How Does High School Poverty Matter?
High School Economic Composition and Post-Secondary Outcomes

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Introduction:

Educators, policy makers, and researchers charged with ensuring the success of individual Americans and the competiveness of the American workforce in an increasingly globalized economy are keenly interested in our nation's college graduation rates. The current data suggest that although college enrollment rates across all socioeconomic groups have generally increased over the past few decades, students from high-income families are far more likely to earn a college degree than their counterparts from low-income families (Bailey and Dynarski 2011). In this paper, I seek to explain the variation in college enrollment and graduation rates by studying the economic composition of the high schools in our country. To do so, I ask the following three questions: First, does high school economic composition influence college enrollment and college graduation outcomes? Next, does the relationship between high school economic composition and post-secondary outcomes vary by (post-secondary) institutional type? Finally, *how* does high school poverty influence post-secondary outcomes or, in other words, what are the mechanisms through which high school economic composition operates?

Using data from the National Educational Longitudinal Study of 1988 (NELS), I find that attending an affluent high school increases the odds of college enrollment as well as college graduation and that the effects of high school economic composition tend to be much stronger for students at four-year colleges and universities. I also show that high school economic composition is a proxy for both, *institutional* mechanisms (particularly teacher certification and

experience) as well as the *informal* effects of peer behaviors and norms. In order to contextualize and explain these results, I have organized this working paper in the following manner: in the section that immediately follows, I summarize the relevant literature and explain the contribution of my paper. I then introduce my dataset and explain my modeling strategy before I discuss the results from my multivariate analyses. I conclude with a few social policy considerations.

Review of Literature:

Prior Literature on (High) School Effects

"School effects" have been studied extensively: Scholars have examined the manner in which a multitude of school attributes influence academic, developmental, and social outcomes for students at all educational levels. Although post-secondary education is not legally mandated and students who attend colleges and universities tend to be from the upper-half of the income distribution (Fletcher and Tienda 2010), there is still significant variation in educational outcomes along economic lines. Past research has shown that high school attended has an influence on college-going intentions and aspirations, college-application behavior, and college persistence and graduation.

Some of the first research to examine the relationship between high school attended and post-secondary outcomes found that the social status of the school was positively associated with students' college aspirations and intentions (Meyer 1970). Since then, researchers have argued that these results could be driven by school context (Alwin and Otto 1977). Recent work has moved past intention to show that there are discrepancies by income level in students' capacities to translate their aspirations into actions. For instance, equally-ranked students from affluent schools are more likely than their counterparts at poor high schools to *apply* to college (Koffman

and Tienda 2012). Researchers have also shown that the number of colleges applied to and the selectivity of the institutions in students' college choice sets is associated with the socioeconomic composition of the high school they attend (Niu and Tienda 2008). Even for students who enter the workforce upon high school graduation, the evidence suggests that earnings are not independent of high school attended (Betts 1995).

In the literature which has focused on longer-term post-secondary outcomes – such as college persistence and graduation – scholars have attempted to find the explanatory variables for "high school attended". Some work points to academic preparation and performance as the key factors connecting high school attended to college outcomes. Early work in this vein demonstrated that high school grades, test scores, class rank and course work were predictive of college completion (Demitroff 1974; Pantages and Creedon 1978). Recent longitudinal analyses have confirmed that institutional characteristics such as academic preparation in high school, measured in math test percentiles, are positively associated with college degree attainment even when jointly considered with race/ethnicity, parental education and income as well as institutional type or access to resources (Bound, Lovenheim et al. 2010).

Other work points to classmates' characteristics as an important influence on college persistence and completion: students who attend high schools with high proportions of college-going students are considerably more likely to persist in college than their peers from high schools with weaker college-going traditions (Manski and Wise 1983). More recently, scholars have used administrative data from the state of Texas to show that students who enter college as a part of a large high school cohort tend to outperform those who enter with a smaller group of peers (Fletcher and Tienda 2009). In general, the theme of this work has been that the (class-

based) socialization processes that happen during the high school years – and at the high schools themselves – influence student behavior well beyond that period.

The Importance of Studying High School Economic Composition

Previous work, including much of the literature cited above, has operationalized high school attended in a number of different ways. In this paper, I use high school economic composition because it accurately captures the "climate" of a high school (Niu and Tienda 2013). More generally, the education literature is shifting away from its historical focus on the racial composition of (high) schools and moving towards a more complete understanding of inequality in outcomes along economic lines. Recent research has shown, for instance, that the differences in academic performance between children born in high- and low-income families have been steadily increasing over the past twenty-five years (Reardon 2011). Coupled with the increasing rates of income-based residential segregation (Jargowsky 1996), there is a pressing need to understand the role of schools in perpetuating (or mitigating) these outcomes.

