9-2019

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CLASS MATTERS: SCHOOL AFFLUENCE AND OTHER PREDICTORS OF
ATTAINMENT FOR WEALTHY AND POOR STUDENTS

by

ALISON BROCKHOUSE

A master's thesis submitted to the Graduate Faculty in Liberal Studies in partial fulfillment of

the requirements for the degree of Master of Arts, The City University of New York

2019

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This manuscript has been read and accepted for the Graduate Faculty in Liberal
Studies in satisfaction of the thesis requirement for the degree of Master of Arts.

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ABSTRACT

Class Matters: School Affluence and Other Predictors of Attainment for Wealthy
and Poor Students

By

Alison Brockhouse

Advisor: Juan Battle

Public schools in the United States are becoming increasingly segregated by socioeconomic
status. Though the educational consequences of socioeconomic segregation are well researched,
segregation is often ignored or exacerbated by education reform. To learn more about the wider
implications of socioeconomic segregation, this study utilizes theoretical frameworks derived
from Max Weber's theory of social stratification to analyze over 10,000 students' experiences
from the National Center for Education Statistics (NCES) Education Longitudinal Study (ELS)
2002, 2004, and 2012 waves of data collection. More specifically, this research explores the
impact of attending an affluent high school on long-term educational attainment. It finds that
attending an affluent school is associated with greater attainment for most students, even when
controlling for a student's demographic background, academic performance, and school and peer
environment. However, this study finds that attending an affluent school has no relationship to
attainment for students in the top and bottom socioeconomic quintiles. It further finds that
several school-level and individual-level factors predicting attainment operate differently for
students from the highest and lowest socioeconomic backgrounds. This research concludes that
the differential effects of school affluence and other factors related to attainment across social
class create the potential to perpetuate social inequality beyond the schoolhouse gates.

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Introduction

A fundamental tension exists in the study of education, and in the creation and evaluation of education policy, around the role of schools in promoting equity and social mobility. Some scholars, educators, and activists argue that schools should help promote a more equal society by prioritizing policies that do the most to help the least advantaged students (Brighouse, Ladd, Loeb, & Swift, 2018). In this view, improving the life chances of students from disadvantaged backgrounds is a fundamental responsibility of the country's public education system. Others believe that inequality is a consequence of natural variations in dedication or ability, and that the most capable individuals are rewarded with chances to move up the social ladder. In this view, the role of a school system is to facilitate the sorting of individuals into occupations appropriate to their capabilities (Davis & Moore, 1945; Durkheim, 1893/1997).

Despite such conflicting views, there is growing concern about the role of the education system in perpetuating social inequality. Schools have long been known to mediate the impact of family background on socioeconomic status (SES) (Blau & Duncan, 1967; Bourdieu, Passeron, & Bourdieu, 1970/1990; Collins, 1971), and as general inequality increases in the United States, it is even more urgent to interrogate the role of schools in perpetuating social stratification. To what extent do public schools generate long-term benefits for students of all socioeconomic backgrounds? Do our public schools systematically produce better outcomes for high-SES students?

Furthermore, as socioeconomic segregation increases in schools across the United States (Reardon, 2013; Reardon & Owens, 2014), we risk creating a two-tiered public school system in which the most affluent students are concentrated in a handful of schools, while students from poor backgrounds attend schools avoided by middle-class and wealthy families. Schools serving

primarily well-off children may help solidify class-based advantages, allowing privileged and

powerful families to monopolize resources and opportunities for the benefit of their children

(Domhoff, 1967). What are the consequences of allowing the separation of public school

students by socioeconomic background? Do some students benefit disproportionately from

attending a wealthy school? The current study seeks to examine the long-term impacts of

attending an affluent public school on students' life chances, specifically on their level of

educational attainment.

A school's socioeconomic composition refers to the general level of economic advantage

or disadvantage among its students (Palardy, 2013). A school with a high socioeconomic

composition has a generally more affluent student body than a school with a low socioeconomic

composition. Numerous strains of sociological theory and empirical research attempt to describe

how a school's socioeconomic composition might operate on students' chances for social

mobility later in life. One set of explanations asserts that mobility chances and social class

positions may be determined in part by behaviors, knowledge, and attitudes that children develop

in school. When schools are socioeconomically homogeneous, they may reproduce class status

by exposing students to the ideas and behaviors only of those with similar class backgrounds.

Other explanations focus on the way that resources are made available to schools

according to the socioeconomic background of the students they serve. Funding for public

schools often relies on local property taxes, meaning that schools in less affluent areas might

have fewer resources, larger class sizes, and worse facilities than schools in wealthier areas.

Schools of different socioeconomic make-ups may also differ in their pedagogical approaches,

levels of academic rigor, or college preparedness programs (Kozol, 1991). These advantages for

students in affluent schools may translate to improved academic outcomes, which can lead to

better jobs and higher pay years later. All of these factors can lead to the solidification of advantage for the most affluent students, and of disadvantage for students from lower socioeconomic backgrounds who lack access to the same resources.

This study aims to explore the many factors at play in the relationship between school socioeconomic composition and a student's chances for class mobility later in life. To do so, it will track the educational attainment of a nationally representative sample of 10,279 students. Because it is directly tied to occupational chances and earning potential, educational attainment is an important component of socioeconomic mobility. While numerous factors undoubtedly intervene to influence attainment after high school, this study acknowledges that the high school years are crucial in preparing students to attend college, vocational programs, and other forms of post-secondary education. It predicts that attending a relatively affluent high school will generally lead to better attainment outcomes, but that predictors of attainment will differ for the most and least privileged students.

This study will attempt to answer three primary research questions:

1. How important is attending an affluent high school to a student's eventual educational attainment?

2. What are the relative impacts of school affluence, demographic background, school and peer environment, and academic performance and expectations on attainment?

3. Do a school's affluence, and other factors mediating attainment outcomes, have different consequences for students from different socioeconomic backgrounds?

To answer these questions, this study uses multiple regression to examine the relative impact of four domains of variables on educational attainment eight years after high school.

These domains are as follows: attending an affluent high school, demographic background, school and peer environment, and academic performance and expectations. Finally, to discern any differences in predictors of attainment across social class background, this study will analyze how these domains operate for students in the top and bottom SES quintiles nationally. Data used in this study come from the Educational Longitudinal Study (ELS) of 2002-2012, a survey following a cohort of students from their sophomore year in high school through eight years after their expected date of high school graduation.

Ultimately this study is concerned with whether public schools are producing disproportionate advantages for some students, and whether the concentration of affluence in a few schools has the potential to widen inequality between social classes. If so, it should be an issue of concern for those interested in promoting greater social equality. Accordingly, this study will conclude with a discussion of public policy responses, applying current research findings to policies surrounding school affluence and educational attainment.

Background

The primary focus of this study is to examine the relative impact of four domains on educational attainment: attending an affluent high school, a student's demographic background, the academic and peer environment at a student's school, and a student's academic performance and expectations. Previous research into the domains and outcomes explored in this study will be discussed in the sections that follow. Although much of the research reviewed here relates to educational attainment, some of it looks at other educational outcomes related to variables included in the study.

To provide a context for exploring the impact of school affluence on attainment, prior research on school socioeconomic composition has been included. Much of this research seeks to explain how the socioeconomic makeup of a school's student body relates to educational outcomes including attainment, although a large amount of this research is focused on achievement outcomes. To understand how demographic background impacts educational outcomes, researchers have explored the influence of family socioeconomic status, race, and gender on achievement and attainment. Studies focusing on school-level factors have sought to determine how inputs like curricular rigor, teacher quality, school climate, and peer characteristics influence attainment or achievement. Finally, a large body of research into individual differences in academic achievement and expectations seeks to locate the role of student-level factors like test scores, GPA, "grit" and persistence, and academic self-concept in determining achievement and attainment.

School Socioeconomic Composition: Impacts on Attainment and Achievement

Overall, there is good empirical support for the idea that attending an affluent school is beneficial for academic outcomes, particularly for students who are themselves from high socioeconomic backgrounds. In a study similar to this one, Gregory Palardy (2013) used ELS data to estimate the relationship between a school's socioeconomic composition and the likelihood that students would graduate from high school or enroll in a 2-year or 4-year college. Controlling for a host of school, individual, and peer factors, Palardy's study found that students who attend schools with a high socioeconomic composition are 68% more likely to enroll at a 4-year college than students who attend schools with a low socioeconomic composition. This result suggests that overall attainment should be higher among students who attended wealthy schools. However, Palardy's study did not include data about attainment eight years after high school,

which would account for college dropout and completion rates, nor did it explore differential outcomes and predictors for students in the highest and lowest SES quintiles. This study will build on Palardy's conclusions by looking at how high school socioeconomic composition influences long-term attainment across social class.

While there is comparatively little research into the influence of school socioeconomic composition on attainment, its impact on achievement has been extensively explored. A research team led by James Coleman investigated how schools influence achievement outcomes in the 1966 report *Equality of Educational Opportunity.* Commissioned by Congress and mandated by the Civil Rights Act of 1964, the Coleman Report concluded that school socioeconomic composition had a greater association with student achievement (as measured by test scores) than any other school factor. Subsequent research has complicated this understanding, but the relationship between school socioeconomic composition and achievement remains well documented.

More recent research supports that students in wealthier districts and schools tend to have higher test scores than students in poorer districts and at poorer schools (Caldas & Bankston, 1997; Coleman, 1966; Jencks & Mayer, 1990; Perry & McConney, 2010; Rumberger & Palardy, 2005). While there are many possible reasons for these differences in achievement, the simplest explanation is that the concentration of individual students by SES comes across as school-level achievement effects. In other words, the achievement effects of concentrating students by SES may be the result of an accumulation of individual student characteristics. Because individual low-SES students tend to have lower test scores on average than high-SES students (V. E. Lee & Burkam, 2002; Reardon, 2013), a school with a high concentration of poor students would be expected to perform worse on average than a school with a high concentration of wealthy

students. Likewise, an individual student in a school with a low socioeconomic composition may be more likely to demonstrate lower achievement simply due to the greater likelihood of being from a low-SES background.

However, concentration of students by SES appears to have an impact beyond simple accumulation. Caldas and Bankston (1997) found that the SES of a student's peers has a significant effect on academic achievement: attending school with wealthier students leads to better scores on standardized achievement measures, even when controlling for a student's own SES (Caldas & Bankston, 1997). A study of Australian public and private schools found that students of all SES backgrounds benefited equally, in terms of increases in standardized test scores, from attending a school with a higher average student SES (Perry & McConney, 2010). A study of achievement gaps in New York City found that both economic and racial segregation privilege high-income, White, and Asian students: both attainment (in terms of high school graduation rates) and achievement (in terms of proficiency levels on state ELA and Math exams) are higher for economically advantaged students who attend the City's most segregated schools (Kirkland & Sanzone, 2017). The same study found that low-income students benefited more from attending diverse schools: 71% of low-income students in diverse high schools graduated in four years, compared with 64% in the City's least diverse schools (Kirkland & Sanzone, 2017).

