienda 2005; Goyette and Xie 1999). But notably, Asian-origin parents are also less likely to share decision-making power with children or to communicate with children compared to white parents (Kao 2004a). It also may be the case that children of different racial groups respond differently to parenting styles. Dornbusch (1989) suggests that while authoritarian parenting is negatively associated with white students' grades, it is positively related to grades for Asian students. However, there is limited evidence on how parent-child discussion and parent participation in activities with students may operate differently among racial/ethnic groups and by generational status. The study by Kao (2004a) is one of the few that has attempted to examine whether children of different race/ethnicity and generation status may respond differently to a particular parent-child interaction. Using the National Education Longitudinal Survey of 1988 (NELS), Kao (2004a) found that while black and Hispanic students respond favorably to general discussions about school, Asian students respond negatively to general discussions about school. Also, discussions about college have a significant positive impact on GPA for Asian students but not for Hispanic or black students. Using the same NELS data, Kao and Rutherford (2007) found that immigrant and minority students experience different returns to parental-school involvement and intergenerational closure. However, neither of two studies examines the impact of parental social capital on educational outcomes net of school effects. Therefore, our work aims to update and expand on Kao (2004) and Kao and Rutherford (2007)'s study by incorporating more aspects of parental involvement and also including school-level contextual factors.

Data and Methods

Data source

We use data from the 2009 and 2012 waves of the HSLs (HSLs:2009–2012; NCES 2013). The HSLs is a national representative study that began in fall 2009 with a cohort of more than 20,000 high school students in the 9th grade. The first follow-up was conducted in 2012. The HSLs is a superior data source for two reasons. First, many previous studies have used the earlier rounds of similar national educational surveys conducted by NCES such as National Education Longitudinal Survey (NELS 1988–2000) to study the relationship between education outcomes and parental engagement (Glick and White 2004; Kao 2004a; Kao and Rutherford 2007). By using the most updated nationally representative survey on education outcomes conducted by the NECS, this article complements those earlier studies while also expanding the literature using the most recent evidence. Moreover, the HSLs 2009 wave collected richer information on parental involvement and participation than previous waves of national educational surveys. The goal of doing so was to understand students' educational trajectories such as how and why students choose certain college majors and careers; at the same time, such data provide a great resource for studying parental engagement and its effects.

Since our central concern is how parental engagement influences adolescents' educational performance, we limit our analysis to participants in the 2009 wave for whom their parents completed the companion parent survey. Many of the key independent variables of interest

(parent-school involvement, parent-child communication, parent participation in students' extracurricular activities) are only available from the parent questionnaire. The base sample used for this study therefore includes 13,000 respondents (rounded) for whom values of all key variables are non-missing. Our analyses are weighted in accordance with NSLS documentation recommendations. Summary statistics of the analytical sample are presented in Table 1.

Descriptive Statistics of Analytic Sample

Key variables

Dependent variables: Educational outcomes—We examine two educational outcomes in this article: standardized math test scores (in the 11th grade follow-up wave) and drop out status (follow-up wave). The standardized math test score is chosen because it is comparable for measuring students' achievement across schools and states, since it is based on the same computer test given to all interviewees during the time of the survey, and it is standardized to a 100-point scale by the NCES, with a mean of 52 and standard deviation of 10. Drop out status is ascertained at the time of the follow-up survey. Students are asked whether they ever dropped out between the time of the first wave (when students are in 9th grade) and the follow up (when students are or would be in 11th grade). We argue that it is important to measure both test scores and enrollment status, since they are indicators of different aspects of academic performance. Standardized test scores have been widely used in studies of educational achievement. They have been generally treated as an indicator of both intelligence and learned information (Kao and Thompson 2003), and also a “more objective measures of what students have learned” (Kao and Rutherford 2007, 33). We follow a long-standing tradition of examining drop out status, for its obvious value as an academic outcome and the associated public policy concern, since high school dropouts are generally more likely to be unemployed or in contact with the criminal justice system. Math scores are used instead of reading scores because they are less likely to be affected by language barriers.

Independent variables: Race/ethnicity and immigrant status—We categorize students by race/ethnicity (non-Hispanic Asian, non-Hispanic black, Hispanic and non-Hispanic white [reference]), and by generational status (first-generation, second-generation, and third-generation and above [reference]). First-generation youth are classified as those born outside of the United States, while second-generation students are classified as those born in the United States but with at least one foreign-born parent. Third+ generation youth are those who are born in the United States with both parents also born in the United States. (For ease of exposition we sometimes refer to this final group as “3rd” generation, recognizing that it also includes all higher-order generational statuses; similarly, we often drop the “non-Hispanic” qualifier for the race-ethnic categories). In our descriptive statistics (means comparison), we represent 12 categories: cross classifying four race/ethnic groups by three generation groups.

Measures of parental engagement

The score of parental engagement is constructed through principal-component factor analysis as a factor score based on twenty-five items asked in the HSLs 2009 survey. Among the twenty-five items, seven items tap *parental school involvement*: whether parent reported attending a general school meeting, a PTO meeting, or school event; served as a school volunteer; participated in a school fund raiser; met with a school counselor; or attended parent teacher conference since the start of the 2009–2010 school year (when students are in 9th grade). *Parental extracurricular participation in students' activities* is measured based on parents' responses to a series of eight questions regarding whether they went to a science or engineering museum; worked or played on a computer; built or fixed something; attended a school science fair; helped their 9th grader with a school science fair project; discussed a STEM program or article; visited a library; or went to a play, concert, or live show with 9th grader in last year (prior to the time of the base-year survey). *Parent-child communication* is measured based on students' responses to a series of ten questions regarding whether they have ever discussed school work, college, jobs/careers, and personal problems with mother/father during the academic year 2009–2010. Table 1 collapsed the ten items to four. Answers from both mother/father are pooled together due to space constraints. For example, discussion about school work includes four questions: whether 9th grader talked to mother about science, whether 9th grader talked to father about science, whether 9th grader talked to mother about other courses, and whether 9th grader talked to father about other courses. Discussion about college includes two items: whether 9th grader talked to mother about going to college and whether 9th grader talked to father about going to college. Discussion about jobs/careers also includes two items: whether 9th grader talked to mother about adult jobs/careers and whether 9th grader talked to father about adult jobs/careers. Discussion about personal problems also includes two items: whether 9th grader talked to mother about personal problems and whether 9th grader talked to father about personal problems.