Why Examine Post-Secondary Outcomes?

It is necessary to better understand the relationship between secondary school experiences and post-secondary outcomes because holding a bachelor's degree is becoming a prerequisite for entrance into the middle class in our nation (Carnevale, Rose et al. 2011). Some scholars suggest that the leveling-off in degree attainment over the past few decades has been driven by the increasing amount of time students spend in college: the norm of four-year college completion has eroded since the early 1990s (Barton 2002; Adelman 2004). In fact, of the first-time college enrollees at four-year institutions in the fall of 2000, only about a third completed a bachelor's degree within four years and 58 percent did so within six years (Planty, Hussar et al.

2009). While students appear to be enrolling in post-secondary institutions with the intention of graduating in four years, an increasing number are prolonging their enrollment beyond eight semesters or are leaving college before completing a degree (Niu and Tienda 2013).

My Paper's Contribution

The literature summarized above underscores the importance of high school economic composition in shaping post-secondary outcomes. In this paper, I will show that although high school economic composition influences college enrollment and college graduation outcomes, this effect does not uniformly influence students across all institutions. In addition, I will systematically test whether high school economic composition proxies for the socialization processes driven by *institutional* agents – specifically teachers – or the *informal* interactions students have with their peers.

Institutional mechanisms are school-based practices and processes that shape students' attitudes and actions. Although institutional mechanisms could include the rigor of the curriculum followed by a school or school-wide behavioral expectations, I will use teacher certification and experience to proxy for school-based institutional conditions. Like other resources, teachers are unevenly distributed across schools and teachers in urban schools tend to be less qualified than their counterparts in suburban districts (Lankford, Loeb et al. 2002). However qualified they may be, teachers play an important role in the lives of their students: formally, they design and implement curricula and they frequently serve as informal mentors and role models. I have chosen to focus on teacher certification and experience because there is broad consensus in the literature that these two factors profoundly shape student outcomes. For instance, students whose math classes are taught by teachers with degrees in mathematics tend to

outperform their peers whose math teachers did not major in mathematics (Goe 2007). In addition, there is evidence to suggest that years of teaching experience matter and might be of greater importance for high school teachers than for teachers of earlier grades (Rice 2003).

In contrast to institutional mechanisms, peer group or classmate-driven norms that define the range of acceptable student behaviors are *informal* mechanisms for high school economic composition. There is ample evidence to suggest that high school peer or classmate groups can – and will – influence post-secondary outcomes: peer groups influence students' academic outcomes and engagement as early as elementary school (Hoxby 2000; Cooley 2007; Ammermueller and Pischke 2009). The evidence on peer effects suggests that friends facilitate the exchange of information, serve as role models for one another, and reinforce social norms (Ryan 2000). In fact, the Tienda and Fletcher (2009) paper cited above confirms that the social norms for behavior and academic achievement established in high school remain relevant for students at their post-secondary institutions. This might be the reason why students' social networks in high school influence their post-secondary social networks (Mayer and Puller 2008).

Data and Methods:

Dataset

I use the second, third, and fourth follow-up surveys of the National Educational Longitudinal Study of 1988 (NELS) to understand the relationship between high school economic composition and post-secondary enrollment and graduation. NELS began as a nationally representative sample of eighth-graders who were subsequently re-interviewed during their sophomore and senior years of high school (first and second follow-up surveys) as well as two and eight years after their expected high school graduation in 1992 (third and fourth follow-

up surveys). As such, the dataset allows me to follow the post-secondary enrollment and graduation outcomes of respondents up to eight years after high school graduation. As I discussed above, current research suggests that students are increasingly taking more than four years to complete their undergraduate studies. For this reason, the fourth (and final) NELS follow-up survey might be well suited to accurately capture degree completion.

NELS is well-suited for studying the relationship between high school economic composition and post-secondary outcomes for two reasons. First, the longitudinal data collection strategy enables me to account for the sorting of high school graduates into college enrollee status and, consequently, into specific types of college students (two- versus four-year students). As I will explain in further detail below, taking account of this sorting process allows me to estimate the effect of high school economic composition for various student groups. Second, the rich set of contextual information contained in NELS enables me to capture the variation in students' background characteristics and the quality of the high school they attended. As NELS was administered to students, parents, and teachers (during the students' high school years), I draw information from all surveys to construct the independent variables for my multivariate analyses.