Another body of research examines the impact of residential socioeconomic segregation on academic outcomes. While residential inequality does not necessarily equate to school segregation, areas with a high degree of residential economic segregation typically also have economically segregated public schools (Boser & Baffour, 2017; Owens, 2015). In one study, residential economic segregation was shown to widen income-based educational attainment gaps: living in a segregated area increased attainment for high-income students, and decreased it

for low-income students (Mayer, 2002). Another study found that achievement gaps based in income are larger in highly segregated metropolitan areas, and that the racial achievement gap is exacerbated by income segregation between districts (Owens, 2018).

The reasons for differences in achievement and attainment by school socioeconomic composition may relate to the availability of resources in affluent vs. poor schools. Schools serving primarily low-SES students may lack the resources to provide the same quality of education as schools serving wealthier students. In most states and localities, public school funding levels are derived from local property taxes, meaning that wealthier areas with higher property values are typically able to direct more money to schools (Biddle & Berliner, 2002). In poorly funded schools, a lack of resources may manifest in larger class sizes, older facilities, less access to specialized equipment, and less access to services like college counseling or tutoring (Duncombe, 2019). Indeed, poor students are more likely to attend schools that are under-funded and which lack proper textbooks and technological resources, are overcrowded, and have poor facilities (Biddle & Berliner, 2002; Fine & Burns, 2003).

In his 1991 book *Savage Inequalities*, Jonathan Kozol reported on conditions in poor urban schools, contrasting them with the conditions he witnessed at wealthier suburban schools. He found that per-pupil funding was drastically lower at schools serving low-income students. Kozol linked higher per-pupil funding to lower class sizes, more experienced teachers, cleaner and more comfortable buildings, and better materials for students. In low-income schools, he found dirty and dangerous conditions, decades-old textbooks, and teachers who were often assigned courses they were not qualified to teach.

There is other research to suggest that the quality of teaching may be lower at schools with a low socioeconomic composition. One study found that schools with a higher proportion of

free lunch-eligible students also have a higher proportion of un-credentialed teachers: in schools of close to 100% free or reduced lunch (FRL), over 25% of teachers are uncertified, while fewer than 5% are uncredentialed in schools of less than 10% FRL (Fine & Burns, 2003).

Teaching methods may also differ across wealthy and poor schools. Social class differences among a school's student body may be translated into differences in curriculum and pedagogy (Bernstein, 1977). In a study of teacher attitudes and practices in urban and suburban elementary schools across the United States, teachers in less affluent schools placed more emphasis on authority and control, were less constructivist in their approach, and had less trust in their students than teachers at more affluent schools (Solomon, Battistich, & Hom, 1996). Teachers of economically disadvantaged students may also have low expectations of their students' academic performance. Low teacher expectations have been linked to poor achievement where students might otherwise have performed better (Rist, 1970; Rosenthal, 1992). In a 1970 study, Ray Rist found that when teachers grouped kindergarten students by perceived ability just a week into the school year, they also unknowingly grouped students along social class lines. Rist theorized that these ability groupings, based in social class, would have profound effects on student's achievement and academic self-concept (Rist, 1970).

Demographic Factors Influencing Attainment: Socioeconomic Status, Race, and Gender

A large body of research is dedicated to examining the relationships between academic outcomes and student's family SES background, race, and gender, all of which will be addressed in this study. Family socioeconomic background has a particularly strong association with educational attainment. Over the last hundred years, educational attainment has been increasing across all social classes and in many parts of the world; accompanying this change has been a declining association between class origins and educational attainment: people of all class

backgrounds are reaching higher levels of education than previously (Breen, Luijkx, Müller, & Pollak, 2010). However, class differentials in educational attainment have tended to display a high degree of stability, with children from advantaged backgrounds receiving relatively more years of education than children from less-advantaged backgrounds (Breen & Goldthorpe, 1997).

Data from the ELS and other longitudinal studies support that students from lower-SES family backgrounds tend to reach lower levels of educational attainment than their high-SES peers (Musu-Gillette, 2015). A longitudinal study of Baltimore students found that family SES was the best predictor of educational attainment by age 22 (Entwisle, Alexander, & Olson, 2005). Students from low-SES backgrounds are also more likely to drop out before graduating from high school (Alexander, Entwisle, & Horsey, 1997; Barrington & Hendricks, 1989; Rumberger, 1987). After high school, low-SES students finish 4-year degrees at a much lower rate than do high-SES students (Terenzini, Cabrera, & Bernal, 2001), and among students enrolled in 4-year universities, parental wealth and income are strong predictors of college degree completion (Conley, 2001). For students enrolled at 2-year schools, those with low-income parents are less likely to receive a certificate or associate's degree, and less likely to go on to receive a bachelor's degree, than students with high-income parents (J. Ma & Baum, 2016).

Breen and Goldthorpe's (1997) model of educational decision making attempts to explain the persistence of class differentials in attainment. It outlines how students decide whether to continue in school or leave and enter the labor market. In their model, parents and students take into account three factors to make decisions about education: the cost of remaining at school, the likelihood of success if a student continues in school, and the value that parents and students attach to different possible educational outcomes (passing, failing, or leaving school). Assuming that families from all socioeconomic backgrounds seek to avoid downward social mobility, they

argue that middle-class students will be more averse to leaving school than working-class or poor students, and that they will attach a higher subjective probability to being successful in the next stage of education. Given these factors, and the fact that middle class families are likelier to have the resources necessary to support students through each level of education (e.g. money to pay for tuition, room, and board), it is likelier that middle class students will continue at each level of education. This process results in a reproduction of class inequalities.

While Breen and Goldthorpe's model focuses on individual choices, some theories of attainment see education as a positional good, the value of which depends to some extent on the choices of others (Hirsch, 1978). Positional goods are valued according to how they are distributed within a population, not according to their absolute amount. A positional good is only valuable when the person who holds it has more than someone else; when one person possesses less than a typical amount of education, no matter how much education they have in the absolute, their education has little value (Koski, 2006). Samuel Lucas's theory of effectively maintained inequality asserts that when a particular level of schooling is not universal, high-SES students and families will use their advantage to secure access to that level of schooling, thus securing advantage through greater *quantity* of education (Lucas, 2001). When an education level does become universal, high-SES families will maintain their status advantage by securing a higher *quality* education at that level. In high school, this might take the form of attending a prestigious magnet or private school, or it may consist of higher-SES students participating in a college-prep academic track while lower-SES students engage in a basic skills curriculum (Lucas, 2001).

It is possible that SES-based differences in attainment are connected to differences in academic performance: students who do not do as well in school might not be expected to go as far as high academic achievers. Achievement gaps between wealthy and poor students, as

measured by test scores, have long been observed and appear to be widening (Coleman, 1966; Reardon, 2013). One possible explanation for the existence of these gaps is that growing up poor can be detrimental to a student's ability to perform. Poverty has been found to have a negative effect on achievement and cognitive development in children (Brooks-Gunn & Duncan, 1997; Duncan, Brooks-Gunn, & Klebanov, 1994). These differences have been documented in very young children: Lee and Burkhan (2002) found that low-SES children start kindergarten with lower cognitive skills than their higher-SES peers, and that these gaps are often exacerbated by differences in the quality of schools attended by high and low-SES students (Lee & Burkam, 2002). However, these gaps are not necessarily due to latent cognitive differences in high- and low-SES children, nor do they necessarily reflect actual differences in ability. A number of factors might intervene to lower test scores for low-SES students. For example, stereotype threat, which has been shown to decrease test scores in Black and female students in high-stakes testing conditions, has also been observed to lead to lower than expected performance in low-SES students (Croizet & Claire, 1998; Steele & Aronson, 1995).

It is also possible that wealthy and middle-class families use specific parenting approaches to secure advantage in schools, resulting in higher educational attainment for their children. A number of researchers have studied the mechanisms by which middle class and wealthy families impart advantages to their children. In a study of Gifted and Talented (G&T) programs in New York City public schools, Allison Roda (2017) found that White, affluent families use G&T programs to activate their cultural capital and gain educational advantages for their children. By obtaining test-prep and tutoring for children as young as three years old, they secure their children's early placement in G&T programs, allowing them to provide their children with clear pathways to future educational opportunities (Roda, 2017).

Annette Lareau examined the ways in which middle-class and working-class parents (both Black and White) transmit attitudes and behaviors to their children. She found that middle-class parents use methods of "concerted cultivation" to prepare their children for success in school, emphasizing the development of language and reasoning skills and enrolling their children in structured, supervised activities (Lareau, 2002). Working-class families, she argued, use a "natural growth" approach to parenting, which involves more unstructured play and encourages deference to authority. According to Lareau, these different parenting styles result in a transmission of differential advantages over time: learned class behaviors become the driving factor in how students navigate institutions, including schools, and help determine their academic trajectories.

The legacy and ongoing reality of racism and racial segregation in American schools means that education researchers have frequently examined the influence of race on educational achievement and attainment. Accordingly, this study includes a variable for race to help determine its influence on attainment. When race is examined as a sole factor, there are sizable differences in college graduation rates between racial groups. According to a 2018 Bureau of Labor Statistics (BLS) report, among Americans over age 25, Asians are the most likely to have graduated from college: 61 percent of Asians in the labor force hold a bachelor's degree or higher, compared with 40 percent of Whites, 30 percent of Blacks, and 20 percent of Hispanics ("Labor force characteristics by race and ethnicity," 2017). However, the BLS also reports that attainment among Blacks has been steadily increasing over the last several decades ("Rising educational attainment," 2018). Additionally, these BLS reports examined race alone, and did not control for socioeconomic background or other factors influencing attainment.

Attainment isn't the only educational outcome that differs along racial lines. There has long been evidence of a test score achievement gap between White and Asian students, who tend to receive higher scores, and Black and Latinx students, who tend to receive lower scores. This gap was noted in the Coleman Report, and has been tracked ever since (Coleman, 1966). The National Assessment of Educational Progress (NAEP), a nationally representative assessment administered by the National Center for Education Statistics (NCES), tests 4th, 8th, and 12th grade students in various academic subjects. NAEP scores shows persistent gaps between White/Asian and Black/Latinx students (Hemphill & Vanneman, 2010; Vanneman, Hamilton, Anderson, & Rahman, 2009). Despite overall increases in NAEP scores since 1990, race-based achievement gaps have not significantly decreased.