In exploratory analysis we considered developing factor scores based on each of the three *a priori* groupings. Given the cross-correlation of the three such factors and limited additional information the separation conveyed, we opted for parsimony. We thus conducted factor analysis with all twenty-five items and extracted a single over-arching factor to capture parental engagement.

Responses for each item are originally coded as dummy variables, and principal component factor analysis is conducted to check the consistency among items and to construct the final factor score of social capital. Principal-component analysis is used here because it is believed to be useful for reducing correlated observed variables to a smaller set of important independent composite variables (Abdi 2003; Suhr 2005). Analytical weights are applied for item responses at the individual level. The complete list of items used for constructing the composite score is presented in Table A1 in the appendix. Only one factor index of parental engagement is retained because of its highest eigenvalue of 4.6, which is greater than the conventional criterion (>1). All of the response items are positively related to the final index, while attending school events (fundraising or volunteering) and parent-child discussion about school have the greatest weights in the parental engagement score.

Control variables

Individual characteristics of gender, base-year math score, family socioeconomic status (SES), family structure, and school-level characteristics are included as control variables in all models. Previous research suggests that those are the measures of individual and family characteristics that influence educational outcomes (Glick and White 2004; Kao and Rutherford 2007). In the HSLs, family SES is a composite measure constructed from the education and occupation (prestige score) of parents and family income. Besides family SES, we also control for family structure. Students living in single-parent households may face extra barriers in accessing social capital and parental attention.

Crucially, we also control for students' prior academic performance (math score in the 9th grade) to accurately capture the effects of parental engagement on achievement trajectory. School-level characteristics, such as school type, share of immigrant students, and percent students in free-lunch program, are also included as controls to minimize the potential confounding impact of school characteristics on education outcomes.

Methods

We begin with a descriptive comparison (Table 2) of educational outcomes, family background characteristics, parent-school involvement, parent-child communication, parent participation in students' extracurricular activities by generational status and race/ethnicity. We then employ mixed effects models to estimate the effect of parental engagement on wave 2 math score (Table 3A) and probability of dropping out of high school (Table 3B), after controlling for base year math score and other individual-level, family background, and school context characteristics. We build our models sequentially, to determine how the predictive effects of variables are altered in the presence of additional covariates. Last, stratified models (Tables 4A and 4B) are used to examine whether these processes appear to differ by race/ethnicity.

We employ mixed-effects models to estimate the effects of parental engagement, race/ethnicity, and generational status on education outcomes, while controlling for family background and school characteristics. Mixed-effects models are advantageous for their ability to reflect and adjust for influences at the higher level of aggregation (the school). Harkening back to the early work of Coleman and colleagues, who used High School and Beyond Data (Coleman, Hoffer, and Kilgore 1982), one would expect school type to matter for students' academic performance and students' family background characteristics to impact the types of schools that students attend. Using the Children of Immigrants Longitudinal Study, Portes and Hao (2004) find that school-level SES is associated with higher GPA and lower probability of school attribution. Mixed-effects models have further advantages, since students with similar background characteristics are clustered within school and the errors for individual observations in the same school are likely to be correlated, with education outcomes reflecting school-level context in addition to individual-level characteristics. Students are not at all randomly distributed across schools. In fact, there is substantial variation in school type (and probably choice where able) by race/ethnicity and by generational status. As shown in Table 2, first-generation students regardless of racial and ethnic origin are far more likely to enroll in schools with higher

shares of immigrants, compared to their native-born counterparts. The clustering of peers of similar ethnicity and immigrant status might have varied implications for students of different racial and ethnic origin. Portes and Hao (2004) suggest that the disadvantage in academic performance among second-generation Mexican are significantly attenuated by attending schools with higher shares of coethnics, while the advantage of Asian second-generation immigrants is also reduced by attending schools with high concentration of Asian students. Also, minority students, particularly black and Hispanic students, are more likely to be clustered in public schools or schools with lower average SES compared to their white counterparts. School-level characteristics such as learning resources (e.g., teacher quality or teacher-student ratio) that are not measured in the model but could affect students' education outcomes are adjusted with a random constant at the school level to allow variation among schools. In sum, to examine the effects of both individual characteristics and school contexts, while addressing the issue of correlated errors at the school level, we employ two-level mixed-effects models, with the students as level 1 and schools as level 2 observations and random intercepts at the school level. Using the math test score as an example, the full mixed-effects model is specified as:

$$Y_{ij} = \beta_{0j} + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \beta_3 X_{3ij} + \beta_4 X_{4ij} + \beta_5 Z_j + e_{ij},$$

where i is the student level; j is the school level; X_1 includes all combinations of race/ethnicity and generation status; X_2 refers to prior academic performance; X_3 refers to family characteristics such as SES and family structure; X_4 refers to parental engagement; Z refers to school specific context (school type, percent student in free lunch program, percent taking AP courses, immigrant stock); and $\beta_{0j} = \gamma_{00} + u_{0j}$ (random intercept by school).