Methodology

To examine the relationship between high school economic composition and college enrollment and graduation, I employ a standard logistic regression modeling strategy as well as conditional logistic regression models. The standard logistic regression modeling strategy enables me to estimate the effect of high school economic composition for all students in my sample (all high school graduates). As Figure 1 shows, however, not all high school graduates

enroll in college and not all college enrollees earn post-secondary credentials. As such, I use the conditional logistic regression modeling strategy to estimate the effect of high school economic composition for all (two- and four-year) college enrollees as well as for four-year college enrollees exclusively. This strategy allows me to "control" for unobserved student characteristics and high school attributes which are associated with students' decisions to enroll in college as well as the types of post-secondary institutions they attend.

I make two simplifying assumptions in my modeling strategy. First, I do not account for student transfer behavior. In other words, if students enroll at a four-year institution, I assume that they will graduate from that (type of) college or university (the same applies for initial two-year college enrollees). Second, the models described above do not distinguish between students who drop out of college and those who are "right-censored" by data collection timelines. In other words, if students take more than eight years to complete their college degrees, they will not be considered college graduates in my analyses. This could be potentially problematic for part-time college students who are more likely to take longer to graduate than those enrolled full-time (O'Toole, Stratton et al. 2003).

Variables

In the standard logistic and sequential logistic regressions described above, college enrollment is coded as "1" if a student enrolled in a post-secondary institution by the third follow-up survey which was conducted two years after expected high school graduation (1994). College type (two- or four-year) is also coded at this time. College graduation is coded as "1" if a respondent reports they have earned an associate's or bachelor's degree by the fourth and final

follow-up survey (2000)[1]. I do not record the amount of time it takes a student to earn their degree. If a respondent reports having earned both, an associate's and a bachelor's degree, I code for the higher-level bachelor's degree. I do not make a distinction between those who have earned bachelor's degrees as well as masters, professional or doctoral degrees within eight years of high school graduation. In my analyses, all these individuals are coded as four-year college graduates.

The key independent variable, high school economic composition, is operationalized from school-level data on the percentage of students eligible for free and/or reduced priced meals. High schools in the lowest quartile of free/reduced meal eligibility are designated as "affluent" schools and those in the highest quartile are designated as "poor" schools. The remaining schools are classified as "average". Although previous researchers have measured school-level poverty by aggregating district- and state-based spending measures (Betts 1995), the operationalization I have chosen is becoming increasingly common in the literature (see, for example, Niu and Tienda 2013). My analyses also control for ascriptive characteristics of the respondent (age, gender, and race) and a measure of family socioeconomic status which is available to all NELS users. This variable is a composite of parents' education, income, and resources while the student is enrolled in twelfth grade. As with high school economic composition, I have taken the quartile measure of family socioeconomic status and converted it into a trichotomous variable.

In order to examine whether high school economic composition captures institutional mechanisms, my analyses include the following two variables:

[1] My sample excludes high school graduates who earned or worked towards certification or other credentials which take less than two years to complete.

- Teacher Certification: For each student, I coded their teacher as being "certified" ("1") if they held at least a bachelor's degree in the content area in which they taught. Teachers who did have any academic credentials or listed only an associate's degree were considered uncertified.
- Teacher Experience: Although teachers with more than five years of experience contribute to their schools in other meaningful ways, they confer few or no additional benefits in terms of student achievement for each additional year of experience (Goe 2007). For this reason, I created a dichotomous variable for years of teacher experience to separate those who had taught for more than five years from those who had taught for up to five years.

To test if high school economic composition captures the informal mechanisms, I add two final variables to my analyses:

- Attendance Rates: For each student, I use the average daily twelfth-grade attendance rates at their high school. This variable is a (crude) estimation of the level of engagement of the student body with schoolwork.
- Alumni in Four-Year Schools: For each student, I use the school-reported percent of alumni, from the most recent graduating class, who are enrolled in four-year colleges. This measure indicates the prevalence of a college-going culture and informal, social resources available to students to find out about post-secondary institutions.

Although I am unable to create distinct peer groups for each respondent with the NELS dataset, I am confident that, even in relatively large high schools, members of a graduating class are familiar with each other and share a set or norms that will carry over into collegiate behavior.