It must be said that in the United States there is considerable overlap between race and class. Individuals whose identities place them at a nexus of more than one marginalized group may experience multiple and compounded forms of oppression (Crenshaw, 1989). Students who are both poor and Black or Latinx, for example, may be subject to multiple, overlapping forms of disadvantage which influence how they experience school and whether or not they choose to continue their education (P. H. Collins, 2002; O'Connor, 2001). Additionally, racial and socioeconomic segregation often occur together, especially in urban areas, compounding the effects of segregation or the concentration of affluence in schools (Owens, 2018; Reardon & Owens, 2014).

Despite the influence of race over educational outcomes, William Julius Wilson (1978) argues for the declining significance of race in American life. He asserts that in post-industrial America, race relations have transformed into a form of class subordination, specifically for Blacks of low socioeconomic status. Class, according to Wilson, is a more significant influence

than race in determining life chances. Recent studies back this assertion, finding that class has a larger impact on academic achievement than race (Battle & Lewis, 2002), that the economic concentration of students in a school is a better predictor of school success than the racial concentration of students (Sirin, 2005), and that the achievement gap between rich and poor students is widening, and is larger than that between Black and White students (Reardon, 2013). When it comes to attainment, studies have found that Black students actually complete more years of school than White students of similar parental background and achievement level (Portes & Wilson, 1976), and that differences in family income largely account for differences in educational attainment between White and Black or Hispanic students (Cameron & Heckman, 2001).

Gender also has a significant effect on educational attainment and other outcomes. In recent years, male students have tended to have lower attainment than female students ("The Condition of Education," 2019), and they are more likely to drop out of high school (Alexander et al., 1997). In 2018, 41% of females aged 25-29 had completed a bachelor's degree, while only 37% of males of the same age did so ("The Condition of Education," 2019). This gap exists despite a lack of historical oppression faced by men. The gender imbalance in attainment has grown since 2000, when 30% of females and 29% of males aged 25-29 had completed a bachelor's degree. Researchers have theorized that such imbalances may exist because achievement in school is stigmatized as not masculine (Legewie & DiPrete, 2012) and that boys' culture is less study-oriented than girls' culture (Van Houtte, 2004). However, questions remain as to the causes of this growing gender-based attainment gap.

School-Level Factors Influencing Attainment: Curricular Rigor, Teacher Quality, School Climate, and Peer Effects

School practices, including teacher quality, discipline practices, and curricular rigor, have great potential to influence academic outcomes, and their impact is assessed in the current study. Teacher quality is multifaceted and difficult to measure. Many factors have been shown to be important to high-quality teaching, including subject matter knowledge, an understanding of human growth, learning, and development, an understanding of how children acquire and use language, the ability to form trusting relationships with students, and the ability to manage classroom behavior and environment (Darling-Hammond & Bransford, 2005; Stronge, Ward, & Grant, 2011). Research indicates that a teacher's educational background is important as well: taking courses in pedagogy and holding an advanced degree in the subject taught have a positive impact on high school student achievement (Rice, 2003).

Methods for measuring teacher quality often rely on examining a teacher's "value added," or their impact on positive changes in student test scores. A study utilizing school district data and tax records found that students who were assigned to high value-added teachers were more likely to attend college, attend higher-ranking colleges, earn higher salaries, live in higher-SES neighborhoods, and save more for retirement (Chetty, Friedman, & Rockoff, 2011).

Teacher expectations are another important element of teacher quality, as they can influence student achievement, especially when teachers behave differently towards students of whom they have low expectations (Rist, 1970; Rosenthal & Jacobson, 1968). When teachers convey their low expectations to students (willingly or not), they may create a self-fulfilling prophecy of low achievement (McKown & Weinstein, 2008; Tsiplakides & Keramida, 2010).

School climate is another important school-level factor influencing student outcomes. Research shows that schools with a positive, supportive climate and an ethos of learning have positive results for student achievement (Haynes, Emmons, & Ben-Avie, 1997). The current

study focuses more specifically on a school's disciplinary climate. Classroom disruptions, which may indicate tension between students and teachers or an overall disruptive school climate, have been shown to have a strong negative relation to student achievement (X. Ma & Willms, 2004). It is possible that being in a disruptive classroom environment also harms attainment, either through its negative influence on achievement, or because it makes students feel less connected to school and therefore less likely to continue their education.

Peer effects research examines how peers' current behaviors, academic outcomes, and family background impact the performance or behavior of other students in their classrooms and schools (Sacerdote, 2011). Studies have found that peer effects are a significant determinant of educational achievement (Zimmer & Toma, 2000), that peer family social status has an achievement effect only slightly less than a student's family SES (Caldas & Bankston, 1997), and that the effects of peers are greater for low-ability students than for high-ability students (Zimmer & Toma, 2000). Other studies have found that classroom peers exert more influence over academic outcomes than peers in a school at large (Burke & Sass, 2013). Peer effects may also arise from unobservables like motivation, ability, or effort rather than from observable factors like performance on achievement tests (Fruehwirth, 2013). When this is the case it is difficult to accurately estimate or measure the magnitude of peer effects.

Peer effects may operate in a number of ways. Epidemic socialization models argue for a "like begets like" process of imitation and influence, in which children will adjust their behavior to match the behaviors they observe in their peers (Jencks & Mayer, 1990). In such models, attending a school in which most students graduate and enroll in college would encourage similar behavior in all students. Relative deprivation models assume that people judge their own successes by comparing themselves to others around them; a child who performs at an average

level would therefore form a more favorable opinion of her own abilities if surrounded by low-achieving peers than by high-achieving peers (Jencks & Mayer, 1990). Because low-SES students tend to perform worse, on average, than high-SES students, a relative deprivation view of socioeconomic segregation would likely suggest that segregation actually benefits low-SES students in that it allows them to become more confident about their own academic skills.

Some research supports that only the mean peer background or outcomes matter for student outcomes; other theories focus on how the behavior of an individual student (perhaps a "bad apple" with poor behavior or a "shining light" who sets an example) might affect an entire classroom (Hoxby & Weingarth, 2005). In a study examining data from school reassignments in Wake County, North Carolina, Hoxby and Weingarth (2005) found that both high- and low-achieving students generally benefit from being in the classroom with students whose ability levels are similar to their own. In examining the effects of mean peer achievement, Burke and Sass (2008) find that higher mean peer achievement leads to small increases in achievement for all students, but that the largest effects are seen for low-achieving students (Burke & Sass, 2013).

Experimental evidence suggests that peer effects do not operate in simple ways, and that mere exposure to high-ability or high-performing peers is not enough to increase performance in lower-ability students. In a study of first-year recruits at the U.S. Air Force Academy, researchers used evidence on peer effects to create peer groupings optimized for the achievement of low-ability students (Carrell, Sacerdote, & West, 2011). They found that, counter to their hypothesis, low-ability students were harmed by being placed into groups with the highest-ability students. Researchers found that students sorted themselves socially within their assigned peer groups, creating sub-groupings with students of similar ability, resulting in decreased beneficial social interactions among peers of mixed ability (Carrell et al., 2011). A study of

randomly-assigned roommates and their socially selected friend groups at the University of Maryland found little evidence for peer effects from either social friends or roommates, casting doubt on the robustness of previous peer effects findings (Foster, 2006).

Student-Level Factors Influencing Attainment: Academic Performance and Expectations

A range of academic performance factors particular to individual students also play an important role in educational attainment. This study includes a model of individual performance and expectations consisting of five variables: an achievement test score, high school GPA, the highest math course taken by a student by the 12th grade, a measure of academic persistence, and a student's expectations of obtaining a college degree.

Prior academic performance as measured by grades and test scores tends to be a powerful predictor of educational attainment. Colleges have long relied on standardized tests such as the SAT and the ACT to admit students, based on the assumption that these test scores measure intelligence or the potential to do well in college. Indeed, research indicates that standardized test scores are good predictors of outcomes including educational attainment and adult SES (Astin & And Others, 1996; Currie & Thomas, 1999; S. M. Lee, Daniels, Puig, Newgent, & Nam, 2008), and students who achieve high scores on Advanced Placement tests in high school are more likely to earn a college degree within four years (Smith, Hurwitz, & Avery, 2015).

However, while there has been considerable focus on test scores as a measure of both student performance and school quality in the last 20 years, many scholars dispute the long-term significance of test scores independent of other student background measures, especially family SES (Anyon, 2005; Au, 2013; Ladd, 2017). In a study of districts with school choice programs, increases in test scores were found to be weak predictors of longer-term outcomes, including attainment (Hitt, McShane, & Wolf, 2018).

Some studies suggest that college grades are better predicted by high school GPA than by standardized test scores when a student's socioeconomic background is taken into account (Rothstein, 2004). Regardless of its significance relative to test scores, GPA has been shown to predict both educational attainment and labor market outcomes (French, Homer, Popovici, & Robins, 2015). Participating in a college preparatory curriculum also predicts attainment. Previous studies indicate that taking an advanced math class such as calculus is a good predictor of college attendance, especially for at-risk students (Horn, 1997; Palardy, 2013).

Non-cognitive factors have also been linked to achievement and attainment outcomes (Duckworth, Peterson, Matthews, & Kelly, 2007; Jachimowicz, Wihler, Bailey, & Galinsky, 2018). Grit, a personality trait defined by researchers as perseverance and passion for long-term goals, has been shown to account for as much as 4% of the variance in educational attainment among adults, as well as a variety of other outcomes like college GPA and retention at the United States Military Academy at West Point (Duckworth, Peterson, Matthews, & Kelly, 2007). In a survey of college freshman, Komarraju et al. found that general determination was highly correlated with commitment to college, goal striving, and academic discipline among college students, and that non-cognitive factors in general better accounted for college GPA than did ACT scores (Komarraju, Ramsey, & Rinella, 2013).

A student's academic self-concept, including expectations of attending or completing college, is also a useful predictor of educational attainment, particularly among low-income students. A study of elementary school students in Quebec found that academic self-concept predicted educational attainment ten years later beyond prior academic achievement when controlling for family SES (Guay, Larose, & Boivin, 2004). In a longitudinal study of attainment

among low-income students in Chicago, Ou & Reynolds found that having high educational aspirations predicted higher attainment (Ou & Reynolds, 2008).

Theory Development and Hypothesis

This study is guided by a supposition that a student's level of educational attainment is a function of four general factors: the socioeconomic composition of the student's school; the student's demographic background; the academic and peer environment of the student's high school; and the student's level of academic performance and expectations. Because this study investigates the ways in which these factors operate for high- and low-SES students, it uses theories from sociology which attempt to describe the interplay between educational attainment, social class and cultural background, and school environment effects. Specifically it relies on four theoretical frameworks: Max Weber's theory of social stratification, Frank Parkin's theory of social closure, Randall Collins's conflict theory of educational stratification, and Pierre Bourdieu's theory of social reproduction. It also draws indirectly from Karl Marx's conflict theory.

