How Many Students Really Graduate from High School? The Effects of Early Failure on Dropping Out

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Introduction

The near universality of high school graduation is considered one of the major achievements of the American education system. National census and survey and census data show that upwards of 85% of young adults have graduated from high school (Mare 1995: 162, Stoops 2004: 2). These figures are comparable with estimates of high school graduation from carefully designed longitudinal surveys (Ingels et al. 2002: 14) and are consistent with official reports on high school dropout rates published by the U.S. Department of Education (Kaufman, Alt, and Chapman. 2001: 17-21). Indeed, most policy discussions of educational opportunity assume that there are few remaining problems of equity at the high school level and focus on promoting greater access to higher education.

Yet, there are persistent voices claiming that high school attrition (dropouts) remains a major problem in American education. Part of this concern is related to race and ethnic disparities. Minorities, especially Mexican Americans and American Indians, are much more likely to drop out of high school than are white and Asian American youth (Freeman and Fox 2005, U.S Department of Education 2003). But there is also growing evidence that conventional responses to censuses and surveys inflate high school completion. For example, Greene and Winters (2002) estimate that the "on-time" high school graduation rate in the United States is only 69% percent—about 15 to 20 percentage points below conventional reports that 85 to 90% of American youth graduate from high school. Using a similar data and assumptions, a recent report from U. S. Department of Education estimated that only 73-74 percent of high school freshman graduate from high school four years later, with the graduation rates are as low as 60% in New York state and some other states (Seastrom 2005: 5).

Beyond these varied accounts of high school dropout and graduation rates, there is even less consensus on the causes of high school attrition. Many studies find high correlations between high school completion and impoverished social backgrounds, including poverty, inner city residence, and disrupted families (Alexander et al. 2001, Astone and McLanahan 1991, Rumberger and Thomas 2000). Other research suggests that the educational system and the high rates of retention in primary and middle schools in particular, is the major factor leading to high school dropouts (Alexander et al. 2003). The high premium put on achievement and high stakes testing, for which many students seem ill prepared, is also thought to exacerbate failure and high school attrition (however, see Warren and Jenkins 2005).

These very different portraits of American high school success (or lack of success) rely on different data sources and measurement. The standard account of high graduation rates is based on household surveys that ask adults to report retrospectively on their educational attainment. The problem is that survey questions typically equate delayed high school completion (and high school equivalency) with on-time high school gradation. Household surveys may also under-enumerate persons with below-average educational levels. The other source of data on high school completion is school records, or the administrative data on the numbers of enrolled students. Analyses based on administrative data yield more pessimistic accounts of high graduation. Although school records do not suffer from recall bias and under-enumeration, there are other problems that emerge when tracking students from year to year in administrative records. The most serious problem is the assumption that all non-enrolled students have dropped

out. The other limitation is that administrative data are typically only available in aggregate tabulations by gender and race/ethnicity.

In this study, we have unit-record administrative data for several cohorts of students in a large metropolitan school district on the West Coast. Tracking individual students from entry into 9th grade to their graduation or their disappearance from annual enrollment records allows us to present a detailed portrait of the incredibly complex educational pathways through high school, including normal progression and retention as well as exits and reentries into the system. We follow each student for up to six years after entry into the 9th grade in order to estimate delayed graduation rates.

Even after 6 years, we find that only about one-half of students who begin 9th grade as first-time freshman in this school district graduate from high school. Even with the most generous assumptions, including that all the students who move to other school districts graduate, we estimate that less than two-thirds of students who began high school in this school district eventually earned a high school diploma. Although rates of high school graduation are probably higher in affluent suburban school districts than in the district studied here, we contend that the conventional portrait of almost universal high school graduation in the United States is an artifice, constructed with the aid of a variety of alternative high school equivalency programs.

The other objective of this study is to posit and test a comprehensive model of school attrition that includes both background "at risk" characteristics as well intervening measures of early educational performance. In addition to providing a more accurate estimate of high school attrition, school administrative data have direct measures of academic performance and school experiences. Consistent with prior research, we find that family background and ascriptive characteristics, such as race/ethnicity, economic status, and gender are strongly associated with the likelihood of high school graduation. These factors are relatively modest, however, in comparison with early high school experiences. Earning poor grades at the outset of high school is the single most important predictor of high school graduation. The debate over the causes of educational failure—whether it is due to poverty of the family of origin or the structural features of schooling is somewhat artificial, since both features are part of the larger picture. Understanding the process of educational failure and attrition is the first step in development of a more inclusive theory of student progression through high school and beyond.

Measuring High School Dropouts and Completion

The measurement of educational attainment in the United States is generally based on census and survey questions on completed years of schooling. Since students may repeat a grade or not finish the highest grade attended, the standard questions usually ask about the "highest grade of schooling attended" (rather than the number of years attended) and whether the last year of schooling was completed. Since completing 12 years of education may not necessarily be equivalent to receiving a high school diploma, recent census and survey questions have been more explicit in asking about the highest level of schooling completed and highest degree received (Kominski and Adams 1994).

Although there are some modest differences in estimates of trends and patterns of high school completion with the changes in the wording of the standard retrospective survey questions

(Hauser 1997: 162-167, Mare 1995), the overall patterns are fairly consistent. Indeed there is a well known standardized account of the trend in high school completion over the twentieth century, which shows that high school graduation has increased steadily across the first half of the century (Duncan 1968: 655), reaching a plateau of upwards of 80 percent of the population for cohorts born at mid century or later (Fox, Connolly, Snyder 2005: 48; Hauser 1997: 161; Mare 1995: 162; Mare and Winship 1988: 182). This trend is shown in Figure 1 with data from annual Current Population Surveys from 1947 to 2003. The top line in this chart shows the percent of persons, age 25 to 29, who reported that they had completed high school (or higher levels of school) in each year. Since most persons would have completed high school about 7 to 10 years earlier before being interviewed (at age 25-29), this trend represents high school graduation rates for about a 60 year period from the early 1940s to the early years of the current century. High school graduation rose steadily from about 50% in the early 1940s to about 80% plus around 1970, with only modest change in subsequent decades. It seems that high school graduation is approaching its "ceiling" with the remaining small number of non-graduates being explicable in terms of individual problems, perhaps complications of health or behavioral or emotional problems that inhibit completion of standardized high school programs.

[Figure 1 About Here]

This picture of success contrasts sharply with the numbers of enrolled students by grade in high school from the "West Coast metropolitan school district" that is the focus of this study. Figure 2, based on annual averages of enrollment data for 7 years, shows that there are typically 3,000 students in the 9th grade freshman class, but only half of that number—less than 1,500 students are enrolled as seniors. Assuming that these cross-sectional data represent a longitudinal process, the clear implication is that only half of freshman students make it to their senior year. There were no major changes in year to year enrollments during the 7 year period from 1997-98 to 2004-05, so making longitudinal inferences from cross-sectional data may not be far off the mark.

Ninth grade enrollment in this school district is 25% higher than 8th grade enrollment because of transfers from private schools (including home schooled students) and from neighboring school districts. Ninth grade enrollments are also "inflated" because of the inclusion of about 200 students (annually) who were retained in 9th grade from the prior year. This increase, however, does not necessarily bias the crude measure of high school attrition, since retained students (and in-transfers) are also reported in the figures for the 10th, 11th, and12th grades.

[Figure 2 About Here]

Might this figure of half as many high school seniors as freshman be an aberration? These data are from only one school district, and metropolitan public school districts typically have above average levels of attrition. However, national administrative data also show that there are many fewer enrolled seniors than freshmen. In 2002-2003, there were over 4.1 million public high school freshmen, but less than 3 million high school seniors (Hoffman et al. 2005: 41). Census data (from the 2000 Census) show that there were between 4.0 and 4.1 million youths in each single year cohort for these ages (ages 11 to 15 in 2000, see U. S. Census Bureau 2001). The most plausible inference is that about a million youth in each birth cohort that begin 9th grade in public schools do not survive (remain enrolled) to their senior year. Since not all high school

seniors graduate, the 25% attrition rate before the senior year may be an underestimate of students who fail to graduate from high school.