Results

Descriptive statistics

First, we present the descriptive statistics for the analysis sample in Table 1. The descriptive statistics show that HSLS 2009 provides a diverse sample with about 5.2 percent of student respondents being first-generation and 19.0 percent of them being second-generation. Table 1 also presents the weighted summary statistics for item measures of the clusters of parental engagement: parent-school involvement; parent participation in extracurricular activities with children; and parent-child communication. As shown in Table 1, parents in general report a fair amount of parent-school involvement and participation. More than half of parents report attending a general school meeting, parent-teacher conference and school event, as well as participation in most extracurricular activities. But parents are less likely to serve as school volunteers, or participate in fund raisers or PTO meetings, all of which are indicators of higher levels of involvement that require more resources (temporal and perhaps monetary) from the parents. Meanwhile, students also report quite high levels of communication with parents. More than 80 percent of the high school students interviewed report discussing going to college and future careers with parents, though the percent of them who are willing to discuss personal problems with parents is lower (63.3 percent).

Table 2 presents the weighted means of academic performance, parental engagement, and household characteristics by race/ethnicity and immigrant status. A significant difference (symbols not indicated for reasons of space) is observed between minority first- and second-generation groups and third+ generation whites in terms of education outcomes. With education outcomes measured as math test scores, first- and second-generation Asians on average have higher math test scores in both 9th grade and 11th grade than native third-generation whites, while immigrant blacks and Hispanics (both first and second generation) perform worse in high school compared to third- or higher-generation whites. Notably, children of Asian and black immigrants all seem to do better than their third-generation counterparts within the same racial/ethnic group, but the generational ordering is not the same for all minority racial groups. For Asians, the second-generation children perform best while for blacks, the first-generation seems to perform best in terms of 11th grade math test scores. For Hispanics, the first- and second-generations seem to lag behind compared to their third+ generation counterparts. Dropout rates increase with generation for all three minority groups. Hispanic and black dropout rates for those in the third (and higher order) generation are almost twice that for comparable whites.

Though immigrant children and children of immigrants have both higher base wave and follow-up wave test scores for all groups except for Hispanics, they are not advantaged in terms of levels of parental engagement. First-generation or second-generation immigrant minority youth tend to have lower parental engagement compared to their third+ generation counterparts, except for Asians. For Asians, third-generation youth have the lowest parental engagement, which could be because the Asian group is more heterogeneous, and that the number of third-generation Asians is relatively small and thus the mean estimation has a large standard error, so the mean estimation for third-generation Asians should be interpreted with caution. In terms of racial/ethnic differences, minority groups all have lower levels of parental engagement compared to whites, regardless of generation status.

Children of different racial/ethnic groups and immigrant status are also exposed to varied household and school-level characteristics. As shown in Table 2, first-generation Hispanic children in general have the lowest SES, though the condition improves across generation. Meanwhile, first- and second-generation Asians are not economically disadvantaged compared to third+ generation whites and economic condition improves over time for Asians. Black youth regardless of generational status are economically disadvantaged compared to their third+ generation white counterparts, and the economic disadvantage among black youth seems to amplify over time. Among whites, the second-generation youth seem to have the highest family SES.

In terms of school-level characteristics, first-generation immigrant youth are most likely to enroll in schools with the highest immigrant student stock and least likely to enroll in Catholic private schools, regardless of race and ethnicity. Both first- and second-generation youth are more likely to enroll in schools with relative higher proportions of students taking AP courses compared to their third-generation counterparts among all racial groups. Minority youth are more likely to enroll in less economically advantaged schools (measured by percent student in free lunch program) overall, although there are some differences along generation lines. First-generation Asians and Hispanics are more likely to enroll in less

economically advantaged schools, compared to their second- or third-generation same-race counterparts. Yet among black youth, the third-generation students are most likely to end up in schools that are more economically disadvantaged.

Mixed-Effects Regression Analysis

Impact of parental engagement on educational trajectories

Mixed-effects Generalized Linear Model(GLM) regression results predicting the effects of race/ethnicity, immigrant status, and parental engagement on math test scores are presented in Table 3A, and logistic regression results predicting probability of dropping out are presented in Table 3B. All models adjust for school-level clustering. In the tables we present here, we include parental engagement as the key independent variable first, to examine its effect solely, since race/ethnicity, generational status, and other family characteristics are likely to have an impact on the level of parental engagement.

In alternative preliminary analyses (tables not presented here), we include race/ethnicity, generational status first before adding in parental engagement. We find that the mediating impact of parental engagement on race/ethnicity and generational status is limited, but the mediating impact of parental engagement on SES, as well as its independent impact, is substantial and statistically significant.

Model 1 in both Tables 3a and 3B shows the effect of parental engagement has highly significant predictive power on wave 2 math test scores and dropping out of high school. Model 2 adds in base-year (9th grade) math, and the estimated effect of parental engagement decreases, but it is still significant. Base-year math explains over half of the variation in the follow-up year math test score in all of the estimation models. (Appendix Table A2 provides the regression on base-year math test score as the outcome from the equivalent set of covariates.) Models 3 in Table 3A and 3B add in gender, race/ethnicity, and generational status. Models 4 in Table 3A and 3B add in family composition and SES. The results in model 4, Table 3A and 3B suggest that in terms of nativity difference, compared to third-generation and above youth, first-generation youth are more likely to have higher 11th grade math scores and lower probability of dropping out after controlling for gender, race/ethnicity, base-year math score, parental engagement, and family SES ($p < .01$). Meanwhile, the impact of being second-generation on math test score and probability of dropping out of high school is not significant. (We do find that first- and second-generation youth in general have higher 9th grade math test scores compared to their third-generation and above counterpart [see appendix Table A2]).

In terms of racial/ethnicity differences, we find that Asian students tend to have higher 11th grade math scores, while non-Hispanic black students tend to have lower 11th grade math scores compared to non-Hispanic whites ($p < .01$), after controlling for base-year math and generational status. Hispanic students also tend to have lower 11th grade math test scores compared to whites, but the effect is only marginally significant, after controlling for base-year math, gender, and generational status. The racial differences observed for 11th grade math scores are also seen in 9th grade test scores. However, race/ethnicity is notably not

appreciably predictive of ever dropping out of high school, after controlling for family SES and composition.