A major theoretical framework used in this study is Max Weber's theory of social stratification, and more specifically his views on status and class. Weber hypothesized that a social class is composed of a group of individuals sharing a "status situation" determined not just by individuals' economic backgrounds, but also by shared interests, behaviors, and social estimations (Weber, 1921/2013). Economically segregated schools can easily act to reaffirm shared interests and behaviors among students of the same status situation, resulting in the reproduction of class advantage or disadvantage in schools. Low-income students who attend affluent schools, on the other hand, might adapt to some of the interests, behaviors, and social

estimations of their wealthier peers, thus attaining a higher status situation than low-income students in poor schools.

Frank Parkin refined Weber's stratification theory into a more precise description of social closure, or the process by which social groups seek to maximize rewards by restricting access to resources and opportunities to a limited circle of eligibles (Parkin, 1983). Social closure occurs through two processes: exclusion, which takes place when a high-status group limits access to rewards and opportunities; and adaptation, through which high-status groups adapt to changing rules and norms to maintain their class position (Collins, 1971; Parkin, 1983). For example, the increasing importance of standardized test scores in college admissions over the last 40 years became an exclusionary tool for affluent families and students, who used their resources to adapt to increasingly competitive college admissions by paying for test prep or taking the SAT multiple times (Alon, 2009). When low-SES students attend economically segregated schools, they risk being cut off by closure processes which advantage their high-SES peers.

Randall Collins's conflict theory of educational stratification is another theoretical framework grounding this study. Although related to Weber's theory of social stratification, Collins's theory is also derived from Marx's conflict theory, which holds that social groups are in perpetual competition for limited resources. Drawing on conflict theories of social organization, Collins posits that status groups, which form around groups of individuals with shared culture, taste, and "moral evaluation," compete for dominance over "goods" like wealth, power, and prestige. Schools teach status cultures to children: elite schools transmit elite culture and prepare students for high-status occupations, while vocational schools transmit working-class culture and prepare students for blue-collar employment. Highly affluent schools, according to Collins's theory, would likely reinforce the status cultures of their student's class

origins and prepare students for employment in the same social class as their parents. Regardless of their abilities and interests, students attending affluent schools would likely be prepared for post-secondary education and high-status occupations.

Pierre Bourdieu's theory of social reproduction describes how educational systems reproduce power and symbolic relationships between classes by legitimating the social assets that affluent students already possess (Bourdieu, Passeron, & Bourdieu, 1970/1990). In other words, middle class students are more likely than working-class students to succeed in school because middle class culture is dominant in the education system. In this view, poor and working-class students are not inherently inferior or lower-achieving than their affluent peers. They simply exhibit attitudes, tastes, ideas, knowledge, and behaviors which are deemed undesirable within the dominant cultural framework, or habitus, of most schools. Nevertheless, children and teachers come to view the academic success of middle-class students as the product of hard work and intelligence, further legitimating the dominance of middle class culture in education.

If Collins and Bourdieu's theories about the role of schools in transmitting cultural attitudes hold true, there are a number of possible implications for students in affluent schools. One possibility is that for students of all class backgrounds, attending an affluent school will facilitate the transmission of knowledge, skills, behaviors, and cultural capital common among high-SES students, possibly promoting entrance into the middle class for lower-SES students. However, it is also possible that lower-SES students in affluent schools will be treated worse than their high-SES peers: their middle-class teachers may see them as less intelligent or hard-working than their classmates, and this might result in worse treatment in the classroom, less attention from teachers, more or harsher punishment, or assignment to a lower academic track.

This study seeks to explore the ways in which school socioeconomic composition and other school-level and individual factors impact attainment. Previous research has indicated that students do better, in terms of achievement and attainment, when they attend wealthy or diverse schools. However, few studies have used longitudinal data to examine long-term attainment among both wealthy and poor students who attend affluent schools. In line with other studies of class-based differences in attainment outcomes, this study hypothesizes that exposure to relatively concentrated economic advantage in school will confer benefits to students, in terms of increased long-term educational attainment, regardless of family SES. It also anticipates that concentrated advantage will operate differently for high and low-SES students. For students from an economically advantaged background, school-level independent variables are likely to have less predictive value for long-term educational attainment. This is because high SES alone is such a strong predictor of attainment, an advantage that high-SES students carry with them regardless of their school's economic makeup. Finally, for low-SES students, individual differences in academic achievement are likely to show greater effects on attainment than for high-SES students, who are more likely to choose to continue their education regardless of their achievement level (Breen & Goldthorpe, 1997).

Data & Methods

To answer the study's primary research questions, a series of ordinary least squares (OLS) regression models was performed, and coefficients obtained, for high school socioeconomic composition and a set of variables related to student demographics, school

environment, and academic performance and expectations. See Table 4 for means and standard deviations of all variables included in this study.

Data Source

This study uses data from the Educational Longitudinal Study (ELS), a national survey run by the NCES. The ELS collected data on students from their sophomore year in high school in 2002 through 2012, eight years after their expected date of high school graduation. The large sample of students surveyed in the ELS, the long time period covered by the data, and the national representativeness of the weighted data set make the ELS a good source of data for understanding the influence of high school socioeconomic composition and other factors on attainment. The requirements of this study necessitated that it make use of only publicly available ELS data.

The current study focuses on only public school students in the ELS. A data set was created by eliminating all private school students from the original ELS data, and the remaining sample of students was used for most analyses in the study. However, prior to the creation of an all-public school data set, all students in the ELS were given a percentile rank according to family SES as calculated in the first year of the study (BYSES2). They were then categorized into quintiles using dummy variables. This was done to enable analysis of attainment outcomes for students in the top and bottom income quintiles nationally, without being restricted to the more limited SES range likely to be represented among the set of only public school students.

The NCES collected data for the ELS using a two-stage design, sampling schools and then students within schools. To ensure certain groups were adequately represented in the data, the NCES over-sampled students from certain racial and geographic minorities. Additionally, the NCES found that higher-SES students were more likely to follow up in later waves of data

collection. This study uses data weights to compensate for these sampling errors. The NCES created weights by a process non-response adjustment, distributing the design weights of survey non-respondents to survey respondents to maintain the national representativeness and total population weight of the sample ("ELS 2002," n.d.). The NCES created panel weights for use with analyses that span more than one round of data collection. The current study uses data from the 10th grade (2002) wave of data collection, as well as the 12th grade (2004) and 2012 follow-up surveys. The panel weight most closely associated with the dependent variable (F3ATTAINMENT) and the main independent variable (BY10FLP) is F3BYPNLWT, which covers respondents to ELS surveys in 2002 and 2012. A normalized version of this variable was used to weight the data in this study.

Outcome Variable: Educational Attainment

The dependent variable used in this study, attainment 8 years after high school, uses the ELS's F3ATTAINMENT composite (see Table 1 for response frequencies). Of the 10,279 students in the sample, 24% reported that their highest level of education was a bachelor's degree, 33% had attended some college but received no degree or certificate, 8.7% reported that their highest level of education was an associate's degree, and 13.6% reported that their highest level of education was a high school diploma.

It is important to note that F3ATTAINMENT is a categorical variable measuring nine attainment levels. Categorical attainment level should not be confused with an absolute, numeric interval measure of attainment (for example a measure of total years of schooling or years of post-secondary attendance). This attainment measure includes only a respondent's reported highest level of attainment; so, a respondent who has completed most of the work towards a bachelor's degree will still be at least one full attainment level lower than a respondent who has

completed a bachelor's degree. Likewise, a respondent who has spent four years at a community college but completed no associate's degree will have a lower attainment level than one who completed an associate's degree in two years. Despite the categorical treatment of attainment, the large number of response categories and the ordinal nature of the categories make it possible to use F3ATTAINMENT as the outcome variable for a series of OLS regressions.

Table 1. Educational Attainment Eight Years After High School

Attainment Level	N	Percent
1 Did Not Finish High School	455	3.6
2 High School Diploma	1731	13.6
3 Some Post-Secondary Attendance	4216	33.0
4 Undergraduate Certificate	1327	10.4
5 Associate's Degree	1114	8.7
6 Bachelor's Degree	3066	24.0
7 Post-Baccalaureate Certificate	89	0.7
8 Master's Degree	590	4.6
9 Doctoral Degree	176	1.4
Total	10279	100.0

Domain 1: Attending an Affluent High School

To assess the relationship between high school affluence and a student's educational attainment, a measure of affluence must be developed. In studies of racial segregation in schools, a commonly used measure is an index of exposure, which examines the proportion of White students enrolled in schools attended by Black or Latinx students (Orfield, 2001). Schools are considered to be highly segregated when they have low proportional White student enrollment; because Whites make up the majority of US students, they would in theory make up the majority of every school in a system completely unaffected by racial segregation.

This study uses a similar measure to identify public schools that are relatively more affluent. It uses the percentage of students in a school receiving free or reduced-price lunch

(FRL). The United States Department of Agriculture certifies FRL eligibility based on income information provided by families (or based on enrollment in public assistance programs). Students are eligible for free lunch if their family's reported income is less than 130% of the federal poverty level, and they are eligible for reduced-price lunch if their family reports income below 185% of the federal poverty level ("Income Eligibility Guidelines," 2019). The proportion of FRL-eligible students in the US in 2001, just before the first wave of ELS data collection, was 38.3%, and by 2014 it had increased to 51.8% ("Digest of Education Statistics," 2014). If FRL-eligible students were distributed equally among schools in 2002, the proportion of FRL students in each school would have been 38.3%. The NCES currently considers a school to be low poverty if less than 25% of its students are enrolled in the free or reduced-price lunch program (Snyder & Musu-Gillette, 2015).

To measure a school's relative level of socioeconomic advantage and diversity, this study uses as its main independent variable a measure of whether a school has 5% or fewer students who are FRL eligible. This measure is drawn from the ELS's BY10FLP, a categorical variable (see Table 2 for response frequencies). This variable does not necessarily indicate an outstanding degree of economic segregation: 17% of public schools in the ELS fit this category, and there is likely significant variation in actual diversity of student SES levels between these schools. However, publicly available data from the ELS do not include other measures of a school's socioeconomic makeup; schools are categorized by FRL status only, and the schools with the lowest number of FRL students are categorized as having 5% or fewer FRL students.

Nonetheless, these schools have a much lower poverty rate than the national average at the time of the study. Because poverty and affluence can be thought of as relative conditions

(Jencks et al., 1981), schools with fewer than 5% free lunch students should thus be considered relatively economically advantaged.