These discrepancies in estimates of high school graduation and dropout rates between survey data and administrative data, and related problems of measurement, are sometimes reviewed by specialists in educational research (Hauser 1997), but are rarely featured in broader studies of educational attainment. One of the few studies that combined both longitudinal survey data with institutional records was a cohort study that tracked Baltimore school children from first grade to age 22 (Alexander, Entwisle, and Kabbani 2001). They found that 42 percent of the cohort had dropped out of school at some time, but almost 40 percent of the dropouts (16 percent of the original cohort) obtained a GED or returned to high school to get a diploma or certificate. The difference between these two estimates—58 percent of the Baltimore cohort were on-time high school graduates compared to 74 percent of the cohort who eventually earning a high school diploma or its equivalent—reflects the complexity of assessing the state of high school education. In spite of heroic efforts to track students over time, the Baltimore study lost many students due to out-transfers.

The current state of the art method used to estimate the annual dropout rate with survey data is the proportion of students who leave school each year without graduating (Kominiski 1990). The dropout rate is estimated by the number of students who were enrolled last year, but are not currently enrolled (by age or grade) divided by the "at risk" population, which is the sum of persons (by age or grade) not enrolled and those currently enrolled (and graduated for those in grade 12). Using this method and the time series from the October CPS, Komimski (1990) shows that about 5 percent of high school students dropout each year (the rate is higher for black and Hispanic youth). The implied cohort attrition rate (not graduating from high school) computed from the grade-specific dropout rates is about 17%, which is slightly higher than the figures from longitudinal surveys (National Educational Longitudinal Surveys and High School and Beyond), but well below the estimates from administrative data.

The most important factor accounting for the lower survey estimates of dropouts (relative to administrative data) is the conflation of high school graduation and high school equivalency certification in survey data. When directly asked about GED (or other certification), about 9 percent of NELS respondents (at age 22) reported they had completed high school, but did not receive a standard high school diploma (Ingels 2002:14). This is likely to be an underestimate since some persons may "upgrade" their high school equivalency completion as constituting a high school diploma. Hauser (1997: 165) shows a consistent increase of about 4 to 5 percentage points in the proportion of a cohort who reported that they completed high school by their mid twenties relative to when the cohort was age 19 to 20. Recall that almost half (40%) of the high school dropouts from the Baltimore cohort eventually completed high school or its equivalent.

The other possible reason for lower estimates of dropouts in survey data is selective under-enumeration in censuses and household surveys. Kominiski (1990:305) notes that census under-enumeration of persons age 15-19 is very low. But recent estimates of CPS under-coverage (not interviewed) of persons age 16-19 were 10% of white, 16% of black, and 13% of Hispanic males (U.S Census Bureau 2000: Ch. 16). Rates were even higher for men in their twenties. Under-enumeration of females was much lower than under-enumeration for males. The possibility of

selective omission of less successful students (in terms of educational attainment) may also affect in-school student surveys. The baseline survey of 8th graders in the 1988 NELS had a weighted response rate of 93.4%, but only about 70% percent of schools selected for the NELS sample participated in the study (Ingels 2002: 88). In our own survey research among high school seniors, we found that a surprisingly high percentage (20 to 30%) of students listed as enrolled on school records were absent, no longer attending high school regularly, or participating in activities outside the school building (Hirschman, Lee, and Emeka 2005). It is possible that the rates of high school graduation from longitudinal surveys of school-based samples of students are biased upward by some degree of selective omission.

If alternative certificates of high school completion were equivalent to regular on-time high school graduation, then the measurement problems noted here would be of limited interest. However, GED recipients and high school graduates differ not only in their early life experiences, but also in their subsequent labor market experiences. The employment patterns and earnings of GED recipients are more similar to high school dropouts than those of high school graduates, and GED recipients are less likely than high school graduates to finish a post-secondary education or training program (Cameron and Heckman 1993). Moreover, the employment and income gaps between high school dropouts and graduates have widened in recent decades (Hauser 1997: 154). If 25 to 40% of students "dropout" of high school before graduation—even if many eventually receive a high school certification—there is an urgent need to measure and understand the process and causes of high school attrition independently of eventual high school completion.

Causes of High School Failure and Attrition

There is an extensive research literature on the correlates and causes of high school dropouts. Most studies report a familiar list of "risk factors" of student characteristics that are associated with above average rates of academic failure and dropout. Among the standard factors identified in most studies are race/ethnicity, nativity, and gender. For example, African American, Native American, Hispanic, students born outside of the United States, and male students have above average dropout rates (Freeman and Fox 2005, Kaufman et al. 2004, Wojtkiewicz and Donato 1995). Socio-economic status (SES), typically measured by parental education, occupational status, or income is one of the strongest and most consistent correlates of dropping out (e.g. Alexander et al. 2001, Rumberger 1983, 1987). Children from single parent families are at very high risk of educational failure, including high school dropout (McLanahan and Sandefur 1994).

Familial characteristics and the social class of the family of origin are generally mediated through intervening variables, such as students' attitude towards, and behavior in, school. Another important predictor of high school completion is student engagement, which is measured by positive attitudes toward school, regular attendance, paying attention in class, and timely completion of assignments (Alexander et al. 1997, McNeal 1995). Self-efficacy, or the sense that students feel that they are in control of their lives, is another trait that is strongly related to leaving school (Ekstrom et al. 1986).

Students who are engaged in deviant behavior, such as skipping class, being disruptive in class, and displaying aggressive behavior, are at high risk of dropping out (Ekstrom et al. 1986, Cairns et al 1989). Peer influences, including having friends that participate in deviant behavior or dropout, can have a negative impact on high school completion (Ekstrom et al. 1986), while

participation in school based extra-curricular activities has been found to reduce the risk of dropping out (McNeal 1995).

Sorting out the inter-relationships among the potential causes, correlates, and mechanisms that affect student educational progression through schooling has been the major challenge for the field. One of the important conceptual leaps has been the formulation of the life course perspective that attempts to link the stages of children and adolescence with longitudinal data (Alexander, Entwisle, and Kabbani 2001). The life course perspective posits that dropping out of school is not an isolated event; rather, it is the culmination of a process of academic failure and disengagement that began early in the student's academic career. Thus, to fully understand a student's decision to drop out, it is important to examine the temporally proximate and distal forces that influence this decision. Over the span of an educational career, the socioeconomic status of the family of origin works through a myriad of mechanisms, such as residential mobility (Astone and McLanahan 1991), the availability of additional educational resources (Ainsworth 2002; Lareau 1987), students educational expectations (Entwistle et al. 2004), parenting style (Rumberger 1990), and parental attitudes towards formal education (Alexander et al 1997) to affect the likelihood of the student prematurely leaving school.

Linking changes in social contexts and behavior over time is one of the key aspects of the life course perspective. Research in this direction has found that a change in the home environment such as change in the family structure, a residential move, or transferring schools increases the likelihood of dropping out (Astone and McLanahan 1991, 1994, Alexander et al. 1997). The magnitude of the negative effect varies by the student's age and what point they are at in their academic career (Haveman et al. 1991; Sandefur et al. 1992).

Among the many challenges in life course research on high school attrition is the lack of longitudinal data and the lack of information on school experiences and academic performance. Educational performance, at all stages of the student's educational career, is highly predictive of dropping out of high school. For example, Alexander et al. (1997) note that after controlling for many other risk factors, poor performance in grade school is one of the strongest predictors of dropping out of high school (1997). Academic performance, as measured by grade point average or standardized testing in middle and high school, also displays a strong relationship to dropping out of school (Alexander et al. 1997, Ekstrom et al 1986). An unresolved question is whether academic performance simply mediates the effects of risk factors and prior conditions, or adds additional explanatory power to predicting high school completion.