Results and Discussion:

Descriptive Results

The NELS sample that I use to conduct my multivariate analyses consists of roughly 8,400 high school graduates. As Table 1 shows, these students are not evenly distributed across the three types of high schools (poor, average, and affluent): while about half of the high school graduates in this sample attended affluent high schools, less than a tenth graduated from poor high schools[2]. This dataset also reflects the racial and income-based clustering that prior researchers have identified (Reardon, Yun et al. 2006) which means that poor schools have a greater proportion of minority (black and Hispanic) students relative to affluent high schools. In addition, only a tenth of the families who send their children to these (poor) schools have high socioeconomic status whereas the opposite is true in affluent schools (only 10 percent of the families whose children attend high-income schools come from poor socioeconomic backgrounds).

Table 1 also suggests that the *institutional* agents (teachers) and *informal* social environments vary across the three types of schools. Students who attend affluent high schools are more likely to encounter teachers who are certified and teach in the same content area. These students (at affluent schools) are also more likely to have experienced teachers. In contrast, students at poor schools are more likely to be a part of student body with lower attendance rates than their counterparts at affluent schools and the alumni networks they can access have fewer four-year college students.

[2] It is important to remember that there might be institutional or informal conditions at the high school level which produce differential graduation rates. I do not explicitly account for that process in my analyses.

Table 2 offers some clues as to why students at poor high schools are less likely to access alumni who are enrolled in four-year colleges. Of the 8,400 students in my sample, less than 4 percent attended poor high schools *and* enrolled in two- or four-year colleges within eight years of high school graduation. The majority of college enrollees in this sample – and, more specifically, four-year college enrollees – attended affluent high schools. The same pattern holds for college graduation: (Four-year) college graduates were most likely to have attended affluent high schools. College graduates from poor high schools, on the other hand, were about equally likely to have graduated from two- or four-year schools. To better understand the processes that produce such outcomes, it is necessary to examine the results from my multivariate analyses.

Does High School Economic Composition Influence College Enrollment and Graduation?

High school economic composition does influence college enrollment: students who attend affluent high schools are more likely than their counterparts at poor high schools to enroll in college. As Table 3 shows, the odds of (two- or four-year) college enrollment for high school graduates from an affluent high school are 1.44 times the odds of equivalent students from a poor high school. Students from average high schools, however, do not fare differently from their peers at poor schools. This finding suggests that the relationship between high school economic composition and college enrollment is non-linear for high school graduates and that attending a marginally richer high school does not appear to confer any advantages for college enrollment outcomes. The advantage, it seems, accrues once students have crossed the threshold into an affluent high school.

Akin to college enrollment, high school economic composition influences college graduation such that students from more affluent high schools are more likely than their peers at

poor high schools to graduate from (two- and four-year) colleges and universities. The estimates presented in Table 4 show that students from affluent high schools have 1.26 times the odds of college graduation than their peers at poor high schools. Once again, there is evidence of a "threshold effect" for high school graduates – students at average high schools fare no differently than their peers at poor schools. Attending an affluent school, however, confers a college graduation advantage.

Does the Relationship Between High School Economic Composition and College Enrollment and Graduation Vary by Post-Secondary Institutional Type?

The relationship between high school economic composition and college enrollment varies for students based on the type of institution they attend. Table 3 shows, for instance, that college enrollees from average high schools are *less* likely to become four-year college students compared to their counterparts at poor high schools. There does not appear to be any difference between college enrollees from affluent and poor high schools in the likelihood of four-year college enrollment. I hypothesize that one of two processes could be driving these results. On one hand, the rising rates of college enrollment across all socioeconomic groups, as documented by Bailey and Dynarski (2011), could mean that the college enrollment differential between students from affluent and poor high schools has been eliminated. On the other hand, there might still be a different college enrollment rate for students at poor and rich high schools; the students from poor schools who do go on to college, however, might be exceptional and are, accordingly, guided towards four-year schools and universities. Both hypotheses warrant further exploration.

The estimates presented in Table 4 suggest that relationship between high school economic composition and college graduation are much stronger for students at four-year

institutions. Regression estimates examining outcomes for *all* college enrollees (Column II) suggest that there is no difference in graduation outcomes for students across the three high school types. Estimates from analyses on four-year college enrollees suggest otherwise (Column III): four-year college enrollees from average high schools have greater odds of graduating from (four-year) colleges than their counterparts from poor high schools. The pattern also holds for students from affluent high schools who have 1.72 times the odds of college graduation relative to their peers at poor schools. The "threshold effect" documented for college enrollment does not apply here – it appears that, for four-year college enrollees, attending a marginally more affluent school does confer college graduation benefits.