In keeping with the findings of much prior research, our results show that family SES (introduced in models 4 and 5) is a highly significant predictor of academic performance regardless of whether the outcome is measured as math test or dropout status. Children living in economically better-off families are more likely to have higher 11th grade math scores and lower probability of dropping out of high school, even after controlling for 9th grade math test scores.

The lack of a two-parent family (family structure also introduced in models 4 and 5) points to inferior schooling outcomes, although several specific differentials do not achieve statistical significance at conventional levels. Family structure effects are more strongly predictive at base year, as shown in appendix Table A2. We do find that children living in households with no biological or adoptive parents are much more likely to drop out of high school than children living in two-parent families. Meanwhile, even after we include all the measures for family SES, family structure, the predictive effect of parental engagement is still statistically significant for improving math test scores and preventing youth from dropping out of high school at $p < .001$.

To further understand how much school context could alter the measured effects of race/ethnicity, generational status, and family characteristics, we introduce school-level characteristics into the regression models. Model 4 (before the explicit introduction of school-level covariates) in both Tables 3A and 3B suggests that school-level clustering explains about 6 percent of the total variance in 12th grade math test scores and about 8 percent of the residual variance in dropout probability, after we control for all individual and family-level characteristics. Model 5 introduces the several school-level measures: school organizational type; poverty (percent free lunch); percent taking AP courses; and immigrant stock. Results in Model 5 indicate that school type has a significant predictive power regarding education outcomes, net of individual and family-level characteristics. Students in Catholic, private schools on average have higher 11th grade math test scores and lower probability of dropping out, compared to students in public schools. Meanwhile, school-level poverty measured by percent of students in the free lunch program is negatively associated with 12th grade math scores and positively associated with probability of dropping out, but the associations are not statistically significant. Other school-level characteristics are not statistically significant in these models.

These results are trajectories, net of base-year circumstance. When we examine base-year conditions (appendix Table A2), we do see some important differences along these lines. Students in schools with a higher percent of students in free lunch program have significantly lower 9th grade math test scores. Student impoverished (large fraction free lunch) schools are predicted to perform less well initially, but those in schools with more advantaged curricula and higher immigrant stock are predicted to do better on the initial math test. Interestingly, students enrolled in private schools (catholic or non-Catholic) are predicted to have lower base-year math test scores, net of the school-level and family background traits entered into the model.

Varied impacts of parental engagement by race/ethnicity and education outcomes

Tables 4a and 4b look at within race/ethnic groups. We estimate these models, stratified by race/ethnicity, to better understand the interactive effect of race/ethnicity, generational status, and parental engagement. We present only models that include all substantive personal, family, and school covariates, as above. The inclusion of parental engagement does not appreciably change the parameter estimates for other variables. (All statistically significant coefficients retain their significance, sign, and approximate magnitude.)

Table 4a reveals that the predictive effect of prior math score is quite strong across all ethnic groups. Generation status is generally non-significant in these models (except for immigrant white students), and is in places inconsistent in sign. Family SES operates as expected to predict more favorable math trajectories, although it is not significant in all cases. Students from non-dual-parent homes are predicted to fare less well, although only a fraction of the coefficients achieve statistical significance. Table 4b echoes the predictive effect of early school performance (wave 1 math) on dropout probability. Students who did well in 9th grade math are less likely to drop out (significant for all but blacks). First- and second-generation students are generally less likely to drop out of high school, with the relationship most pronounced for Asians and blacks. More favorable family background conditions—higher SES and dual-parent household—generally pointed to lower dropout. (Interestingly, the SES effect was near zero for Asians.)

Parental engagement carries only substantively statistically significant predictive power over math trajectory for Hispanics. For Asians and whites, the coefficient on engagement is smaller in size and non-significant. For blacks the coefficient is negative while non-significant. Asian, black, and white students from homes with engaged parents were generally much less likely to drop out than their peers ($p < .01$). Oddly, a parental engagement effect was in the same direction but not of statistical significance for Hispanic students.

School-level effects, where they manifest, are inconsistent. For whites and blacks, Catholic school attendance predicts a superior math trajectory, but for Asians Catholic school attendance (and for peers in free lunch programs) lowers the trajectory. School-level variables are not usually significant in the dropout models. Estimation parameters from the multilevel math trajectory model also shed some interesting light on the school achievement variation by race/ethnicity. Not surprisingly (and consistent with pooled models) variance at the individual level dominates variance at the school level. We do find for blacks, however, that this is the case, and in turn, the intraclass correlation is higher than for the other groups. This would be consistent with higher error correlation (more similarity) within schools among blacks, perhaps in turn reflective of more sorting or academic segregation not otherwise measured by included covariates in these models. Due to the variation in sample size for the different racial groups and variances in standard errors, the results for cross comparison between racial groups should still be interpreted with caution. All told, parental engagement comes through more strongly in predicting dropout than the trajectory of math. This is consistent with a behavioral mechanism in which the parents are able to translate their aspirations more into school attendance itself than into within-school performance.

Conclusion

While previous research has examined the effect of parental engagement on students' educational outcomes in general, we used the most recent nationally representative education survey to focus on both the overall and conditional (including mediating) effects of parental engagement. We look at parental engagement through a rich set of indicators which include parent-school involvement, parental participation in extracurricular activities, and parent-child discussions, and our analysis considers a host of family background characteristics, including race/ethnicity, immigrant generation status, and characteristics of the school itself. Our models take advantage of the longitudinal nature of the data, predicting 11th grade math outcomes while controlling for 9th grade math performance, thereby giving a better sense of how the covariates influence outcomes. Our approach is in the spirit of Coleman, in that we seek to assess the determinants of stratification in schools and improve our understanding of family social capital. Accordingly, our models include individual demographic characteristics, conventional family background measures, direct measures of parental engagement, and school contextual effects.