Grade retention, another performance indicator, is associated with dropping out of high school. The effect of grade retention varies by grade, and the effect is strongest during middle school. The increased effect of being retained during middle school is due to the fact that during adolescence youth are much more self-conscious and 'fitting in' is important. Retained students, rather than focusing on their education, may focus their efforts on the social aspect of school, such as extracurricular activities and friendships. However, the retained student may find it hard to socially integrate themselves into a new cohort of students, as they are 'over age' for their grade. Often the retained student is still negotiating social relationships when they make the transition from middle to high school. The move to a larger, more bureaucratic school is difficult for many students. The combination of a lack of social bonds and the difficulties associated with

the transition to high school may lead the student to opt out of an environment they perceive to be unfriendly (Alexander et al. 2003).

Another perspective, influential in the dropout literature, emphasizes the structure of schools and school effectiveness, in particular. Schools, through their location, social and demographic composition, climate, and structure, play an important role in shaping student performance and progress. These factors may be particularly important for students experiencing the transition from 8th to 9th grade, which typically is associated with a change from smaller and more personal middle school environment to a larger high school (Roderick and Camburn 1999).

Students attending public and urban high schools are much more likely to drop out than students in private schools and schools in small towns and rural areas (Bryk and Thum 1989, Rumberger and Thomas 2000). Students in schools with high percentages of minorities and from low income families are also more likely to drop out of high school (Bryk and Thum 1989, Rumberger 1995, Rumberger and Thomas 2000).

Attending a high school with academic and social climates that allow the student to concentrate on their school work increases the likelihood that they will graduate. High school dropout rates were lower in schools in which the students were more likely to take advanced courses, did more homework, and were less likely to skip school (Bryk and Thum 1989, Rumberger and Thomas 2000). Also schools in which students found the disciplinary procedures to be fair had higher rates of graduation (Rumberger 1995). Students are more likely to graduate from high schools in which there were fewer staff problems and schools in which the teachers had more positive attitudes towards the student body (Bryk and Thum 1989, Lee and Burkham 2003).

The structural properties of the school are also important. Lee and colleagues have written a great deal about the relationship between the size and structure of secondary schools and educational achievement (Lee and Smith 1997, Lee and Burkham 2003). They found that students that attend larger high schools are more likely to drop out. The size effect is due to the organizational feature of larger schools which, to deal with a greater number of students, are more bureaucratic and less personal. One of the mechanisms through which the larger bureaucratic structure affects students' educational achievement is through the relationships with teachers. The larger school settings make it more difficult for teachers and students to develop quality relationships as they have less formal or informal contact (Lee and Burkham 2003). The dearth of quality teacher-student relationships in larger schools is particularly harmful to at-risk students, as they benefit most from student-teacher relationships and the informal guidance provided by teachers (Cronninger and Lee 2001).

The difference between middle level and high school in the structure, academic expectations, and the academic and social climate negatively affects academic success in high school, particularly in the early years (Roderick and Camburn 1999). As students move from middle level schools to high schools, they must deal with the increase in school size, a change in the size and composition of their peer group, and the change in status from being the oldest to the youngest students in the school. Students are also faced with increased academic demands and a more complex academic schedule. They must also learn to balance competing academic and social demands. Students must interact with a greater number of teachers and adapt to new teaching

styles (Roderick and Camburn 1999, Roderick 1993). In short, the skills necessary to succeed in high school are different from those required to succeed in middle level schools.

There are interactions between home environments and school settings. Within the same school, some students are able to succeed because they have the skills and connections to deal with problems. Coleman (1988) suggests that students with high levels of social capital are more likely to get the necessary help that allows them to successfully transition into high school. For example, a student may draw upon resources at home, such as an engaged parent, to assist with schoolwork. Or, if a student has a problem that the parent can not address, the parent may turn to another person in his or her social network to provide assistance. Students and families with deficits in social capital are further disadvantaged because they are more likely to attend elementary and middle schools that are poorer at preparing students for high school, which makes the academic transition to high school more difficult (Roderick and Camburn 1999).

As success in high school requires acclimating to their new environment, learning to meet increased educational demands, and adapting to differential teaching styles, many students experience academic problems in the early stages of their high school career. A study of 9th graders in Chicago noted that at least 40% failed a course during the first semester of high school (Roderick and Camburn 1999). High levels of academic failure are not too problematic if they are an isolated event. However, high failure rates in the 9th grade are problematic if they lead to students academically disengaging and beginning the process of dropping out of school.

Data

This study is based on unit-record annual school enrollment data from 1994 to 2004 for a large metropolitan school district on the West coast. School records are maintained primarily for administrative needs, including the counts of students that are required to allocate budgets, teachers, and other resources within districts as well as to apply for financial support from state and federal governments. One of the primary sources of student records is the academic reports of courses taken, grades received, and credits accumulated. These records are supplemented with demographic characteristics supplied by students and their families as well as additional information from teachers, counselors, and administrators.[1]

With unique identifiers, individual student records were matched from semester to semester and from year to year. The underlying logic is that students follow the standard path of progression up the academic ladder from year to year. For example, the entering 9th grade students are expected to be 10th graders the following year and to graduate from high school at the end of their senior (12th grade) year. Students who are retained because they have insufficient credits to be promoted are classified in a grade below their expected level.

The student database includes students from all five comprehensive high schools in the district as well as students in a broad variety of alternative programs. There is "open enrollment" across high schools in the district, which means that students are free to transfer from one school to another in the district. Students who "exit" the database (not enrolled in a particular semester before graduation) may have dropped out or may have transferred to another school district.

[1] Only limited aspects of student records were made available to the researchers under terms that prevent the identification of individual students.

Short of searching administrative records of other school districts, there is no way to determine which individual students have transferred out of the school district. However, at the aggregate level, we estimate that about 6 to 8% of students who begin the 9th grade have transferred out of the district before high school graduation.

Our aggregate estimate of out-transfers are based on two methods. The first method assumes that out-transfers from the school district are approximately equal to in-transfers. Since the total number or students in the school district are fairly steady from year to year, this seems to be a reasonable assumption. On average (over four cohorts), about 8 percent of each senior class have transferred into the school district during high school (they did not begin 9th grade in the school district).

The second method is to assume that the out-transfer rate is represented by the proportion of students with a GPA of 3.0 who are "net exits" from the school district. GPA is measured for the semester immediately prior their exit. Since is unlikely that students with a GPA above 3.0 are dropouts, it seems that these students transferred to another school district. On average (over four cohorts), almost 6 percent of high achieving (GPA above 3.0) students who began 9th grade exit from the school district before graduation.

These indirect estimates suggest that 6 to 8 percent of the freshmen cohort transfer to another school district before graduation. Since about half of all freshmen exit the school system, we estimate that the overwhelming numbers of students who exit are dropouts, either temporary or permanent.

In sum, the school records file allow us to estimate an individual-level longitudinal model of the process of high school completion. With data on the students' academic progress from each semester, we can directly estimate high school graduation rates as well as document the variant paths to high school completion or failure. Since there are only slight differences across cohorts, we have created a merged data file of four cohorts of students that entered the 9th grade from 1995 to 1998. Each cohort only includes first-time 9th graders—that is, we have excluded retained 9th graders (who were in the 9th grade the year before). The sample includes students who transferred into the school district at the beginning of the 9th grade. Since we do not have prior school records for these in-transfer students, some may have been repeating the 9th grade for the second time. Students who transfer into the school district after the beginning of the 9th grade (or later) are excluded from the sample.

Methods

We first describe the temporal process of high school attrition for four cohorts of entering 9th graders, examining the conditional probabilities of staying "on track," being retained, or exiting schooling. Since there are only small differences across cohorts, our subsequent analysis is based on pooled sample of all four cohorts. At the aggregate level, we can measure "on time" graduation rates at four years after entering 9th grade, as well as at 5 years and 6 years.