Does High School Economic Composition Proxy for Institutional or Informal Mechanisms?

High school economic composition is capturing both institutional and informal mechanisms in the college enrollment process, according to the regression estimates presented in Table 5. Having certified teachers and instructors with more than five years of experience increases the odds of college enrollment for high school graduates as well as increasing the odds of four-year college enrollment for college enrollees. This suggests that the curricular emphases of certified teachers and/or classroom practices of more experienced types of teachers might be more effective at introducing students to and preparing them for college entrance. Informal mechanisms also drive college enrollment, primarily through alumni behavior. An increase in the percentage of alumni in four-year colleges and universities increases the odds of college enrollment for high school graduates and four-year college enrollment for college enrollees. The fact that high school attendance rates seem to have no effect on college enrollment suggests that high school students might be more inclined to use older peers as sources of information and role models.

As with college enrollment, the results presented in Table 6 show that both institutional and informal mechanisms appear to drive college graduation outcomes. In contrast to college enrollment, however, the effects of high school economic composition on college graduation appear to operate primarily through one institutional mechanism: teacher experience. High school graduates, college enrollees, and four-year college enrollees benefit from having teachers with more than five years of experience. This might happen because teachers with more experience are able to offer their students informal mentoring and advice which furthers their post-secondary success. Informal mechanisms appear to influence college graduation outcomes in the same way they influence college enrollment – through alumni behavior: high school graduates, college enrollees and four-year college enrollees face higher odds of college graduation as more alumni from their high schools attend four-year colleges and universities. As above, this might be a result of role modeling and information sharing between older students and their younger counterparts.

Conclusion:

This paper has furthered the literature on "school effects" by demonstrating that variations in post-secondary outcomes are related to factors at the high school level. More specifically, I have shown that high school economic composition does influence students' college enrollment and graduation outcomes although the effect is not the same for students across various institutions. In addition, the implication of both, institutional and informal mechanisms in shaping post-secondary outcomes has important consequences for school policy considerations. The findings of this paper suggest that improving secondary schools can have substantial long-term impacts. The strength of institutional and informal mechanisms indicate that high school-based reforms need to encompass systemic changes (such as developing plans to

retain high-quality, experienced teachers) as well as changing classmate- and peer-driven norms to focus on and value college-going attitudes and behaviors.

This paper has also underscored the need for further research, particularly on non-traditional (full-time, four-year college) students for whom effects of high school economic composition are weaker. It would be helpful to know, for instance, whether it is variation in these students' secondary or post-secondary environments that is responsible for the differences this paper has documented. In addition, while I have shown that school-based conditions are, indeed, responsible for variation in post-secondary outcomes, it is necessary to explore whether family- or neighborhood-based factors are also responsible for these trends. Understanding the contextual factors will enable educators and policy makers to create the appropriate environments for all students to achieve academic success.