We find that higher levels of parental engagement predict improvements in students' math test scores and prevent students from dropping out of high school. This effect persists even when we control for conventional educational attainment variables such as race/ethnicity, family SES and school-level contextual factors, as well as when interactions of parental engagement with other race/ethnicity/immigrant generation variables are examined. In keeping with prior studies, we find that students from higher socioeconomic backgrounds are less likely to drop out and are more likely to follow superior academic trajectories. Further, we find that greater parental engagement predicts a superior achievement trajectory (as reflected in standardized math test scores) across the high school years.

School-level effects are also discernable in our empirical results. This is evidenced both by direct covariate measures (such as school organizational type and school socioeconomic composition) and by the portion of the variance that remains at the school level. Including these school-level measures reduces the magnitude of the parental engagement effect but notably does not remove it. All told, these findings add weight to arguments for the importance of family social capital.

We do find some variation in the impact of parental engagement by ethno-racial groups. Across all four major groups that we can analyze in the HSLs:2009, we find that greater parental engagement is associated with lower dropout rates. For this fundamental education outcome, our results are quite robust. Effects of parental engagement on predicting math trajectory were weaker and inconsistent across the four groups. Taken together we interpret these findings to mean that parental involvement translates more easily into children continuing in school, rather than performing well. It also points to potential differences in the way that school engagement is manifest across different race/ethnic groups and is correlated with other achievement variables, such as family socioeconomic background and school type.

Parental engagement, as arguably one window into the broader landscape of family social capital, clearly matters in ways that promote high school achievement. Still, future analysis must do more to understand how different features of engagement may operate to promote success, and equally important, how parental aspirations and their associated behaviors might differentially operate across various race/ethnicity/generation groups. As schools come to have increasing shares of first- and second-generation minority children, it is important to understand how the influences of parenting might operate differently among subpopulations, so that we can develop constructive policies that improve education outcomes for the growing number of children of immigrant minorities in contemporary American society.

Acknowledgments

We are grateful to the Population Studies and Training Center at Brown University, which receives funding from the NIH (P2C HD041020), for general support. A previous version of this paper was presented at the 2016 annual meetings of the Population Association of America in Washington D.C. We thank Margot Jackson and Susan Moffitt for their helpful comments.

Appendix 1: Items used to construct index of parental engagement

Input Item	Definition
Parent school involvement	
PISCHMTG	Attended a general school meeting since start of 2009-10 school year
PIPTOMTG	Attended a PTO meeting since start of 2009-10 school year
PIPTCONFER	Attended parent-teacher conference since start of 2009-10 school year
PISCHEVENT	Attended school event since start of 2009-10 school year
PIVOLUNTEER	Served as a school volunteer since start of 2009-10 school year
PIFUNDRAISE	Participated in school fund raiser since start of 2009-10 school year
PICOUNSELOR	Met with a school counselor since start of 2009-10 school year
Parental participation in extracurricular activities	
PIMUSEUM	Went to science or engineering museum with 9th grader in last year
PICOMPUTER	Worked or played on computer with 9th grader in last year
PIFIXED	Built or fixed something with 9th grader in last year
PISCIFAIR	Attended a school science fair with 9th grader in last year
PISCIPROJ	Helped 9th grader with a school science fair project in last year
PISTEMDISC	Discussed STEM program or article with 9th grader in last year
PILIBRARY	Visited a library with 9th grader in last year
PISHOW	Went to a play, concert or live show with 9th grader in last year
Parent-Child discussion	
SIMOMTALKS	9th grader talked to mother about science courses to take in 2009-2010
SIDADTALKS	9th grader talked to father about science courses to take in 2009-2010
SIMOMTALKOTH	9th grader talked to mother about other courses to take in 2009-2010
SIDADTALKOTH	9th grader talked to father about other courses to take in 2009-2010
SIMOMTALKCLG	9th grader talked to mother about going to college
SIDADTALKCLG	9th grader talked to father about going to college

Input Item	Definition
S1MOMTALKJOB	9th grader talked to mother about adult jobs/careers
S1DADTALKJOB	9th grader talked to father about adult jobs/careers
S1MOMTALKPRB	9th grader talked to mother about personal problems
S1DADTALKPRB	9th grader talked to father about personal problems

Appendix 2: Mixed-Effects Model Predicting Base-year (9th Grade) Math Test Score

	Model 1	Model 2	Model 3	Model 4
<i>Parental Engagement</i>	2.353 *** (0.173)	2.251 *** (0.183)	1.521 *** (0.146)	1.437 *** (0.146)
<i>Individual Characteristics</i>				
Males (ref= Females)		0.105 (0.341)	-0.134 (0.317)	-0.0532 (0.314)
Race/Ethnicity (ref=Non Hispanic whites)				
Non-Hispanic Asian		4.108 *** (0.879)	3.592 *** (0.831)	3.417 *** (0.824)
Non-Hispanic Black		-4.081 *** (0.595)	-2.854 *** (0.564)	-2.700 *** (0.535)
Hispanic		-2.545 ** (1.057)	-1.313 (0.975)	-1.598 (1.012)
Generation Status (ref= Third+ Generation)				
First Generation		1.996 ** (0.818)	2.787 *** (0.762)	1.981 *** (0.753)
Second Generation		1.963 *** (0.485)	1.961 *** (0.463)	1.310 *** (0.458)
<i>Family Background Characteristics</i>				
2009 (base year) composite SES score			3.331 *** (0.329)	3.007 *** (0.303)
Family Composition				
Single mother			-0.311 (0.463)	-0.278 (0.479)
Single father			-1.738 ** (0.840)	-1.648 ** (0.836)
No parent			-2.322 *** (0.727)	-2.173 *** (0.705)
<i>School-level characteristics</i>				
School type (vs. Public school)				
Non-Catholic private school				-1.975 *** (0.689)
Catholic private school				-1.293 **

	Model 1	Model 2	Model 3	Model 4
				(0.509)
Percent student body in freelunch program				−0.0542**
				(0.00974)
Percent student taking AP courses				0.0431**
				(0.0167)
Percent students who are first or second generation				0.0629**
				(0.0156)
Constant (Mean of school level intercepts)	50.99	51.3	51.24	52.36
Random effects				
Variance at the school level	12.70	10.68	6.79	4.47
Variance at the individual level	69.62	68.13	64.38	64.24
Intraclass correlation	0.15	0.14	0.10	0.07
Observations	~13,000	~13,000	~13,000	~13,000
Number of schools	~900	~900	~900	~900

***
p<0.01,
**
p<0.05,
*
p<0.1

Note: Results presented in this table are based on complete cases. Weights are used to adjust for missing of parent questionnaires in the survey, following documentation from NECS. Results are consistent when multiple imputation (20 imputations) is used to impute missing values. Findings also hold when country of origin is added in the models.