At the micro-level, we measure several dichotomous dependent variables of high school graduation, depending on whether the student stayed on track and the length of time to graduation. Given the binary nature of the outcome variable we employ binary logistic regression

to examine the effects of the independent variables on the log-likelihood of graduating from high school. We begin by estimating models that illustrate basic demographic differentials in the likelihood of graduating from high school. Drawing upon the life course perspective as well as prior studies that have stressed the significance of early academic success on school attrition, we construct a series of sequential regression models that add in additional mediating and explanatory variables.

Overall, missing data are not a problem, as no more than 4 % of the cases are missing data for any given variable. Given the nature of the data and the lack of any systematic pattern in the cases which are missing data we can safely assume that the data are missing at random. We use stochastic regression imputation to impute missing values for the explanatory variables. This method samples from the error distribution to maintain the natural variance in the variable and provide a predicted value for the missing data point. This method is superior to all imputation methods that provide a specific predictive value without accounting for the distribution of predictive values (Allison 2002). Results were compared to analyses in which listwise deletion was employed and there were no significant differences in the magnitude or statistical significance of the coefficients. To account for any possible heteroskedastic disturbances amongst the independent variables we estimate robust standard errors, which provide a more conservative estimate of standard errors.

A Model of High School Progression and Attrition

In Figure 3, we present a graphic representation and statistical summary of educational pathways for students in our West Coast metropolitan school district. Specifically, Figure 3 presents "life table" estimates of year-to-year progression, retention, and attrition for the population of four cohorts of first time 9th graders[2] that entered high school from 1995 to 1998 to their eventual graduation outcome status. With life-table logic, this model traces the "survival" (remaining on-track) of 1000 entering 9th graders through four years of high school (measured as of the spring semester of each academic year). The numbers within each box show the numbers in that state (can be read as percentages of the original population or L(x) values). The values beside each arrow are the proportion of students in the origin category (conditional probability) who follow a particular trajectory—akin to p(x) and q(x) values in a life table.

[Figure 3 About Here]

We trace the initial cohort of 9th graders (actually four cohorts standardized on a base of 1000) for four years (spring of the 9th, 10th, 11th, and 12th grades) and then to a final graduation status, which is measured 6 years after entry into the 9th grade. In each year, students may be in three possible states: on track (on time grade progression), retained (enrolled behind expected grade level), and not enrolled (exited the school data base). As noted earlier, the overwhelming majority of non enrolled students are dropouts, but some fraction, perhaps one in six or seven of those exiting the school system may have transferred to another school district (within district transfers are measured as still enrolled). Since we cannot identify transfer students at the

[2] First time 9th graders are students that are in 9th grade for the first time. For many of the students we're able to determine that they were 1st time 9th graders by checking the students' grade level in the school record files from the previous year. For students that transfer into the school district for 9th grade we were unable to verify that they are first time 9th graders.

individual level, the label for the nonenrolled students is "net exits." Since some students who exit do return as students in the school system, the numbers in the top row represent only those who are not currently enrolled (net) and not all those who have ever exited (gross).

Less than half (46%) of the students who begin 9th grade graduate "on time" four years later. We are able to identify another 11% of the students who graduated late (5 or 6 years after entering 9th grade) or "probably graduated"—students who are still enrolled after 6 years or had sufficient credits to graduate, but for whom there was no record of graduation. If we can assume that 6% to 8% of the "net exits" transferred to another school and graduated from there, then perhaps 65% or two-thirds (47% + 10% + 8%) of the entry cohort of 9th graders graduated from high school. This figure may seem low relative to other national estimates, including those based on administrative records. Metropolitan cities typically have more social problems than suburban and rural areas, including lower high school graduation rates. However, we suspect that the problem of high school attrition identified here is much higher and more pervasive than the standard account.

One of the features of this model is that student retention and student exits are evident at every stage of the school process. Looking at the bottom panel of "on-track" progression, there is a loss of 28% from the spring of freshman year to the spring of the sophomore year and another 23% to the junior year and 14% to the senior year. Failure is ubiquitous. One might think of grade retention (non promotion) as the first step to school failure, which is eventually followed by exiting from school. However, many students just leave without first being held back: 7% in the freshman year, 14% between the sophomore and junior years, 12% between the sophomore and junior years, and another 9% before the senior year. Retention is also common: 14% of freshmen are retained as are 11% of sophomores.

Retained students are very likely to leave school—about one-third or more of retained students are not enrolled the following year. The most common path of retained students is to remain behind their peers. It is also possible, but fairly rare, for retained students to catch up and resume on track status. It is also possible for students who have exited (mostly dropouts) to re-enter the schools, mostly likely behind their expected grade level. A few rare students leave the school system and return to an on-time status (about 1%).

If students remain on track for four years, then the odds are that more than 90% will graduate in four years. In other words, 51 percent of the cohort reaches their senior year on time, and 92% of them graduate that spring. About one-quarter of students will have been retained sometime during their high school career, and less than half of these make it to their senior year (only 9% of the cohort). About two-thirds of the ever-retained students who make it to their senior year eventually graduate from high school. Of the 40 plus percent of students who exit the school system, only a small fraction will ever graduate from high school.

The myriad of educational pathways presented in Figure 3 are too complex to describe and represent too many possibilities for an explanatory analysis. In the balance of the paper, we focus on a small number of educational outcomes that represent measures of high school graduation. The first is a simple measure of "on time graduation," which represents the probability that a student entering 9th grade will graduate four years later. Graduation could be from any high

school in the district, but out-transfers to other school districts will be confounded by non-graduates.

This measure of on-time graduation can be further parsed to "continuously on-track on-time graduates," which are students who are in enrolled in the appropriate grade level and graduate on time. The difference between these two measures is explained by students who fell behind their grade level by failing a course, but then caught up by taking an extra course during the year or perhaps in summer school. Unlike students in primary or middle school, the retention of high school students (because of insufficient credits) may be largely invisible. For example, a student who is supposed to be a junior, but is classified as sophomore because s/he failed a class may be taking junior level courses and spend free time with junior level students. It is also possible that some of the students who were not enrolled in one year (and thus not continuously on track) may have enrolled in another school district (or in a private school) for a year, but then re-enrolled and graduated on time.

The other measure of high school graduation includes students whose high school graduation is delayed. We compute measures of 5-year graduation and 6-year graduation, which include all those who graduate (from the school district) in these intervals or less. As noted earlier, these figures underestimate high school graduation rates because some of those who exited from this school district transferred to another school district. Moreover, there are a few students who are still enrolled after six years and some who had enough credits to graduate but were not classified as graduates.[3]

Basic Descriptive Patterns

The data examined here, as noted earlier includes administrative records of almost 9,000 students, who were enrolled as first-time 9th graders in a West Coast metropolitan school district from 1995 to 1999. The first column in Table 1 shows summary measures—largely in the form of percentages—for all students in the pooled data base. The following four columns show the same patterns for each individual cohort (indexed by their year of entry into high school). Each student was followed for six years after entering 9th grade until they graduated or disappeared from the database (the most recent cohort can only be measured for 5 years). We continued to track students even if they disappeared from the database in one year and included them if they re-enrolled in the school district.

Table 1 About Here

Four educational outcomes are presented in Table 1. Only a little more than 2 in 5 students (40%) were continuously on track (never retained or exited) and graduated in four years, but almost 46% graduated on time (four years after their freshman year). If we follow each cohort for additional years, we find that the percentage of students graduating from high school rises to 49% after 5 years and almost to 51% after 6 years. As noted in Figure 3, the sum of those who

[3] In trying to reconcile some of these inconsistencies, school staff explained that high school graduation is often "negotiated" for students who have sufficient or nearly sufficient credits but who may not have met every requirement. A school counselor or the school principal may certify a student for graduation, if the student is short a credit or has not taken a specific requirement.

are still enrolled in high school after 6 years and those who have enough credits to graduate (but have not) could bring the graduation rate up to about 56%. In addition, we estimate that about 6 to 8 percent of each cohort transferred to another school district, and some of them certainly graduated from high school.