Figure 1: Pathways from High School Graduation to College Graduation

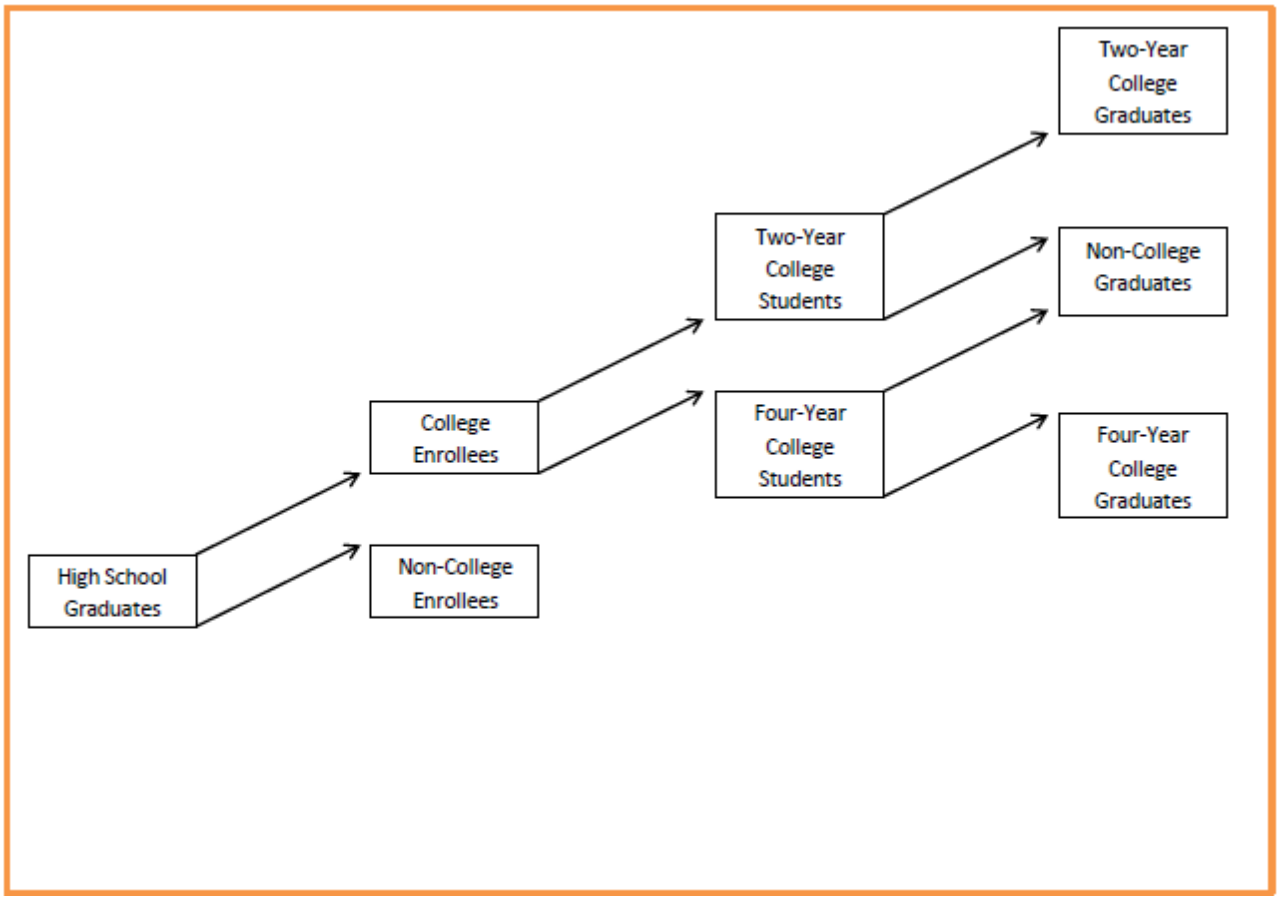

Table 1: Background Variables and High School Characteristics by High School Type

	Affluent High Schools	Average High Schools	Poor High Schools
Percent of High School Graduates	50 N=4,263	41 N=3,500	9 N= 690
Background Variables			
Average Age	18.3	18.3	18.4
Percent Female	52.3	53.8	52.5
Race[1]			
Percent Black	4.8	10.6	21.4
Percent White	80.1	68.8	38.7
Percent Asian	7.9	6.7	6.1
Percent Hispanic	5.7	12.6	31.2
Family SES			
Percent High SES	43.1	18.3	10.7
Percent Average SES	47	55.1	46.1
Percent Low SES	9.9	26.6	43.2
High School Characteristics			
Percent of Teachers with Certification in Content Area	95.8	95.1	94.5
Percent of Teachers with More than Five Years of Experience	90.9	90.1	89.1
Average Daily Twelfth-Grade Attendance Rate	93.6	92.4	90.5
Percent of Alumni in Four-Year Colleges	54.2	37	33.2

Source: NELS:88 (Follow-Up 1, Follow-Up 2)

[1] Column totals for race do not add up to 100 percent because this table does not display those who identified as "Native American" or "Other".

Table 2: College Enrollment and Graduation Outcomes by High School Type

	Affluent High Schools	Average High Schools	Poor High Schools
Percent College Enrollees[1]	32.9	21	3.5
Two-Year Enrollees	7.6	7.4	1.2
Four-Year Enrollees	25.3	13.6	2.3
Percent College Graduates[1]	32	20.8	3.4
Two-Year Graduates	6.1	7.4	1.6
Four-Year Graduates	25.9	13.4	1.8

Source: NELS:88 (Follow-Up 3, Follow-Up 4)

[1] Row totals for college enrollment and graduation do not add up to 100 percent because not all students in the sample enroll in and/or graduate from college.