Table 2. Percent of Free or Reduced Lunch Students in ELS Schools

Free or Reduced Lunch Level (%)	Proportion of Schools in ELS Data Set (%)
0 to 5	17.3
6 to10	11.7
11 to 20	20.9
21 to 30	17.2
31 to 50	16.8
51 to 70	9.9
76 to 100	6.2

Domain 2: Demographic Background Variables

In addition to the question of whether attending an affluent school, on its own, confers attainment advantages to students, this study seeks to explore the impact of demographic background on attainment. Accordingly, variables for a student's socioeconomic status, race, and gender are included. To assess the impact of race, this study uses a dummy variable grouping together White and Asian/Pacific Islander students, created from the BYRACE variable in the 2002 ELS data collection wave. White and Asian students are grouped together because prior data shows that they tend to have higher academic attainment than Black and Latinx students (BLS, 2018). A dummy variable was also created for gender, using BYSEX, with male students coded as 1 and female students as 0.

Socioeconomic status is measured using the BYSES2 variable. The ELS created BYSES2 using data on parental income and occupation. OLS regression models IV-IX also use BYSES2 as the basis for determining which students are in the top and bottom SES quintiles. Although the SES calculation used in the ELS is derived from both family income and parental occupation, a general picture of the income earned in each quintile in 2002 is helpful to interpreting the results of this study (see Table 3). The mean income for families in the top income quintile was $143,743 in 2002, while those in the bottom income quintile earned only $9,900.

Table 3. 2002 Mean Family Income by Quintile (2002 Dollars)

Income Quintile	Mean Income
First	$9,900
Second	$25,400
Third	$42,802
Fourth	$67,326
Fifth	$143,743

Source: (DeNavas-Walt, Cleveland, & Webster, 2003).

Domain 3: School and Peer Advantage Level

A set of school-level variables, including variables for peer influence, was used to explore the relative impact of other school factors, relative to SEC, on attainment. A variable measuring an estimate of the proportion of students in AP classes at a student's school (F1A22F) is included as a measure of a school's general academic climate, with a higher proportion of students enrolled in AP classes indicating a more academically-oriented school culture. The estimated proportion is taken from an administrator survey in the 2004 survey wave.

Teacher quality was measured using two variables. A categorical variable measuring the highest degree earned by a student's 10th grade math teacher (BYTMHDEG) was included as a measure of teacher preparedness and qualification. A dummy variable measuring teacher expectations was created by assigning a value of 1 to students who reported they agree or strongly agree that their teachers expect them to succeed in school (BYS27H). This variable is also meant to control for the effects of lower teacher expectations of low-SES students. To measure the school's climate and disciplinary environment, a dummy variable was created by assigning a value of 1 to 10th graders who reported feeling that disruptions in their classes get in the way of learning (BYS20K).

Two dummy variables were created to measure the impact of peer effects on attainment. A variable measuring whether a student's friends are college-bound was created by assigning a value of 1 to students who reported that most or all of their friends planned to attend a 4-year college in the 12th grade survey wave (F1S65D). A variable measuring whether a student's friends struggle academically was created by assigning a value of 1 to students who reported that no friends dropped out of high school by the 12th grade survey wave (F1S65A).

Domain 4: Student Performance and Expectations

This study also explores how attainment outcomes are impacted by academic achievements and expectations particular to each student. To measure academic performance, this study uses the ELS's standardized achievement measure (BYTXCSTD), derived from a math and reading exam given to participants in 10th grade. It also uses high school GPA, a measure which reflects both academic achievement and non-cognitive skills like conscientiousness, since high grades typically reflect both academic performance and qualities like class preparedness, timely homework completion, and class participation and effort. The

publicly available GPA data in the ELS come from a categorical variable, with integers

representing GPA categories spaced at 0.5-point intervals. The ELS's variable (F1RGPP2) was

recoded to begin at 1 rather than 0.

A variable was also included to measure a student's highest level of math course taken

while in high school. This ordinal, 6-category variable (F1HIMATH) was taken from the

2004/12th grade survey wave, and is meant to measure the degree to which a student is taking

part in a college preparatory curriculum (Horn, 1997; Palardy, 2013). Independent of GPA and

test scores, participation in a high-level math course should indicate a high level of curricular

rigor.

To measure academic self-concept, variables related to expectations and persistence were

included. A dummy variable was created by assigning a value of 1 to students who reported, in

10th grade, that they expect to earn a 4-year degree. This variable uses the ELS's BYSTEXP,

which asked 10th graders what they expected their highest level of attainment to be. To reflect

the relevance of qualities such as grit, determination, and conscientiousness to attainment

outcomes, a composite variable created for this study reflects a student's self-reported academic

persistence. It was created through factor analysis by combining several Likert-type response

questions from the ELS (BYS89S, BYS89T, BYS89V, BYS89O, BYS89J), asking students how

strongly they agreed with statements like "I keep working even when things get difficult" and "I

always try to work as hard as possible." Although this measure is subjective, academic

persistence is an important factor in attainment: persistent students are likely to persevere in their

studies and unlikely to quit school if they find the work too difficult.

Means, standard deviations, and ranges for all variables can be found in Table 4 below.

Table 4. Means, Standard Deviations, and Ranges for All Variables (N = 10279)

Variables	Mean	St. Dev.	Range
Dependent Variable			
Attainment Eight Years After High School (2012)	4.15	1.88	1-9
Domain 1: Attending an Affluent High School			
Student's School is Less Than 5% Free Lunch	0.17	0.38	0-1
Domain 2: Demographic Variables			
Student is Male	0.49	0.50	0-1
Student is White or Asian/Pacific Islander	0.64	0.48	0-1
Socioeconomic Status Composite	-0.04	0.71	-2.11-1.98
Domain 3: School/Peer Environment			
Percent of Student Body in AP Classes	14.20	12.36	0-80
Math Teacher's Education Level	4.02	1.00	1-6
Teachers Expect Students to Be Successful	0.60	0.49	0-1
Disruptions Get in the Way of Learning	0.47	0.50	0-1
Most or All Friends Plan to Attend a 4-Year College	0.49	0.50	0-1
No Friends Dropped Out of HS (12th Grade)	0.50	0.50	0-1
Domain 4: Academic Performance and Expectations			
Standardized Test Composite	50.04	9.80	21.50-79.94
HS GPA (12th Grade)	4.81	1.58	1-7
Highest Math Class Taken (12th Grade)	4.90	1.23	1-6
Persistence Scale	2.73	0.75	1-4
Student Expects to Earn 4-Year Degree	0.79	0.41	0-1

Note: Unless otherwise noted, variables are from 10th grade survey wave (2002). HS GPA as reported in publicly available ELS data set is a non-honors weighted categorical variable; the mean of 4.91 reflects a GPA of between 2.0 (4=2.0-2.5) and 3.0 (5=2.5-3.0) for all courses.

Findings

The results of several statistical analyses show that high school affluence is a significant predictor of educational attainment overall; however, school affluence does not predict attainment for the wealthiest and poorest public school students. Furthermore, school and peer environment and individual academic performance and expectations vary considerably in their impact on attainment according to a student's socioeconomic background.

Correlations

A series of Pearson's correlations was performed to test the relationships between all variables in the study (Table 5). Although many variables were correlated, none were so highly correlated as to indicate possible multicollinearity. As to the major relationships investigated in this study, attending an affluent high school has a positive and significant, though weak, correlation with educational attainment (.160, p<.001). Attending an affluent high school had a

Table 5a. Pearson's Correlations

Variables	1	2	3	4	5	6	7
(1) Educational Attainment	1						
(2) School Has Less Than 5% Free Lunch	.160***	1					
(3) Socioeconomic Status	.326***	.224***	1				
(4) Student is Male	-.119***	.038*	.085***	1			
(5) Student is White or Asian/Pacific Islander	.139***	.149***	.210***	.017	1		
(6) 10th Grade Achievement Test Score	.409***	.188***	.380***	.045**	.322***	1	
(7) High School GPA	.482***	.078***	.258***	-.140***	.255***	.548***	1
(8) Highest Math Course	.381***	.111***	.242***	-.013	.128***	.501***	.489***
(9) Persistence Score	.205***	.030	.094***	.-.079***	-.012	.176***	.289***
(10) Student Expects to Earn 4-Year Degree	.276***	.097***	.208***	-.099***	.069***	.366***	.292***
(11) % of Student Body in AP Courses	.093***	.230***	.185***	.004	.030	.117***	.015
(12) Math Teacher's Education Level	.082***	.133***	.080***	-.017	.020	.093***	.059***
(13) Teachers Expect Students to Succeed	.072***	-.029	-.007	-.081***	-.025	-.018*	.097***
(14) Disruptions Get in the Way of Learning	-.047**	-.084***	-.069***	-.060***	-.086***	-.159***	0.074***
(15) Most or All Friends Plan to Attend 4-year College	.271***	.135***	.240***	-.070***	.069***	.256***	.251***
(16) No Friends Dropped Out of High School	.218***	.088***	.164***	-.037**	.151***	.220***	.255***

***p=.001   **p=.01   *p=.05

somewhat stronger correlation with the number of students in Advanced Placement classes (.230, p<.001), student SES (.224, p<.001), and 10th grade achievement test scores (.188, p<.001).

Unsurprisingly, many variables related to academic achievement had a positive, moderately strong correlation with educational attainment: high school GPA (.482, p<.001), 10th grade achievement test scores (.409, p<.001), and highest math course taken (.381, p<.001) showed the strongest relationship of any variables to attainment. Socioeconomic status also had a moderate positive correlation with attainment (.326, p<.001).

Table 5b. Pearson's Correlations

Variables	8	9	10	11	12	13	14	15
(8) Highest Math Course	1							
(9) Persistence Score	.183***	1						
(10) Student Expects to Earn 4-Year Degree	.326***	.202***	1					
(11) % of Student Body in AP Courses	.116***	.039*	.056***	1				
(12) Math Teacher's Education Level	.049**	.019	.050**	.009	1			
(13) Teachers Expect Students to Succeed	.059***	.193***	.083***	-.019	.033*	1		
(14) Disruptions Get in the Way of Learning	-.060***	.051**	.006	-.027	-.004	.077***	1	
(15) Most or All Friends Plan to Attend 4-year College	.265***	.158***	.225***	.139***	.031	.077***	-.061***	1
(16) No Friends Dropped Out of High School	.180***	.093***	.124***	.030	.050**	.073***	-.037*	.189***

***p=.001 **p=.01 *p=.05

Mean Differences in Attainment by School Socioeconomic Composition

As an initial step towards answering the research questions, an analysis was conducted comparing mean educational attainment levels for students who attended affluent schools to those who did not (Table 6). For students of all SES levels, attending an affluent high school was associated with higher mean educational attainment. Students in the sample attending affluent

35

schools averaged attainment level of 4.81, close to an associate's degree (5), while students at

less affluent schools had a mean attainment level of 4.00, the equivalent of obtaining an

undergraduate certificate but no degree. For students in the top SES quintile, average attainment

was higher whether or not they attended relatively affluent schools, but those who did averaged

5.61, significantly closer to a bachelor's degree (6) than those who attended schools with a lower

socioeconomic composition, who averaged 5.31. For students in the bottom SES quintile,

average attainment was lower overall, but still significantly higher for those who attended

affluent schools: 3.58 as opposed to 3.33.