But even with these generous assumptions, we estimate that less than 65 percent of students who began 9th grade will graduate from this school district (or any other school district). Of course, many more will obtain a GED or complete a high school equivalency program through a community college or alternative educational program. Our focus here is on explaining variations in those who achieve on-time graduation after 4 years or delayed graduation 6 years after entering 9th grade.

The balance of Table 1 shows the basic description of the sample of the four cohorts of students in the West Coast metropolitan school district. Social, ethnic, and economic diversity are characteristic features of the school population. Almost 58% of the students were white, 20% were African American, 15% were Asian, and the balance was of Hispanic, American Indian, and Pacific Islander origins. A little more than 40% percent of the students were from homes with family incomes of less than 185%o of the federal poverty level (making them eligible for subsidized lunch programs). A little more than half of the sample was male. The other background variable is a classification of "neighborhoods," which differ in average socioeconomic status, ethnic composition, and other characteristics that may influence educational outcomes. For the subsequent analysis, we have created a classification of 38 nominal categories (dummy variables) that correspond to the elementary school catchment areas (attendance zones) in the school district. To summarize this variable in these tables, we present only 5 values, corresponding to the 90th, 75th, 50th (median), 25th, and 10th percentiles of high school graduation rates for 38 neighborhoods. About 5% of students did not report a home address and were classified in a 39th dummy variable for this classification.

Since prior research has identified the early 9th grade experience as the critical threshold, we identify several measures that have been hypothesized to represent conditions or experiences in the 9th grade that might put students at risk of failure in high school. For example, almost one-quarter of first time 9th graders can be considered at-risk because they had likely been retained in primary or middle school (indexed by being more than one year above the modal age for 9th grade). Alexander, Entwisle, and Dauber (2003: Ch. 9) find that prior school retention is the major predictor of high school attrition. About 15% of 9th graders were new in-transfers to the school district. Migration of students is considered to be a risk factor, especially if combined with family dislocation (Astone and McLanahan 1991, Cherlin 1999: 424-425).

Based on their middle school records, students are assigned to certain levels of 9th grade mathematics and freshman English. Here we have classified about 16% of students as being in an advanced curriculum if they were assigned to an honors or advanced 9th grade English class. About 10% of students were taking special education classes, but one-third of these students were in all (or mostly) special education classes. About 2 to 3% of students are enrolled in ESL (English as second language) classes, but most will eventually transition to one of the other streams. The balance of the students—about 70%— are in a traditional curriculum as evidenced by their enrollment in a regular English class.

One of the "shocks" of entering high school is failing a class. In this school district, as in many others, expectations of performance in high school are much higher than those in middle school. Ninth graders must adjust to a more "bureaucratic" high school culture, which means being in classes with older students and teachers who are less likely to coddle students who fall behind. This adjustment is reflected in the poor grades received by many first semester 9th graders. About 1 in 6 students (15-16%) have a GPA of less than 1.0 and another 20% have a GPA between 1.0 and 2.0. Altogether, more than one-third of 9th graders begin their second semester of high school with a GPA below 2.0, which indicates failing (or almost failing) one or more classes.

Bivariate Relationships between At-Risk Statuses and High School Graduation

Social origins, including ascriptive characteristics and the family of origin are strongly associated with schooling outcomes. In an equal opportunity society, the expectation is that it does not matter where you came from, but only what you do that determines success in schooling. The distance from this goal is shown in Table 2, which shows the percentage point differences across social origin categories for the educational outcomes, "Four-Year Graduation" and "Six-Year Graduation"[4].

Table 2 about Here

African American students are about 7 to 8 percentage points less likely than whites to graduate from high school, while Asian Americans are slightly more likely than whites to graduate.. Hispanic and American Indians/Pacific Islander students are much less likely than African Americans to make it through high school.[5] These disparities are fairly consistent across indicators and cohorts. One of the standard findings in the literature is that part, but not all, of race/ethnic differences in schooling are a product of socioeconomic and familial background. Table 2 also shows about a 12-13 percentage point gap in high school graduation rates between students from poor (or near poor) families and those from middle class families. There is a smaller, but no less significant gender gap in high school graduation. There are also significant differences in graduation rates between neighborhoods, with an 11 to 12 percentage point spread between the 25th and 75th percentiles and about 22 to 27 points between the 10th and 90th percentiles. Girls are about 6 to 7 percentage points more successful than boys. Since the sex of a child is a random event, social class, neighborhood, race/ethnicity or other measures of composition cannot explain the gender differential, though there could be interactions with these background variables.

The impacts of these background variables on high school graduation are likely to be mediated by schooling experiences. For example, to the extent that students from disadvantaged backgrounds are more to prone to experience geographic mobility, differential placement in school tracks, or below average academic performance, the links between social origins and the

[4] Although not included, we estimated the bivariate relationship between the social and economic characteristics in table 2 and two additional educational outcomes: on-track on-time graduation and graduating in 5 years. The relationship between these additional educational outcomes and the social and economic characteristics are similar to those presented in table 2.

[5] The lower likelihood of American Indian students to graduate from high school in 6 rather than in 4 years is a product of different samples for these two outcomes (only 3 of the 4 cohorts were observed for 6 years.

processes of educational stratification are revealed. Students who transfer to the school district at ninth grade have lower graduation rates than other students, especially for on-time graduation. With extra time, however, this disparity is reduced, though not completely eliminated. Transfer students are 22 percentage points less likely to be continuously enrolled and graduate in four years, but with time, transfer students catch up and six years after entering 9th grade the gap is reduced to 11 percentage points.

Overage students, our proxy for a prior retention, are 6 to 12 percentage points less likely to finish high school than students that have progressed through schooling at the standard times. There are also wide disparities in graduation by early high school academic performance. The widest gaps are evident for those who have doing poorly in school. Failing a class in the first semester of high school or having a GPA below 1.0 (almost the same thing) resembles a death sentence in terms of high school graduation. Although some students who fail a class do eventually graduate after 6 years, the odds are very much against them. Students who begin high school with a slightly higher, but still low, GPA of 1.0 to 2.0, also face tremendous odds against graduation.

An early positive academic record and successful adjustment to high school are the best predictors of graduation. About three-quarters of the students whose first semester grades were B's or above (GPA above 3.0), or who were assigned to advanced curriculum on the basis of their middle school record, are on-time graduates and 80% eventually graduate from the school district.

A Multivariate Model of High School Graduation

To understand how ascriptive factors, at risk factors, and academic performance interact, Table 3 presents the results from a series of logistic regressions on whether the student graduated from high school in 4 years, and Table 4 shows a comparable analysis for graduation in 6 years. Models were also run for other educational outcomes, and the results are broadly similar to those presented here.

Four models or equations are estimated for each educational outcome. The baseline (Model 1) includes the gender and race/ethnicity—two fundamental ascriptive variables. These exogenous risk factors may be explained or mediated through a variety of intermediate variables. In Model 2, three additional background variables are added, including family income, the neighborhood in which the student lives, and transfer status. These variables are grouped together because they are mechanisms through which families are able to promote the education of their children. Income, indexed here as a dichotomous index of whether the student's family is above or below 185% of the poverty line, is a fundamental family resource. There are other aspects of socioeconomic status, including parental education, which are not available in school records. Among the other resources of advantaged families are access to better schools and stability. Families often choose to live in certain areas because of perceived differences in school quality. The third family resource variable represented here is a measure of transfer status. In-transfers are students who were newly enrolled in the school district for 9th grade. In transfers are products of geographic mobility as well as students who shift from nearby local private or other public school districts. Mobility between school districts may require some degree of adjustment by students, as well as tapping other dimensions of family life (both positive and negative). In

addition to mediating the observed ethnic disparities, measured in Model 1, the additional variables added in Model 2 may have direct and independent effects on educational outcomes.