Biographies

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Figure 1.

What are the possible mechanisms for race/ethnicity, generational status and parental engagement to affect educational outcomes?

Table 1

Descriptive Statistics of Analytical Sample

	Weighted means ^a
Key outcome variables	
Student ever dropped out of school (by follow up year 2012)	7.1%
Follow-up year math score (standardized theta score)	52.2 (10.0)
Base-year year math score (standardized theta score)	51.9(9.8)
Main independent variables	
Generation Status	
First Generation	5.2%
Second Generation	19.0%
Third + Generation	75.8%
Gender	
Male	49.4%
Race/Ethnicity	
Asian	4.2%
Black	10.7%
Latino	20.9%
Whites and Others	64.2%
Family Characteristics	
Family socioeconomic status (standardized)	0.03(0.8)
Family structure (in base year 2009)	
Intact family	63.0%
Single mother (with or without partner)	28.1%
Single father (with or without partner)	6.2%
No parent	2.7%
Parental Engagement	
Parent school involvement	
item: Attended a general school meeting since start of 2009-10 school year	82.9%
item: Attended a PTO meeting since start of 2009-10 school year	35.8%
item: Attended parent-teacher conference since start of 2009-10 school year	53.7%
item: Attended school event since start of 2009-10 school year	65.2%
item: Served as a school volunteer since start of 2009-10 school year	26.4%
item: Participated in school fund raiser since start of 2009-10 school year	49.9%
item: Met with a school counselor since start of 2009-10 school year	42.3%
Parent participation in extracurricular activities with children	
item: Went to science or engineering museum with 9th grader in last year	53.0%
item: Worked or played on computer with 9th grader in last year	86.9%
item: Built or fixed something with 9th grader in last year	47.2%
item: Attended a school science fair with 9th grader in last year	16.7%
item: Helped 9th grader with a school science fair project in last year	39.8%
item: Discussed STEM program or article with 9th grader in last year	65.2%

	Weighted means ^a
item: Visited a library with 9th grader in last year	64.2%
item: Went to a play, concert or live show with 9th grader in last year	63.2%
<i>Parent-child communication^b</i>	
item: Discuss about school course work	66.7%
item: Discuss about going to college	84.2%
item: Discuss about jobs/career	86.3%
item: Discuss about personal problems	63.3%
<i>School-level characteristics</i>	
Percent in public school	41.6%
Percent in non-Catholic private school	3.7%
Percent in Catholic school	4.1%
Percent student body in freelunch program	36.5(23.2)
Percent students taking AP courses	16.7(13.1)
Percent students who are first or second generation	19.1(15.5)

Source: High School Longitudinal Survey 2009 and 2012 panels (N~13,000). The analytical sample used in this paper only include students that participated in both waves and also have parent interviewed in the base year who have answered questions on parental engagement. Key information such as generation status, parental engagement are only available from the parent data.

Note:

^aThe means and proportions are weighted by WIPARENT, which is defined as “parent weight for studentlevel analyses involving the parent questionnaire”. According to NCES, because of low response rate in parent questionnaires, analysis involving parent information should be adjusted by parent weight.

^bParent-child communication is measured based on students’ responses to a series of 10 questions regarding whether they have ever discussed school work, college, jobs/careers and personal problems with mother/father during the academic year. We collapsed the 12 items to 4. Answers from both mother/father are pooled together due to space constraints.

Table 2

Weighted Means of Measures of Academic Performance, Parental Engagement, Family Background, School Characteristics, by Race/Ethnicity and Generational Status

	Asian			Black			Hispanic			White		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Key outcome variables												
Base-year year math score (standardized theta score)	57.57	60.23	55.47	49.20	49.98	46.43	50.40	49.52	49.50	55.58	55.91	53.08
Follow-up year math score (standardized theta score)	58.18	61.55	52.94	50.96	48.36	46.93	49.45	49.24	50.02	57.65	55.94	53.39
Student ever dropped out of school (by follow up year 2012)	0.03	0.05	0.09	0.03	0.02	0.12	0.06	0.10	0.11	0.14	0.04	0.06
Parental engagement index	-0.12	0.03	-0.39	-0.51	-0.24	-0.21	-0.36	-0.35	-0.27	-0.05	0.22	0.17
Household characteristics												
Intact family(both parent present)	0.86	0.83	0.75	0.71	0.59	0.34	0.73	0.68	0.47	0.84	0.77	0.68
Family socioeconomic status (standardized score)	0.30	0.35	0.37	-0.15	0.11	-0.30	-0.72	-0.57	-0.12	0.12	0.47	0.23
School-level characteristics												
Percent in public school	91.39	93.38	93.01	94.66	89.26	96.83	98.11	96.00	94.06	93.53	86.83	90.10
Percent in non-Catholic private school	6.74	3.65	3.01	4.27	3.10	0.96	0.80	1.38	2.29	5.44	5.73	4.84
Percent in Catholic school	1.87	2.97	3.98	1.07	7.64	2.21	1.09	2.62	3.65	1.03	7.44	5.06
Percent student body in freelunch program	39.40	27.67	31.38	40.67	44.48	50.15	51.49	49.34	43.45	27.89	26.80	30.22
Percent students taking AP courses	22.24	20.75	14.10	17.84	19.82	16.87	21.60	18.89	17.63	19.07	18.04	15.44
Percent students who are first or second generation	36.42	32.19	18.77	39.42	27.20	15.54	37.98	33.61	22.31	34.00	24.98	13.59

* Note: The number of students who are identified as third-generation Asian, first-generation or second-generation Black are relative small, and thus the mean estimations have large standard deviations. They should be interpreted with caution.