Table 3: Odds Ratios for College Enrollment

	I College Enrollment[1]	II Four-Year College Enrollment[2]
High School Economic Composition [Poor H.S.]		
Average H.S.	1.14	0.78†
Affluent H.S.	1.44***	1.02
Background Variables		
Age	0.68***	0.87*
Female	1.28***	1.08
Race [Black]		
White	0.95	0.69**
Asian	2.15***	0.73*
Hispanic	1.04	0.39***
Family SES [Low SES]		
Average SES	2.13***	1.29**
High SES	6.67***	3.93***
Pseudo R^2	0.1012	0.0698
N	8,273	5,071

Source: NELS:88 (Follow-Up 1, Follow-Up 2, Follow-Up 4)
Note: *** p<0.001, ** p<0.01, *p<0.05, † p<0.10

[1] Results displayed in this column are from logistic regressions and applicable to all high school graduates.
[2] Results displayed in this column are from conditional logistic regressions. Enrollment in four-year colleges is calculated *conditional* on high school graduates enrolling in post-secondary institutions.

Table 4: Odds Ratios for College Graduation

	I College Graduation[1]	II Conditional College Graduation[2]	III Four-Year College Graduation[3]
High School Economic Composition [Poor H.S.]			
Average H.S.	1.05	1.14	1.47*
Affluent H.S.	1.26*	1.20	1.72**
Background Variables			
Age	0.73***	0.88†	0.84†
Female	1.46***	1.47***	1.51***
Race [Black]			
White	1.28**	1.78***	1.84***
Asian	1.94***	1.65**	2.81***
Hispanic	1.03	0.99	1.13
Family SES [Low SES]			
Average SES	1.65***	1.28*	1.44**
High SES	5.08***	2.77***	3.31***
Pseudo R^2	0.088	0.0481	0.0669
N	8,337	5,071	3,438

Source: NELS:88 (Follow-Up 1, Follow-Up 2, Follow-Up 4)
Note: *** p<0.001, ** p<0.01, *p<0.05, † p<0.10

[1] Results displayed in this column are from logistic regressions and applicable to all high school graduates.
[2] Results displayed in this column are from conditional logistic regressions. Graduation from two- or four-year colleges is calculated *conditional on* high school graduates enrolling in a post-secondary institution.
[3] Results displayed in this column are from conditional logistic regressions. Graduation from four-year colleges is calculated *conditional* on high school graduates enrolling in four-year post-secondary institutions.

Table 5: Odds Ratios for College Enrollment by Mechanism

	I College Enrollment[1]	II Four-Year College Enrollment[2]
<u>High School Economic Composition</u> [Poor H.S.]		
Average H.S.	1.20	0.72
Affluent H.S.	1.22	0.74
<u>High School Characteristics</u>		
Teachers with Certification in Content Area	1.21	2.57***
Teacher Experience	1.27*	1.38*
Attendance Rates	1.01	1.01
Alumni in Four-Year Colleges	1.01***	1.02***
Pseudo R^2	0.1030	0.0973
N	3,335	2,413

Source: NELS:88 (Follow-Up 1, Follow-Up 2, Follow-Up 4)
Note: *** p<0.001, ** p<0.01, *p<0.05, † p<0.10

[1] Results displayed in this column are from logistic regressions and applicable to all high school graduates.
[2] Results displayed in this column are from conditional logistic regressions. Enrollment in four-year colleges is calculated *conditional* on high school graduates enrolling in post-secondary institutions.

Table 6: Odds Ratios for College Graduation by Mechanism

	I College Graduation[1]	II Conditional College Graduation[2]	III Four-Year College Graduation[2]
High School Economic Composition [Poor H.S.]			
Average H.S.	1.05	1.00	1.13
Affluent H.S.	1.06	0.99	1.28
High School Characteristics			
Teachers with Certification in Content Area	1.44*	1.56†	1.04
Teacher Experience	1.45**	1.44*	1.56*
Attendance Rates	0.99	0.99	0.99
Alumni in Four-Year Colleges	1.01***	1.01**	1.01*
Pseudo R^2	0.0979	0.0538	0.0669
N	3,354	2,413	1,812

Source: NELS:88 (Follow-Up 1, Follow-Up 2, Follow-Up 4)
Note: *** p<0.001, ** p<0.01, *p<0.05, † p<0.10

[1] Results displayed in this column are from logistic regressions and applicable to all high school graduates.
[2] Results displayed in this column are from conditional logistic regressions. Graduation from two- or four-year colleges is calculated *conditional on* high school graduates enrolling in a post-secondary institution.
[3] Results displayed in this column are from conditional logistic regressions. Graduation from four-year colleges is calculated *conditional* on high school graduates enrolling in four-year post-secondary institutions.