In the third model, 4 additional early schooling variables are added as covariates in order to measure how much inequality in educational outcomes is mediated and/or "created" by educational experiences prior to high school. These covariates include a prior school retention (indexed by whether a student is older than the modal age for 9th grade) and educational placement in 9th grade, which is based on middle school records. This model also includes measures for placement in special education and ESL classes. To the extent that these variables affect (directly or indirectly) the likelihood and timing of high school graduation, it is a script that was written before entry into high school. In the fourth and final model, the grades from the first semester of the 9th grade are added as a covariate. The model shows how much of the impact of social background (all the variables included in Model 3) on educational outcomes are mediated by early high school grades. The increment to the (pseudo) R-squared of each model (equation) shows how much additional explanatory power (above and beyond that of all prior variables) of high school graduation is explained with the inclusion of each bloc of variables.

Gender has a strong and significant effect that is entirely mediated by early schooling experiences and early high school grades. Girls do better than boys academically, but boys with the same grades as girls are just as likely to complete high school. These patterns do not reveal how much of the gender gap in grades is due to socialization and reflected in differential behavior such as attentiveness and completion of assignments. As observed in Table 2, race/ethnicity is strongly associated with high school graduation. The baseline model (1) in Table 3, shows that Hispanic and American Indian/Pacific Islander students are less than half as likely as white students to graduate from high school, while African American students are about 25% less likely than white students to achieve on time graduation.

The addition of family background and resources (income, neighborhood in which student lives, and transfer status) explain about all of the black-white disparity in on time graduation rates, but only about one third of the gap faced by Hispanic and American Indian/Pacific Islander students. The observed advantage of Asian American students (relative to whites) is increased in Table 2, when socioeconomic and neighborhood characteristics are held controlled. Early educational experiences, and 9th grade marks in particular, provide interesting insights into the mechanisms of race/ethnic differentials in high school graduation rates. African American students would be more likely to graduate from high school if they had comparable grades to white students. The lower grades of American Indian/Pacific Islander students explains their lower graduation rates. This logic, however, does not explain the lower graduation rates of Hispanic students. Even holding grades constant, Hispanic students are less likely to graduate from high school. The higher graduation rates of Asian American students are a product of their higher grades.

Measures of family resources, including income, neighborhood in which student lives, and transfer status, have significant and persistent effects on high school graduation (both 4 year and 6 year). These effects are only slightly mediated through early schooling experiences and by 9th grade school marks. But net of every measured variable (in Model 4), children from poor families are still 20 percent less likely to graduate from high school than children from non poor families. There are no significant direct effects of neighborhood, except for those who live in the

poorest (10th percentile) areas. Transfer status has a very strong negative effect that is even stronger than net of grades.

Students who were retained in middle or primary school are about 20 percent less likely to graduate from high school in four years than students who were not retained (and 30 percent less likely to have graduated in 6 years). This disadvantage is almost completed mediated by early high school grades. Students who were placed in honors classes in 9th grade are much more likely to graduate, while students who take special education classes are much less likely to make it through school. ESL students are more likely to graduate from high school than regular students, primary because of their higher grades.

As important as these background factors are, their impact on high school graduation are dwarfed by the impact of early high school grades. The inclusion of GPA in the last model doubles the pseudo-R squared three coefficient. Initial grades in high school not only mediate much of the handicaps of the social background and prior school experience, but also add considerable explanatory power that is independent of all other measured predictors in this model.

Table 4 replicates the prior analysis with the dependent variable of the likelihood of graduation from high school within 6 years after entry into high school (9th grade). In general, the same patterns hold, though some effects are muted when considering 6 year graduation rates as opposed to 4 year graduation rates. For example, the negative effects of very poor neighborhoods and transfer status are not significant in the final model of Table 4. In some instances, extra time gives students an opportunity to catch up and recover from handicaps. Very poor 9th grade marks have just as strong an impact, however, on 6 year graduation rates as they do on4 year graduation rates.

Conclusions

There is a disconnect between the standard account of almost universal high school completion (80 to 90%) in the United States and the reality that only about 65 to75% of adolescents achieve "on time "graduation from high schools. Our study found that less half of 9th graders in a large West Coast metropolitan school district actually graduated from high school in four years. If we stretch the graduation rate out to six years and assume that all out-transfers graduate, the high school graduation rate might rise to 60% or even to 65%. The school district examined here undoubtedly has a higher dropout rate than many other areas, but the patterns reported here are probably similar to national studies based on administrative records.

The gap between the high rates of high school completion and the much lower rates of on time graduation is largely explicable with the variety of ways that a high school degree can be patched together without marching steadily through four years of high school meeting every requirement. A surprising high fraction of students dropout of high school sometime before graduation. Many of these students find their way back to the educational system, including re-enrollment in regular high schools, alternative programs operated by the school district, or in high school equivalency programs operated by community colleges. Given a second chance, many high school dropouts find a way to complete a high school degree. A modest estimate would be that

the "true" cohort dropout rate is close to 30% of those who begin high school, but half of these dropouts eventually obtain a high school degree.

Regardless of the exact level of high school attrition, there is deep and pervasive inequality in completing high school. Every study of high school attrition reports a familiar litany of risk factors associated with minority status, economic marginality, and families in distress. Dropout rates are higher in inner-city schools and in high poverty areas. Although some adolescents have the resilience to survive and achieve in harsh environments and deprived circumstances, many, perhaps most, youth need help to make it from childhood to adolescence (Catterall 1998). Students need economic, social, and emotional support from their families, communities, and schools to keep them out of trouble as well as the positive direction and encouragement to attend and actively participate in their schooling. Even children with all the advantages of middle class families still need considerable encouragement and monitoring to get through high school. Students with fewer resources to fall back on are simply less likely to make it. The analysis reported here reinforce these findings, including the disadvantages of race/ethnicity, family resources, gender, neighborhood, and transfer status. The inequalities in American society cast their shadow on educational stratification in the list of risk factors associated with high school completion.

The administrative data analyzed here allow us to go beyond measuring the impact of risk factors, but also to measure how these factors are structured and mediated in educational experiences. A fair degree of the inequality in high school outcomes can be predicted from early educational experiences in middle and primary school. Having been retained in school and placement in high school tracks is moderately correlated with high school outcomes.

Even more strongly predictive outcomes are early high school grades. The school marks received in the first semester of high school is the single most important predictor of who will dropout and who will graduate. If a student fails a class in the first semester of 9th grade—and there are a lot of poor grades in the first semester of high school—then there is only a slight chance that s/he will graduate from high school in four years. And of only 1 in 5 students who fail a class will graduate after 6 years. There are many other reasons why adolescents dropout of high school, but early failure is the most common path. And early academic failure is the primary mechanism by which "at-risk" students depart from schooling before graduation.

One possible reason for the high failure rate in high school is that many entering 9th graders are simply not ready for rigors and independence of high school. Not all children and adolescents develop and mature at the same pace. Some children are independent learners and self-motivated at a very early age, while others are easily distracted and require more external supervision and monitoring to complete homework and pay attention in a classroom. For example, many more boys seem to be slower to mature and adjust to classroom expectations than girls. There may be a wide range of individual predispositions in development over which are layered the impacts of families, peers, and teachers, and the structure of schools.

Many students may simply not be ready for the abrupt change in expectations from middle school to high school at age 15. High school teachers have different (and more) expectations for students than middle school teachers. It doesn't take very long for missed assignments, school

absences, and inattention to lead to failure on tests and then failure for a course. It is possible to recover from failure, and some students do (see Figure 3), but the odds are against it. The opinions of teachers and peers may reinforce failure and led to the path that culminates in dropping out.