Table 3a

Mixed-Effects Model Predicting 11th Grade Math Test Score

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Parental Engagement</i>	2.262*** (0.179)	0.636*** (0.142)	0.607*** (0.150)	0.310** (0.155)	0.294* (0.154)
<i>Individual Characteristics</i>					
2009 (base year) standardized math score		0.684*** (0.0280)	0.671*** (0.0262)	0.640*** (0.0252)	0.638*** (0.0237)
Males (ref= Females)			0.329 (0.309)	0.239 (0.312)	0.275 (0.312)
Race/Ethnicity (ref=Non Hispanic whites)					
Non-Hispanic Asian			2.032*** (0.585)	1.944*** (0.606)	1.944*** (0.615)
Non-Hispanic Black			-2.145*** (0.660)	-1.702*** (0.636)	-1.686*** (0.628)
Hispanic			-1.024* (0.562)	-0.492 (0.522)	-0.549 (0.537)
Generation Status (ref= Third+ Generation)					
First Generation			1.106* (0.669)	1.335* (0.698)	1.167* (0.686)
Second Generation			0.0466 (0.434)	-0.0324 (0.442)	-0.175 (0.424)
<i>Family Background Characteristics</i>					
2009 (base year) composite SES score				1.438*** (0.235)	1.317*** (0.249)
Family Composition					
Single mother				-0.503 (0.351)	-0.467 (0.350)

	Model 1	Model 2	Model 3	Model 4	Model 5
Single father				-0.817 (0.665)	-0.769 (0.658)
No parent				-0.326 (0.632)	-0.272 (0.641)
<i>School-level characteristics</i>					
School type (vs. Public school)					
Non-Catholic private school					0.846 (0.533)
Catholic private school					1.199 *** (0.355)
Percent student body in freelunch program					-0.00341 (0.00823)
Percent students taking AP courses					-0.00713 (0.0137)
Percent students who are first or second generation					0.0142 (0.0119)
Constant (Mean of school level intercepts)	51.84	16.77	17.51	19.16	19.07
Random effects					
Variance at the school level	12.89	4.10	3.63	2.73	2.47
Variance at the individual level	71.21	40.49	40.22	39.71	39.74
Intraclass correlation	0.15	0.09	0.08	0.06	0.06
Observations	~13,000	~13,000	~13,000	~13,000	~13,000
Number of schools	~900	~900	~900	~900	~900

***
p<0.01,**
p<0.05,*
p<0.1

Note: Results presented in this table are based on complete cases. Weights are used to adjust for missing of parent questionnaires in the survey, following documentation from NECS. Results are consistent when multiple imputation (20 imputations) is used to impute missing values. Findings also hold when country of origin is added in the models.

Table 3b

Mixed-Effects Logistic Models Predicting Probability of Ever Drop Out

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Parental Engagement</i>					
	−0.694*** (0.0864)	−0.564*** (0.0933)	−0.557*** (0.0933)	−0.432*** (0.115)	−0.427*** (0.112)
<i>Individual Characteristics</i>					
2009 (base year) standardized math score		−0.0506*** (0.00915)	−0.0479** (0.00906)	−0.0337** (0.00975)	−0.0319*** (0.00957)
Males (ref= Females)			0.167 (0.162)	0.191 (0.165)	0.194 (0.164)
Race/Ethnicity (ref=Non Hispanic whites)					
Non-Hispanic Asian			0.433 (0.390)	0.488 (0.400)	0.485 (0.382)
Non-Hispanic Black			0.327 (0.302)	0.141 (0.282)	0.184 (0.291)
Hispanic			0.182 (0.241)	−0.0178 (0.255)	−0.0114 (0.267)
Generation Status (ref= Third+ Generation)					
First Generation			−0.619** (0.308)	−0.745** (0.315)	−0.756** (0.326)
Second Generation			−0.357 (0.243)	−0.349 (0.253)	−0.350 (0.268)
<i>Family Background Characteristics</i>					
2009 (base year) composite SES score				−0.616*** (0.165)	−0.636*** (0.153)
Family Composition					
Single mother				0.110 (0.160)	0.132 (0.158)
Single father				0.400 (0.160)	0.413 (0.158)

	Model 1	Model 2	Model 3	Model 4	Model 5
No parent				0.717** (0.321)	0.730** (0.325)
School-level characteristics					
School type (vs. Public school)					
Non-Catholic private school					0.481* (0.283)
Catholic private school					-0.915*** (0.320)
Percent student body in freelunch program					0.00103 (0.00416)
Percent students taking AP courses					-0.00866 (0.00713)
Percent students who are first or second generation					0.00273 (0.00630)
Constant (Mean of school level intercepts)	-3.037	-0.508	-0.732	-1.514	-1.613
Random effects					
Variance at the school level	0.476	0.415	0.389	0.297	0.236
Intraclass correlation^a	0.13	0.11	0.11	0.08	0.07
Observations	~13,000	~13,000	~13,000	~13,000	~13,000
Number of schools	~900	~900	~900	~900	~900

***
p<0.01,

**
p<0.05,

*
p<0.1

Note:

^aResidual variance is assumed to be $\pi^2/3$. Results presented in this table are based on complete cases. Weights are used to adjust for missing of parent questionnaires in the survey, following documentation from NECS. Results are consistent when multiple imputation (20 imputations) is used to impute missing values. Findings also hold when country of origin is added in the models.