Table 6. Mean Attainment Eight Years After High School

Student's School is Less than 5% Free Lunch	*Attainment Level in 2012*
All Students	
Yes	4.81***
No	4.00
Top 20% SES	
Yes	5.61**
No	5.30
Bottom 20% SES	
Yes	3.58*
No	3.33

***p=.001   **p=.01   *p=.05
Note: within each predictor on the dependent variables, the superscript indicating the level of statistical significance is placed on one of the two categories to indicate that the relative mean scores are statistically different from one another.

Two preliminary conclusions can be drawn from the tests of mean differences in Table 6.

First, high school socioeconomic composition does have a relationship with eventual attainment:

students at schools with relatively fewer poor students tend to go further in school, regardless of

whether they come from high-SES families. Second, it appears that high school socioeconomic composition has a stronger relationship to attainment for students in the aggregate than for students at either extreme in the SES distribution. In other words, the wealthiest and poorest students experience a smaller attainment effect from attending an affluent school than does the average student. The larger effect of school affluence on the average student may be because other factors are more important in predicting attainment for the most and least privileged students, or because mobility is hardest to achieve at extremes in wealth and income inequality.

A further set of t-tests was performed to examine a set of dichotomous variables associated with higher educational attainment (Table 7). Results appear to confirm previous research into the role of demographic background, school environment, and peer effects on educational attainment. Demographically, being female and being White or Asian/Pacific Islander is associated with higher attainment.

Having an orderly and supportive school environment is also associated with higher attainment: students who feel as though their teachers expect them to succeed, and students who do not feel that disruptions get in the way of learning at their schools, both completed more education than students who answered otherwise. Having no friends who dropped out of high school, having friends who plan to attend a 4-year college or university, and expecting to earn a 4-year degree are also significantly associated with higher educational attainment.

For the variables included in this analysis, the greatest mean differences in attainment were for peer effects and student expectations. Students who expect to earn a 4-year degree averaged 1.55 units of attainment higher than students who did not expect to earn a 4-year degree. Without controlling for other factors, a student's expectation of success appears to be twice as impactful as race and over three times more important than gender in determining how

far a student will go in his or her education. Peer effects were nearly as strong: respondents who

reported that most or all of their friends planned to attend a 4-year college reached 1.27 levels of

Table 7. Comparison of Means: Educational Attainment Eight Years After High School

Independent Variables	*Attainment Level in 2012*
Sex	
Male	3.93***
Female	4.38
Student is White or Asian/Pacific Islander	
Yes	4.43***
No	3.68
Teachers expect success in school	
Yes	4.28***
No	4.01
Disruptions get in the way of learning	
Yes	4.04***
No	4.28
Most or all friends plan to attend 4-year college	
Yes	4.89***
No	3.62
No friends dropped out of high school	
Yes	4.71***
No	3.75
Student expects to earn a 4-year degree	
Yes	4.56***
No	3.01

***p=.001
Note: within each predictor on the dependent variables, the superscript indicating the level of statistical significance is placed
on one of the two categories to indicate that the relative mean scores are statistically different from one another.

attainment higher than other students, and those who reported having no friends who dropped out of high school reached 0.96 levels of attainment higher than respondents who had at least one friend who dropped out.

OLS Regressions

Nine OLS regressions was conducted to determine the relationship between educational attainment, high school SEC, student background, academic performance and expectations, and a set of school environment variables (Table 8). Before regressions were conducted, all variables were standardized to a mean of 0 and a standard deviation of 1. Independent variables were added in 4 domains: attending an affluent high school; demographic variables; school-level variables (including teacher quality, disciplinary environment, academic rigor, and peer effects); and student-level variables (including academic performance and expectations). The first three regressions, Models I, II, and III, included students of all SES levels. Students were then split according to SES to compare how each domain operates for high- and low-SES students. Models IV, V, and VI used only students in the top SES quintile of the full ELS sample; Models VII, VIII, and IX used only students from the lowest SES quintile. As mentioned in a previous section, SES quintiles were determined through a percentile rank-ordering of all students in the entire ELS data set, including those who attended private school, although the regression analyses are limited to public school students. Because variables are standardized, the regression coefficients indicate the relative importance of each variable in the model. Standard errors are reported in parentheses.

One pattern that emerges is that the amount of variance explained by each model is considerably larger for students across SES backgrounds than for students in the top and bottom SES quintiles. For example, Model III predicts over 33% of the variance in attainment levels for

all students; Model IX explains 23.3% of attainment variance for low-SES students, and Model VI explains 23.4% of variance for high-SES students. This difference in adjusted R square can be explained in part by the fact that Models VI and IX contain students from a narrower range of SES backgrounds, allowing for less variance attributable to student SES level.

The differences in the predictive value of the models may also be due to the fact that there is less mobility at the top and bottom of the SES distribution than in the middle. When it comes to attainment, the most affluent students are likely to opt for more years of schooling, and students from the lowest-SES backgrounds are more likely to end their schooling early. Middle-class families experience more mobility, both upward and downward, than those of the highest or lowest SES (Parkin, 1983), and their children's educational experiences likely reflect this. Students from middle-class backgrounds may experience more variance in their level of attainment, and are potentially more sensitive to changes in the variables included in the model. Students in the middle were not specifically examined in this study, but their inclusion in the first set of regressions helps explain the greater predictive value of Model III. For the first three OLS regressions, all public school students in the ELS data set were included. The initial set of findings discussed here relates to the results of these models.

Baseline Effect of Attending an Affluent High School

In Model I, when controlling for SES, gender, and race, the attainment effect of attending an affluent school is positive and moderate, with school affluence (B = .082, p<.001) having greater predictive value for attainment than race (B = .060, p<.001) but less than family SES (B = .313, p<.001) and gender (B = -.150, p<.001). School socioeconomic composition is therefore an influential variable above and beyond a student's family SES, confirming previous research, and a higher level of school affluence predicts higher educational attainment.

Table 8. OLS Regression, Educational Attainment Eight Years After High School (Standardized Variables; Standard Errors in Parenthesis)

Variables	All Public School Students (N = 10279)			Top 20% SES (N = 1742)			Bottom 20% SES (N = 2880)		
	I	II	III	IV	V	VI	VII	VIII	IX
Domain 1: Attending an Affluent High School									
Student's School is Less Than 5% Free Lunch	.082*** (.014)	.059*** (.014)	.054*** (.013)	.053 (.028)	.031 (.029)	.034 (.027)	-.010 (.051)	.010 (.050)	-.019 (.046)
Domain 2: Demographic Variables									
Socioeconomic Status	.313*** (.016)	.254*** (.016)	.155*** (.015)	.253** (.087)	.227** (.087)	.031 (.083)	.078 (.108)	.020 (.050)	-.008 (.097)
Male	-.150*** (.015)	-.125*** (.015)	-.082*** (.014)	-.165*** (.035)	-.146*** (.035)	-.089** (.033)	-.126*** (.039)	-.088* (.038)	-.052 (.036)
White or Asian/Pac. Island.	.067*** (.017)	.049** (.017)	-.034* (.016)	.147** (.046)	.109* (.047)	.011 (.044)	.048 (.037)	.025 (.037)	-.039 (.036)
Domain 3: School and Peer Environment									
% of Students in AP classes		.006 (.015)	.010 (.014)		.027 (.031)	.030*** (.002)		-.052 (.042)	-.020 (.039)
Math Teacher's Education Level		.038** (.015)	.023 (.013)		.014 (.036)	-.005 (.033)		-.011 (.036)	.003 (.033)
Teachers Expect Success		.046** (.015)	.015 (.014)		.041 (.036)	.039 (.033)		.076 (.039)	.029 (.037)
Disruptions Get in the Way of Learning		-.017 (.015)	.006 (.014)		.026 (.036)	.014 (.034)		-.060 (.037)	-.020 (.034)
Most/All Friends Plan to Attend 4-Year College		.164*** (.016)	.072*** (.015)		.078 (.042)	-.001 (.040)		.166*** (.038)	.088* (.035)
No Friends Dropped Out		.125*** (.015)	.056*** (.014)		.160*** (.038)	.078* (.036)		.118** (.038)	.042 (.035)
Domain 4: Academic Performance and Expectations									
10th Grade Standardized Tests			.101*** (.020)			.079 (.046)			.159** (.052)
HS GPA			.326*** (.021)			.452*** (.057)			.244*** (.050)
Highest Math Course (12th Grade)			.123*** (.019)			.126* (.057)			.100** (.042)
Persistence			.038** (.015)			.028 (.038)			.007 (.034)
Expects to Earn BA Degree			.061*** (.017)			.018 (.070)			.109** (.035)
Constant	.198***	.158***	.032*	.291*	.251	.211	-.06	-.10	-.136
Adjusted R Square	.140***	.190***	.331***	.058***	.092***	.234***	.016**	.075***	.233***

***p=.001   **p=.01   *p=.05

Other Factors Influencing Attainment

   Examining the influence of school-level variables (Domain 3) on the baseline model helps to discern possible mediators of high school affluence. The results presented in Model II suggest that a large part of the attainment benefit of school affluence operates through peer effects: having friends who plan to attend a 4-year college (B = .164, p<.001) and having no friends who have dropped out of high school (B = .125, p<.001) are both good predictors of attainment. Other variables meant to measure aspects of school quality had less predictive value, though they were still positive and significant: teacher's education level (B = .038, p<.01) and students feeling that teachers expect them to succeed (B = .046, p<.01) also appear to somewhat mediate the effects of school affluence. Reporting that disruptions interfere with learning at school had no significant impact on attainment, nor did the proportion of students enrolled in AP classes.

   It is possible that the influence of peers is attributable to the tendency of students to form friendships with others on a similar academic trajectory. If honors students tend to be friends with other honors students, and if students who are in danger of failing form friendships with other at-risk students, this might explain why having college-bound friends is a good predictor of academic attainment. In addition, it is possible that individual students at schools with a high socioeconomic composition are better equipped for education beyond high school (with better academic skills or stronger achievement records) than students at schools with a low socioeconomic composition, and that this collection of individual differences explains any apparent effects of attending an affluent school. The addition of a block of individual variables related to academic performance and expectations (Domain 4) helps control for these possibilities.