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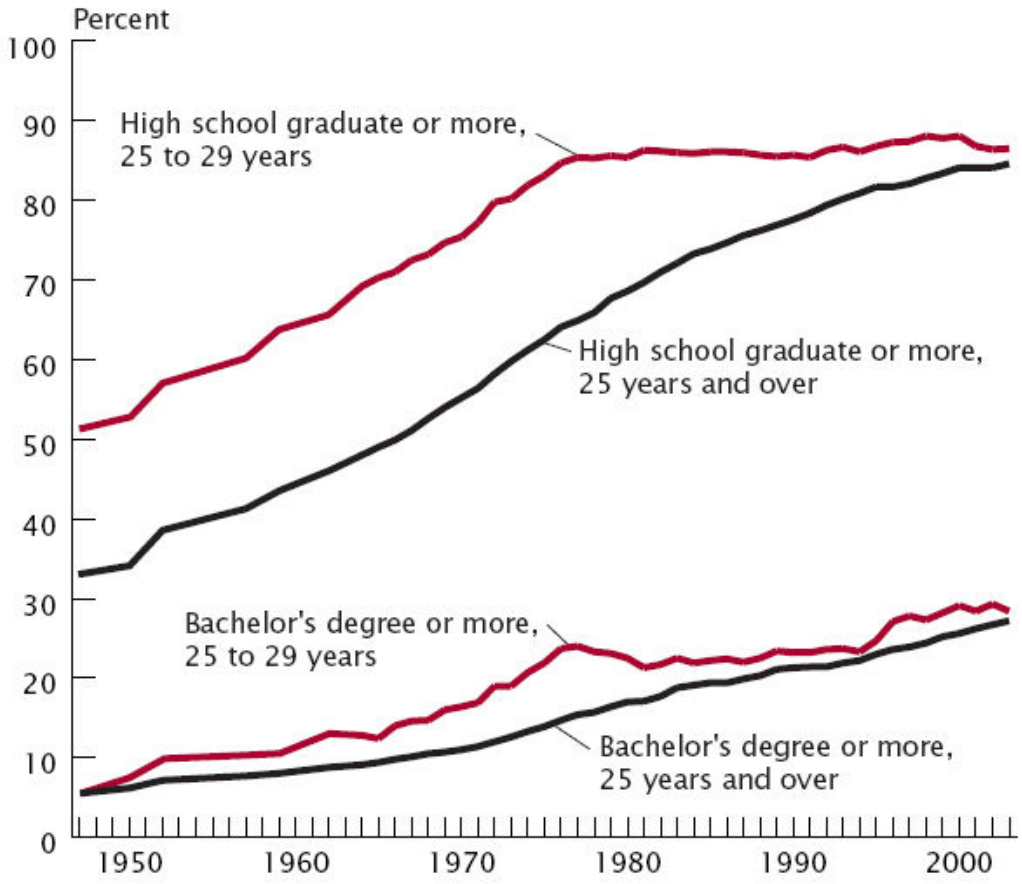
Figure 1.

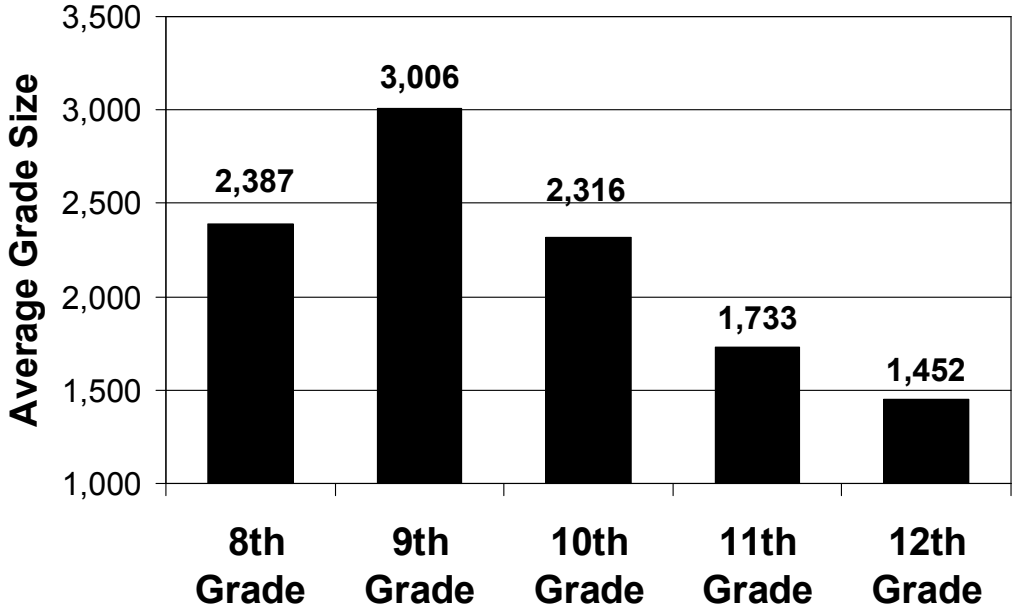
Educational Attainment of the Population 25 Years and Over by Age: 1947 to 2003



Note: Prior to 1964, data are shown for 1947, 1950, 1952, 1957, 1959, and 1962.
Source: U.S. Census Bureau, Current Population Survey and the 1950 Census of of Population.

Source: Stoops 2004: 2

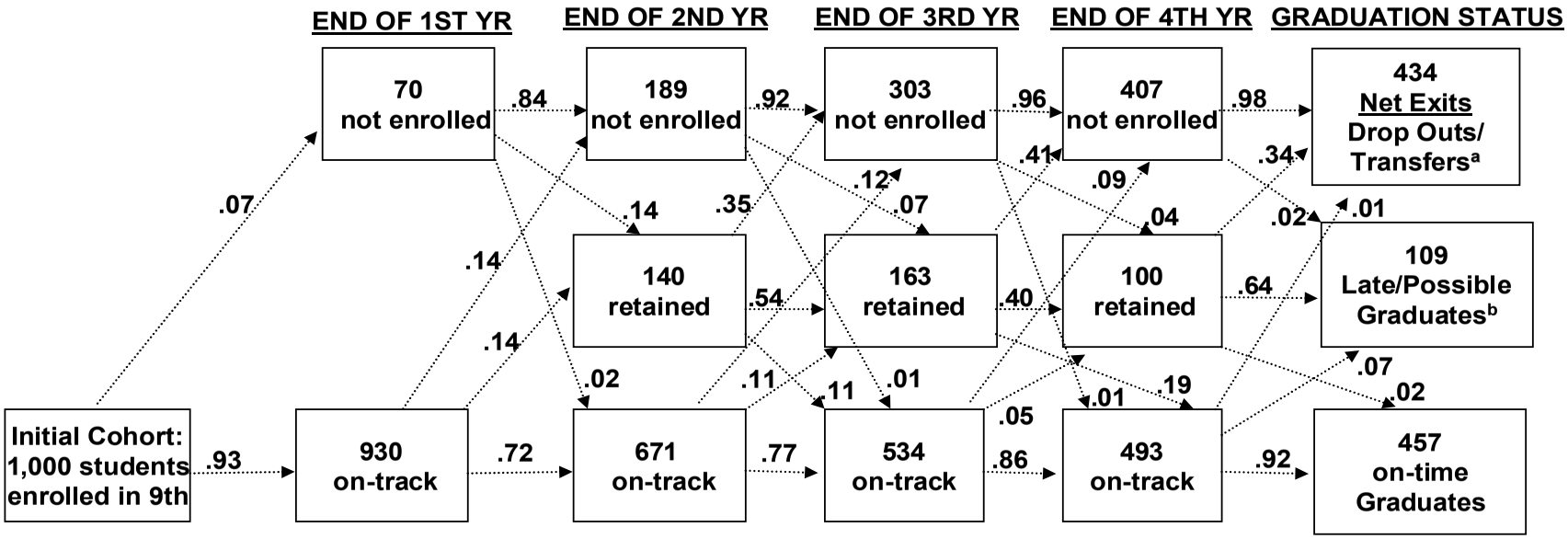
Figure 2. Students enrolled, by Grade Level: Averages for Academic Years from 1997-98 to 2004-05.



Source: Merged grade history files (MRDF) of enrolled students from 1997-98 to 2004-05 in a West Coast metropolitan school district.