Table 4a

Mixed-Effects Model Predicting 11th Grade Math Test Score

	Asian	Black	Hispanic	White
<i>Parental Engagement</i>				
	0.646 (0.423)	-0.805 (0.635)	0.696** (0.351)	0.246 (0.206)
<i>Individual Characteristics</i>				
2009 (base year) standardized math score	0.732*** (0.0372)	0.618*** (0.0392)	0.653*** (0.0393)	0.634*** (0.0403)
Males (ref= Females)	0.488 (0.802)	-1.346* (0.731)	0.140 (0.676)	0.556 (0.380)
Generation Status (ref= Third+ Generation)				
First Generation	1.005 (1.784)	3.253** (1.414)	-0.698 (0.843)	4.131** (1.748)
Second Generation	1.646 (1.620)	-1.279 (2.073)	-0.678 (0.613)	-0.829 (0.624)
<i>Family Background Characteristics</i>				
2009 (base year) composite SES score	0.798* (0.428)	1.444*** (0.543)	0.747 (0.471)	1.603*** (0.344)
Family Composition				
Single mother	-0.716 (0.862)	-1.579* (0.830)	-0.602 (0.982)	-0.256 (0.515)
Single father	-4.944 (3.023)	-1.335 (1.230)	-0.867 (1.139)	-0.472 (0.879)
No parent	-0.297 (1.116)	-1.749** (0.781)	0.467 (1.247)	0.217 (0.997)
<i>School-level characteristics</i>				
School type (vs. Public school)				
Non-Catholic private school	0.494	1.131	1.491	0.345

	Asian	Black	Hispanic	White
	(0.941)	(1.451)	(1.259)	(0.557)
Catholic private school	-2.159**	2.590***	1.431	0.907**
	(1.092)	(0.903)	(0.969)	(0.422)
Percent student body in freelunch program	-0.0392**	0.0191	0.00862	-0.0180
	(0.0148)	(0.0168)	(0.0143)	(0.0121)
Percent students taking AP courses	0.0103	0.0489	0.0163	-0.0262*
	(0.0250)	(0.0339)	(0.0268)	(0.0149)
Percent students who are first or second generation	0.00316	0.0282	0.000618	0.0102
	(0.0228)	(0.0333)	(0.0210)	(0.0139)
Constant (Mean of school level intercepts)	16.11***	17.37***	17.56***	19.91***
Random effects				
Variance at the school level	0	2.439	0.885	2.367
Variance at the individual level	32.31	34.91	40.84	39.46
Intraclass correlation	0.000	0.065	0.021	0.057
Observations	~900	~1100	~2000	~7700
Number of schools	~400	~500	~700	~900

***
p<0.01,

**
p<0.05,

*
p<0.1

Table 4b

Mixed-Effects Model Predicting High School Dropout Status

	Asian	Black	Hispanic	White
<i>Parental Engagement</i>	−0.857 ***	−1.477 ***	−0.135	−0.487 ***
	(0.241)	(0.475)	(0.175)	(0.148)
<i>Individual Characteristics</i>				
2009 (base year) standardized math score	−0.0481 **	−0.00723	−0.0653 **	−0.0220 *
	(0.0230)	(0.0347)	(0.0179)	(0.0116)
Males (ref= Females)	−0.724	1.005	0.120	0.0442
	(0.471)	(0.684)	(0.267)	(0.194)
Generation Status (ref= Third+ Generation)				
First Generation	−1.928 **	−3.840 ***	−0.528	−0.0129
	(0.849)	(1.472)	(0.413)	(0.803)
Second Generation	−1.385 ***	−3.197 **	0.0696	−0.807 **
	(0.439)	(1.578)	(0.381)	(0.401)
<i>Family Background Characteristics</i>				
2009 (base year) composite SES score	0.0464	−1.151 **	−0.920 ***	−0.456 **
	(0.359)	(0.564)	(0.258)	(0.210)
<i>Family Composition</i>				
Single mother	0.781	0.948	−0.0151	0.140
	(0.521)	(0.801)	(0.352)	(0.198)
Single father	0.388	2.427	0.307	0.653
	(0.691)	(1.754)	(0.661)	(0.406)
No parent ^a	—	−0.527	1.953 ***	0.836 **
		(1.272)	(0.662)	(0.416)
<i>School-level characteristics</i>				
School type (vs. Public school)				
Non-Catholic private school	−0.0397	−6.217 **	0.625	0.695 *
	(0.671)	(2.547)	(0.779)	(0.398)
Catholic private school ^b	—	−2.149	0.265	−0.942 **
		(1.652)	(0.558)	(0.465)
Percent student body in freelunch program	0.00463	−0.0155	0.00293	0.00791
	(0.0122)	(0.0182)	(0.00729)	(0.00662)
Percent students taking AP courses	0.00200	−0.0649	−0.00723	−0.0154
	(0.0149)	(0.0508)	(0.00987)	(0.0121)
Percent students who are first or second generation	0.00910	−0.0289	0.00196	0.0149
	(0.0144)	(0.0265)	(0.00960)	(0.0110)
Constant	0.291	−3.659	−0.454	−2.299 ***

	Asian	Black	Hispanic	White
Random effects				
Variance at the school level	0	6.453	0.218	0.0532
Intraclass correlation	0.00	0.66	0.06	0.02
Observations	~900	~1100	~2000	~7700
Number of schools	~400	~500	~700	~900

Standard errors in parentheses;

***
p<0.01,

**
p<0.05,

*
p<0.1

Note:

^a There is no coefficient for no parent for the Asian subgroup because there are only 20 (rounded) Asian students without any biological parent present in the sample and none has dropped out during Grade 9 and Grade 11.

Note:

^b There is no coefficient for Catholic private school for the Asian subgroup because there are 130 (rounded) Asian students enrolled in Catholic private school in the sample and none has dropped out during Grade 9 and Grade 11.