For the 10,279 students sampled, academic performance and expectations have a large impact on attainment. Test scores (B = .101, p<.001), GPA (B = .326, p<.001), and highest math course completed (B = .123, p<.001) are some of the strongest relative predictors of attainment among all students in Model III. School affluence remains a positive and significant predictor of attainment when other variables are controlled for, though its relative importance declines very slightly (B = .054, p<.001); school affluence is ultimately less impactful than SES, gender, peer effects, test scores, grades, math course completion, and expectations. However, it remains a better predictor of attainment than a student's race, their persistence level, and all school-level variables except for those that measure peer effects. Having friends who plan to attend college (B = .072, p<.001) is still a good predictor of attainment, beyond individual factors and school affluence. Family SES also remains a strong predictor of attainment (B = .155, p<.001), stronger than any variable in the model except for GPA.

This first set of models provides evidence to answer the study's first two research questions. School affluence is a small but significant predictor of attainment for students in the sample. When school and individual factors are controlled for, the predictive power of school affluence remains significant. However, family SES, academic performance, and having college-bound peers are much better predictors of academic attainment than school SEC.

Impact of High School Affluence for Students in the Top and Bottom SES Quintiles

Given the above findings, a second major goal of this study is to determine how the same relationships operate for students in the top and bottom SES quintiles. The same set of OLS regressions were run in Models IV-VI which were restricted to attainment outcomes for students in the top SES quintile, and Models VII-IX, which were restricted to attainment outcomes for

students in the lowest SES quintile. Results show that attending an affluent high school is not a significant predictor of attainment for students in the top and bottom SES quintiles.

Other Factors Predicting Attainment for High and Low-SES Students

An analysis of Models IV-IX reveals that demographic, school-level, and academic performance factors vary significantly in their influence on attainment for students in the top and bottom SES quintiles. Family socioeconomic status, the strongest predictor in Model III, is not significant in Models VI and IX; however, this is likely due to the fact that the impact of SES has already been accounted for by limiting analyses to students of specific SES levels. While race is a significant predictor in Model III, with White and Asian students reaching slightly lower levels of attainment once academic performance variables are controlled for, race loses its significance in Models VI and IX. Being male is detrimental to attainment for most students, including the most affluent, but it is not a significant predictor for the poorest students.

There are far fewer significant predictors of attainment for wealthy and poor students than for students overall. Eleven of fifteen variables in Model III were significant predictors of attainment. For high-SES students, the five significant predictors are as follows: being female, the proportion AP enrollment in student's school, having no friends who dropped out of school, GPA, and highest math course completed. For wealthy students, GPA (.452, p<.001) matters almost four times as much as the second strongest predictor, highest math course attempted (.126, p<.05). For poor students, the five significant predictors of attainment are having friends who plan to attend college, expecting to earn a 4-year degree, GPA, and highest math course completed. Only two variables predict attainment for all students analyzed in Models I-IX: high school GPA and highest math course completed.

Wealthy students differ from all other students along several dimensions. Wealthy students are the only group in this study for whom standardized test scores, having friends who plan to attend college, and the expectation of earning a 4-year degree are not significant predictors of attainment. Conversely, they are the only group for whom the proportion of AP enrollment matters. The relative importance of GPA is also much higher for wealthy students than for any other group.

Students from the bottom income quintile also differ from other students in the study along several dimensions. They are the only students for whom having friends who have dropped out of school does not affect attainment, and they are the only group for whom gender is not a significant predictor of attainment. Additionally, several factors are better predictors of attainment for low-SES students than for others in the study: the expectation of earning a bachelor's degree, standardized test scores, and having friends who plan to attend college all matter more for students from poor backgrounds than for other students analyzed.

Discussion

The analyses presented in this study are evidence that, while attending an affluent high school predicts attainment for some students, those at the top and bottom of the SES distribution experience no significant effect from high school affluence. Furthermore, school-level and individual factors operate differently for the richest and poorest students in this study. Several implications of these findings are considered below.

School Affluence and Social Reproduction

When individual and school variables are controlled for, attending an affluent high school predicts attainment for students in the aggregate, but has no effect on the most or least

advantaged students. There are several possible explanations for this finding. Students in the top SES quintile experience a high degree of privilege and affluence regardless of what schools they attend. Because their families have greater resources, it is possible that high-SES students will pursue some form of post-secondary education regardless of their high school background. And although high-SES students who attend affluent schools experience a mean difference in attainment over those who do not (see Table 6), this effect is not significant when family SES, gender, and race are controlled for.

For students in the bottom SES quintile, it is possible that attending an affluent school alone does not mean they have access to the advantages of their wealthier schoolmates. Tracking, peer group formation, and other forms of within-school segregation may keep poor students who attend affluent schools from benefiting from the social and cultural capital possessed by their peers. Bourdieu's (1970/1990) theory of social reproduction and Collins's (1971) conflict theory of educational stratification both describe how schools legitimate middle-class forms of behavior and knowledge and delegitimize the behavior and knowledge of poor and working-class students. If low-SES students in affluent schools are subject to such processes, it would help explain why attending an affluent school does not have attainment benefits for students from poor backgrounds. Concretely, it is possible that lower-SES students in affluent schools face discrimination or low teacher expectations, and that they are placed into lower academic tracks than their high-SES peers. While this study controls for teacher expectations using a variable based on student perceptions, is possible that low teacher expectations also manifest in some ways which are imperceptible to students.

Other Mediators of Attainment Outcomes

Although school socioeconomic composition is a significant predictor of attainment for some students, several other factors explored in this study have a greater influence on attainment. As with school affluence, many of these factors operate differently for students in the top and bottom SES quintiles. In particular, GPA, test scores, and peer effects seem to have different consequences for high- and low-SES students.

Academic performance measures are the strongest predictors of attainment. Individual academic achievements matter a great deal overall, and GPA is the strongest predictor of attainment in all models. However, there are important differences in how academic performance measure operate for students depending on family SES. GPA is a stronger predictor of attainment for high-SES students than for other students in the sample, while test scores are a stronger predictor for low-income students than for wealthy students or the sample overall.

There are several possible explanations for the weaker predictive power of achievement test scores among the most affluent students, none of which are mutually exclusive. All other things being equal, more affluent students tend to receive higher test scores, and it may be that test scores matter less for this group simply because high scores with low variance is a characteristic of this SES bracket. It is also likely that affluent students have more opportunities to continue their education, regardless of achievement test scores, because their families can afford to pay for it. This might mean that even low-scoring students from high-SES families will go on to some form of post-secondary education, making test scores a poor predictor of attainment.

Test scores play an entirely different role in the educational trajectories of the low-SES students analyzed in this study. After GPA, test scores are the most important predictor of

attainment for students from the bottom SES quintile. This may reflect some advantages for high-scoring low-SES students. Students from poor backgrounds may be unable to access the same college-preparatory resources as their higher-SES peers, whose parents can use their own resources and social and cultural capital to secure advantage for their children, for example through enrichment activities like internships, private tutoring, volunteer travel, or music lessons. High test scores might then be weighed more heavily by college admissions officers when considering admission for low-SES students whose pre-college activities are more limited.

However, the strong association between test scores and attainment is also true in reverse: for low-SES students, lower scores mean lower levels of attainment, and this relationship is stronger than for other students in this study. The implication here is that test scores have higher stakes for poor students, for whom low test scores will result in a greater decrease in attainment than for other students.

In addition to test scores, a student's expectation of earning a bachelor's degree stands out as much more important for students in the bottom income quintile than for other students in this study. Even when controlling for GPA, test scores, and academic track, the expectation of earning a 4-year degree is a strong predictor of attainment for students from poor backgrounds, suggesting that the expectation of earning a degree is not simply a function of a student's academic performance level. Rather, even lower-achieving poor students benefit from expecting to complete college. This suggests a possible area for policy or pedagogical intervention: if more low-SES students can be made to expect to finish college, this should bring attainment benefits.

Peer effects are important for all students, but operate differently according to SES. In all of the six of the models in which they were included, variables measuring peer effects were the most important school-level factors predicting attainment. This finding echoes previous

studies of the importance of peer effects in academic achievement and attainment (Arnott & Rowse, 1987; Burke & Sass, 2013). Having friends who plan to attend college is a powerful predictor of attainment for everyone but the wealthiest students. For students from poor backgrounds, having friends who plan to attend a 4-year college is the only significant school environment variable in the model. For high-SES students, on the other hand, controlling for individual factors causes this variable to lose all significance. Peer effects still matter for wealthy students, however: having no friends who dropped out of high school is a strong predictor of attainment even for students in the top income quintile.

The predictive value of these variables indicates that peer factors, specifically exposure to college-bound peers (rather than peers who plan to attend community colleges, professional programs, or no college), is important beyond the influence of a school's overall affluence. This has crucial implications: if education reformers seek to increase educational attainment among low-SES students, exposure to peers who are college-bound should be increased where possible.

The mechanisms by which exposure to college-bound peers works may relate to theories of social reproduction and the transmission of cultural capital. In diverse schools, poor students may benefit from exposure to the behaviors and knowledge of wealthy students—for example, low-SES students may gain knowledge about applying to and attending college. This is not to imply that high-SES students have qualitatively better knowledge or skills than lower-SES students. However, the barriers erected around college admission and attendance (SAT tests, college essay coaches, a complex and highly competitive application process) often exclude poorer students (Alon, 2009). In socioeconomically diverse schools, especially those which are diverse at the classroom level, poor students may have a better chance to adapt to exclusionary barriers, thus reaching greater educational attainment. In socioeconomically segregated schools,

affluent and poor students are less likely to mix, and affluent students and families' cultural capital as it relates to college attendance will not be transmitted to lower-SES students, resulting in the closure of mobility chances.

Disruptive classes, teacher education level, teacher expectations, and the proportion of students in AP courses do not have long-term attainment impacts. Among the variables included in this study to measure teacher quality and a school's academic climate and disciplinary environment, most were not significant once individual performance variables were controlled for. The proportion of students in AP classes remains significant only for students in the top income quintile. These findings indicate that academic performance, peer effects, and demographic background have a much stronger relationship to attainment than school climate and teacher quality. Policies seeking to promote attainment should therefore prioritize other aspects of a student's school experience.

However, this does not mean that teacher quality and school climate are unimportant; rather, they matter enormously for a student's qualitative experience in school. These factors can impact how students experience school, how they form relationships with teachers and other students, how they view themselves academically, and how much they learn. Additionally, previous research has found a relationship between teacher quality and attainment by examining teacher impacts on test scores, rather than teacher education level and expectations (Chetty et al., 2011).

Persistence matters, but not for all students. A student's self-reported academic persistence level is a predictor of attainment for the overall sample of students in this study, but for high- and low-SES students, persistence appears not to matter. This suggests that, for students from wealthy and poor backgrounds, other factors may intervene to reduce the effects of

persistence. For example, a wealthy student who lacks persistence may reach a higher level of attainment simply because they have the resources to continue in school, while even a very persistent low-SES student may opt out of college not because the work is too difficult but because the financial costs are too high.