References:

Adelman, C. (2004). "Principal Indicators of Student Academic Histories in Postsecondary Education." Institute of Educational Sciences Publication.

Alwin, D. F. and L. B. Otto (1977). "High School Context Effects on Aspirations." Sociology of Education **50**(4): 259-273.

Ammermueller, A. and J. S. Pischke (2009). "Peer Effects in European Primary Schools: Evidence from the Progress in International Reading Literacy Study." Journal of Labor Economics **27**(3): 315-348.

Bailey, M. J. and S. M. Dynarski (2011). Gains and Gaps: Changing Inequality in U.S. College Entry and Completion, National Bureau of Economic Research.

Barton, P. E. (2002). "The Closing of the Education Frontier? Policy Information Report."

Betts, J. R. (1995). "Does School Quality Matter? Evidence from the National Longitudinal Survey of Youth." The Review of Economics and Statistics: 231-250.

Bound, J., M. F. Lovenheim, et al. (2010). "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources." American Economic Journal -- Applied Economics **2**(3): 129.

Carnevale, A., S. J. Rose, et al. (2011). "The College Payoff Education, Occupations, Lifetime Earnings." 36.

Cooley, J. (2007). Desegregation and the Achievement Gap: Do Diverse Peers Help? Madison, WI, University of Wisconsin-Madison.

Demitroff, J. F. (1974). "Student Persistence." College and University **49**(4): 553-567.

Fletcher, J. and M. Tienda (2010). "Race and Ethnic Differences in College Achievement: Does High School Attended Matter?" The Annals of the American Academy of Political and Social Science **627**(1): 144-166.

Fletcher, J. M. and M. Tienda (2009). "High School Classmates and College Success." Sociology of Education **82**(4): 287-314.

Goe, L. (2007). The Link Between Teacher Quality and Student Outcomes: A Research Synthesis. Washington, DC, National Comprehensive Center for Teacher Quality

Hoxby, C. (2000). Peer Effects in the Classroom: Learning from Gender and Race Variation, National Bureau of Economic Research.

Jargowsky, P. A. (1996). "Take the Money and Run: Economic Segregation in US Metropolitan Areas." American Sociological Review: 984-998.

Koffman, D. and M. Tienda (2012). Admission Guarantees, High School Economic Composition, and College Application Behavior.

Lankford, H., S. Loeb, et al. (2002). "Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis." Educational Evaluation and Policy Analysis **24**(1): 37-62.

Manski, C. F. and D. A. Wise (1983). College Choice in America, Harvard University Press.

Mayer, A. and S. L. Puller (2008). "The Old Boy (and Girl) Network: Social Network Formation on University Campuses." Journal of Public Economics **92**(1): 329-347.

Meyer, J. W. (1970). "High School Effects on College Intentions." American Journal of Sociology **76**(1): 59-70.

Niu, S. X. and M. Tienda (2008). "Choosing Colleges: Identifying and Modeling Choice Sets." Social Science Research **37**(2): 416-433.

Niu, S. X. and M. Tienda (2013). "High School Economic Composition and College Persistence." Research in Higher Education **54**(1): 30-62.

O'Toole, D. M., L. S. Stratton, et al. (2003). "A Longitudinal Analysis of the Frequency of Part-Time Enrollment and the Persistence of Students who Enroll Part-Time." Research in Higher Education **44**(5): 519-537.

Pantages, T. J. and C. F. Creedon (1978). "Studies of College Attrition: 1950-1975." Review of Educational Research **48**(1): 49-101.

Planty, M., W. J. Hussar, et al. (2009). Condition of Education 2009, National Center for Education Statistics.

Reardon, S. F. (2011). "The Widening Academic Achievement Gap between the Rich and the Poor: New Evidence and Possible Explanations." Whither Opportunity: 91-116.

Reardon, S. F., J. T. Yun, et al. (2006). "Implications of Income-Based School Assignment Policies for Racial School Segregation." Educational Evaluation and Policy Analysis **28**(1): 49-75.

Rice, J. K. (2003). Teacher Quality: Understanding the Effectiveness of Teacher Attributes, ERIC.

Ryan, A. M. (2000). "Peer Groups as a Context for the Socialization of Adolescents' Motivation, Engagement, and Achievement in School." Educational Psychologist **35**(2): 101-111.