The different role of academic persistence across social classes also hints at a system of meritocracy which may operate differently for wealthy, middle-class, and poor students. A belief in meritocracy endorses the idea that all individuals have the chance to become successful through hard work and talent, and that any failure to achieve is attributable to individual deficits (Au, 2013). However, structural factors or life circumstances can impede success even for talented and hard-working individuals. A typical high-SES student is more likely than a typical low-SES student to benefit from structural and life circumstances which encourage continuation in school. A typical low-SES student is more likely to face financial obstacles to continuing in school, especially after high school. Low-SES students who do not pursue a post-secondary education may contend with assumptions about a lack of persistence or merit when, in reality, other factors intervened to diminish the effects of persistence.

Limitations

Several of this study's limitations stem from the use of publicly available data. Importantly, the ELS's public data set does not aggregate students by school. Without precise, school-level information on student SES background, it was not possible to create an index of school socioeconomic composition that went beyond the free lunch categorization discussed in the methods section.

Several variables included in this study are derived from subjective estimates rather than from objective measurement. For example, the percentage of students in AP classes is based on an administrator's estimate; a more objective and precise measure might use a school's course enrollment data. Several school-level variables—teacher expectations of success, disruptions getting in the way of learning, and peer effects variables—are based on student estimates and self-reports, which may be biased, incorrect, or open to interpretation.

The measures of teacher quality used in this study—math teacher's highest education level and student reports that teachers expect success—are imprecise and don't necessarily translate to teacher effectiveness. Indeed, there is little consensus as to what constitutes high-quality teaching, and attempts to measure teacher effectiveness through value-added formulas have been controversial (Darling-Hammond & Bransford, 2005; Stronge et al., 2011).

This study focused on socioeconomic background and did not include an analysis for interaction effects between SES and other variables. Further research would specifically benefit from an examination of interactions between race, gender, and SES, as these identity variables tend to intersect in ways that can deeply influence an individual student's experiences in school (Crenshaw, 1989; Picower & Mayorga, 2015; Sullivan, Larke, & Webb-Hasan, 2010).

Finally, this study deliberately did not include variables related to family background or parental support, other than SES. This choice allowed a narrower focus for the study. However, it is possible that family factors influence these models in ways that are important but unaccounted for here.

<center>**Conclusions and Policy Implications**</center>

There is little consensus among scholars and policymakers as to whether, and how, public schools ought to promote equity and socioeconomic mobility. However, public concern over unequal outcomes for wealthy and poor students has pervaded American society since the 1960s. James Coleman's 1966 conclusions that rich and poor students fared differently in US schools, and that family background and peer environment were the key determinants in student achievement, formed the basis of education policy decisions for years to come (Hanushek, 2016). Yet despite decades of policy aimed at remedying achievement and attainment gaps, there is a growing gulf between academic outcomes for students on either end of the SES spectrum (Musu-Gillette, 2015; Reardon, 2013). Based on the findings presented in this study, there may be several opportunities to more effectively use policy to remedy attainment gaps based in family socioeconomic background.

Increase Attainment by Increasing Achievement

Because of the importance of test scores and GPA in producing attainment outcomes, one approach to increasing attainment might be to focus on achievement. Indeed, American education policy over the past 30 years has largely focused on increasing student achievement as measured by standardized tests. Reformers concerned with equality have primarily focused on addressing achievement gaps between White/Asian and Black/Latinx students. Initiatives such as No Child Left Behind (NCLB) and Race To The Top (RTTT) have sought to promote choice and accountability by relying on test scores to offer incentives and hand out punishments to schools, districts, and states. These policies have also prompted localities to close struggling schools and divert resources to other schools, including charter networks, that can prove they have a positive impact on test scores. Many of these reform efforts have indeed produced test score gains for

students, especially in some urban charter schools (CREDO, 2015). However, there is limited evidence to suggest that increases in test scores alone contribute to educational attainment outcomes, including high school graduation rates, college enrollment, and college completion. In addition, such policies have often ignored or even exacerbated racial and socioeconomic segregation (Mader, Hemphill, & Abbas, 2018; Yancey & Saporito, 1995).

Promote Socioeconomic Integration

This study finds that, although attending an affluent public school is not associated with higher attainment for low-SES students, having friends who are college-bound carries a significant attainment benefit. Higher-SES students are more likely to be college-bound than their lower-SES peers. Yet when schools are socioeconomically segregated, students from different class backgrounds, and with attendant differences in college cultural capital, are unlikely to form friendships. Promoting socioeconomic integration at the school level may be the most direct way to address this issue, since an integrated or unitary school system would not contain the concentrated affluence and opportunity monopolies of a segregated system.

Yet there are numerous obstacles to creating socioeconomically integrated school systems. In the United States, the right to an education tends to be structured as an individual choice rather than as an obligation of the state (Aggarwal, 2014). Parents tend to choose schools that are close to home, demonstrate high academic achievement, and have a socioeconomic composition similar to that of their own family (Burgess, Greaves, Vignoles, & Wilson, 2015). Accordingly, it can be argued that socioeconomic and racial imbalances in schools are a regrettable but natural consequence of market sorting and parent choice (Thernstrom & Thernstrom, 2003). In highly segregated cities and districts, integration would require a disruption of the status quo in ways that might limit the right of parents to freely choose schools

for their children. Most parents support school integration in theory; however, most also prioritize getting their own children into the "best" schools and reject policies that limit their educational options (Boser & Baffour, 2017; Roda & Wells, 2013).

This is not to say that socioeconomic integration is impossible. Amidst growing concern about school segregation, some parents and activists are leading integration initiatives that hold promise for the future. Families, community leaders, and politicians worked together in Brooklyn's District 15 to create a plan for socioeconomic integration that was recently approved by City leaders ("D15 Diversity Plan," 2017; Haimson, 2018). This plan sets the proportion of low-income students in each of the district's middle schools at 52%, the same as the proportion of low-income students district-wide. The plan was not without opposition, but it generally enjoyed community support. However, it is in the early stages of being implemented, so any conclusions as to its effects on students, families, and the district as a whole are years off.

Focus On Meaningful Social and Academic Integration

This study gives evidence that having college-bound friends is a predictor of attainment above and beyond individual ability and socioeconomic background. Even socioeconomically diverse schools may not be structured in such a way that allows all students to benefit from the presence of affluent peers. Tracking, school organization, classroom pedagogy, and grouping practices may separate students by ability level or perceived ability level in ways that reinforce or widen existing gaps between students of different socioeconomic backgrounds. Schools and districts dedicated to equity must implement policies allowing greater access to rigorous curricula for all students (Oakes, Wells, & Yonezawa, 1997).

There is an important distinction to be made between *exposure* to college-bound peers and *friendship* with college-bound peers. Mere exposure is unlikely to have a positive attainment

effect for low-SES students if they form friendship sub-groups only with students from similar SES backgrounds or of similar ability (Carrell et al., 2011). Attempts to increase attainment by placing high- and low-SES students in the same schools would therefore benefit from a focus on policies and activities that foster the development of meaningful connections across class lines. Possible ways to achieve this might involve detracking the high school curriculum, or creating pathways for more students to access advanced curricular tracks, so that high- and low-SES students are more likely to be in classes together. Extracurricular activities have an important role to play as well: athletics, the arts, outdoor activities, activism and community service, or other clubs that offer students a chance to socialize and bond across class lines might allow low-SES students to form friendships that have beneficial effects for their eventual attainment.

Make College Less Expensive

Exposure to affluent students isn't the only mechanism by which lower-SES students might be given exposure to more college-bound peers. Policy initiatives which make it easier for all students to attend a 4-year college, such as loan forgiveness or reducing or eliminating 4-year college tuition, could increase the number of low-SES students who plan to attend college even in socioeconomically segregated schools. This would also increase the probability that students of all SES levels would have college-bound friends. Beyond peer effects, cheaper college tuition would also likely have a large and positive impact on academic attainment among low-SES students, simply because college affordability is a major barrier to attainment.

Decrease Reliance on Standardized Test Scores

This study finds that test scores are better predictors of attainment for students in the lowest income quintile, meaning that performance on tests has higher stakes for this group of students. Low-SES students are also the group least likely to be able to afford test prep or

tutoring to improve their scores. Furthermore, the association between family SES and test scores has long been implicated as a factor in lowering achievement and attainment for poor students. Recent decisions by colleges and universities to make test scores an optional part of the admissions process reflect concern about the equity impacts of an over-reliance on test scores. This study's findings suggest that this concern is well-placed. Policies seeking to increase attainment for poor students by expanding college access should promote a decreased reliance on test scores in college admissions decisions.

The Issue of Credentialism

A larger issue lurks behind questions of increasing educational attainment: that of credentialism. Even if attainment were to improve among students of all social strata, it is not clear that the job market would respond by rewarding highly educated people with high-paying, high-status jobs. Conflict theories of educational stratification note that high-status groups maintain their monopoly over certain occupations by imposing their own cultural standards on the process of selection for employment (R. Collins, 1971). This imposition of standards can take the form of a requirement for an advanced degree, credential, or certificate, or it can be seen in the qualitative distinctions made by employers between degrees from elite universities and those from less prestigious institutions (Alon, 2009; Lucas, 2001). As a positional good, the value of an educational qualification diminishes in proportion to the number of people who acquire it (Breen, Luijkx, Müller, & Pollak, 2009; Hirsch, 1978). Research has also shown that, while educational attainment is the most important determinant of occupational attainment and income, the effects of education are much larger for Whites than for Blacks (Coleman, Berry, & Blum, 1972). Policies specifically targeted at closing the income and wealth gaps between White and Black Americans are necessary for equalizing the benefits of increased educational attainment.

In light of this, policies which simply seek to promote higher attainment among low-SES students may not increase social mobility in the long term. Rather, they may contribute to the growing problem of credentialism. The most prestigious occupations may remain closed off to people from poor backgrounds, even as attainment levels increase. To promote true social equality, policies are also needed to address issues like income inequality, minimum wage requirements, childcare, workplace discrimination, and universal health care. However, these considerations are beyond the scope of this study.

This study began by asking how attending an affluent high school influences attainment outcomes for students, and what the relative impact of attending an affluent school is in relation to demographic background, school environment, and academic performance and expectations. It also sought to explore whether and how these domains operate differently for the wealthiest and poorest students. It finds that attending an affluent high school generally predicts greater educational attainment, but not for students in the highest and lowest SES quintiles. Attainment outcomes for the richest and poorest students are more fixed than for students overall, and less sensitive to variations in school affluence and other school environment variables. Additionally, test scores have higher stakes for low-SES students than for all others. This study also uncovered an important role for peer effects and academic expectations, allowing for the possibility that meaningful socioeconomic integration in schools might raise the attainment of low-SES students by allowing them to form friendships across social class barriers. Policies seeking to decrease socioeconomic inequality should therefore take into account socioeconomic integration in schools and seek to break up monopolies of affluence and opportunity.

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