Notes:
These figures are the numbers of enrolled students in the fall semester of each academic year, averaged across 8 academic years.

Figure 3. The Process of School Progression and Attrition For an Entering Cohort of 1,000 Ninth Graders: Averages from Cohorts of 1995-96 to 1998-99.



a) Net Exits include students that left high school with too few credits (does include some transfers).

b) Students who graduate late, are still enrolled after 6 years, or exited with sufficient credits to graduate.

Table 1. Distribution of Social and Economic Characteristics and Educational Outcomes for 4 Cohorts of 9th Graders (1996 to 1999).

Variables [A]	All Cohorts	1996-97 Cohort	1997-98 Cohort	1998-99 Cohort	1999-00 Cohort
Educational Outcomes:	Percent	Percent	Percent	Percent	Percent
CONTINOUSLY ON-TRACK ON-TIME FOUR YEAR GRADUATES					
Graduated	40.1%	42.0%	39.2%	39.1%	40.0%
Did not Graduate	59.9%	58.0%	60.8%	60.9%	60.0%
GRADUATED IN 4 YEARS					
Graduated	45.7%	47.0%	44.6%	45.4%	45.9%
Did not graduate	54.3%	53.0%	55.4%	54.6%	54.1%
GRADUATED IN 5 YEARS					
Graduated	49.2%	50.6%	48.8%	49.2%	46.9%
Did not graduate	50.8%	49.4%	51.2%	49.2%	53.2%
GRADUATED IN 6 YEARS					
Graduated	50.6%	51.4%	49.6%	50.8%	NA
Did not graduate	49.4%	48.6%	50.4%	49.2%	NA
Risk Factors:					
GENDER					
Male	51.5%	52.6%	51.3%	50.7%	51.4%
Female	48.5%	47.4%	48.7%	49.3%	48.6%
RACE/ETHNICITY					
Hispanic	5.3%	4.1%	5.5%	5.8%	5.6%
African American	19.5%	19.4%	20.3%	19.4%	19.1%
Asian	15.2%	15.6%	16.0%	15.5%	14.7%
American Indian/ Pacific Islander	2.1%	2.2%	1.8%	1.9%	2.6%
White	57.9%	58.8%	56.4%	58.4%	58.1%
FAMILY INCOME					
Above 185% of the federal poverty level	58.3%	59.1%	57.2%	58.1%	58.9%
Less than 185% of the federal poverty level	41.7%	40.9%	42.8%	41.9%	41.1%
NEIGHBORHOOD[B]					
90th to 100th Percentile	14.7%	8.7%	11.3%	11.6%	11.9%
75th to 90th Percentile	12.5%	13.2%	13.9%	15.6%	12.4%
50th to 75th Percentile	24.9%	23.3%	25.9%	25.3%	25.9%
25th to 50th Percentile	20.6%	20.7%	27.4%	26.0%	25.0%
10th to 25th Percentile	15.3%	13.1%	12.4%	12.5%	14.4%
0 to 10th Percentile	12.0%	21.1%	9.1%	9.1%	10.4%
TRANSFERRED INTO DISTRICT FOR 9TH GRADE					
Transferred	15.5%	12.6%	15.0%	16.7%	17.7%
Did not transfer	84.5%	87.4%	85.0%	83.3%	82.3%

Table 1 (continued). Distribution of Social and Economic Characteristics and Educational Outcomes for 4 Cohorts of 9th Graders (1996 to 1999).

	All Cohorts	1996-97 Cohort	1997-98 Cohort	1998-99 Cohort	1999-00 Cohort
Educational Experiences:	Percent	Percent	Percent	Percent	Percent
EVER RETAINED IN GRADES K TO 8TH					
Never Retained	75.6%	73.7%	74.7%	75.3%	78.5%
Retained	24.4%	26.3%	25.3%	24.7%	21.5%
9TH GRADE CLASSES					
Traditional Curriculum	69.1%	71.2%	67.6%	70.4%	67.5%
Advanced/College bound classes	17.5%	16.3%	18.9%	16.0%	18.6%
Special education: full time	3.0%	2.3%	2.8%	3.7%	3.5%
Special education: part time	7.7%	8.2%	7.7%	7.1%	7.6%
English as a second language	2.7%	2.0%	3.1%	2.8%	2.8%
GPA 1ST SEMESTER OF 9TH GRADE					
GPA less than 1.0	15.5%	15.0%	16.0%	14.5%	16.4%
GPA 1.0 to 1.99	20.7%	21.6%	21.0%	20.4%	19.9%
GPA 2.0 to 2.99	29.6%	28.6%	29.5%	30.7%	29.8%
GPA 3.0 to 4.0	31.8%	32.4%	30.6%	32.5%	31.8%
Took only Pass/Fail classes	2.4%	2.5%	3.0%	1.9%	2.2%
N of 9th graders	8,948	2,189	2,255	2,109	2,395

Notes:

[A] Specific variables definitions are included in the appendix.

[B] Neighborhood is a set of 38 geographic areas in the school district which correspond to elementary school catchment areas. Neighborhoods are measured by 38 dummy variables, but the percentage composition is only shown for those between the maximum, minimum and 5 intervening categories: the neighborhoods that are closest to values of the 90th, 75th, 50th (reference category), 25th and 10th percentiles of students graduating from high school in four years.

Table 2. Social and Economic Characteristics for 9th Graders by Graduating From High School in Four or Six years.		
Independent Variables[B]	**Percent of Four Year Graduates**	**Percent of Six Year Graduates[A]**
Risk Factors:		
GENDER		
Male	42.0%	47.0%
Female	49.6%	54.4%
RACE/ETHNICITY		
Hispanic	30.6%	35.0%
African American	40.6%	44.8%
Asian	53.0%	56.7%
American Indian/ Pacific Islander	30.0%	27.1%
White	47.5%	53.1%
FAMILY INCOME		
Above 185% of the federal poverty level	51.0%	56.0%
Less than 185% of the federal poverty level	38.4%	43.1%
NEIGHBORHOOD [C]		
90th Percentile	57.9%	64.7%
75th Percentile	52.9%	57.1%
50th Percentile (Median)	48.2%	51.3%
25th Percentile	40.0%	46.0%
10th Percentile	35.9%	37.4%
TRANSFERRED INTO DISTRICT FOR 9TH GRADE		
Transferred	27.2%	41.0%
Did not transfer	49.1%	52.3%
Educational Experiences:		
EVER RETAINED IN GRADES K TO 8TH		
Never Retained	48.7%	54.2%
Retained	36.6%	40.1%
9TH GRADE CLASSES [C]		
Traditional Curriculum	40.8%	46.2%
Advanced/College bound classes	77.6%	79.0%
Special education: full time	19.5%	26.5%
Special education: part time	28.7%	36.2%
English as a second language	44.0%	51.5%
GPA 1ST SEMESTER OF 9TH GRADE		
GPA less than 1.0	4.8%	6.1%
GPA 1.0 to 1.99	25.7%	31.6%
GPA 2.0 to 2.99	54.4%	58.5%
GPA 3.0 to 4.0	73.3%	80.2%
Took only Pass/Fail classes	9.8%	8.6%

Table 2 (Continued). Social and Economic Characteristics for 9th Graders by Graduating From High School in Four or Six years.		
COHORT		
Began 9th fall 96-97 AY (Grad Spring 2000)	47.0%	51.4%
Began 9th fall 97-98 AY (Grad Spring 2001)	44.6%	49.6%
Began 9th fall 98-99 AY (Grad Spring 2002)	45.4%	50.8%
Began 9th fall 99-00 AY (Grad Spring 2003)	45.9%	NA
N of 9th graders	8,948	6,553

Notes:

[A] Does not include the cohort that began 9th grade in 1999-2000 AY, as we do not have 6 year graduation data.

[B] Specific variables definitions are included in the appendix

[C] Neighborhood is a set of 38 geographic areas in the school district which correspond to elementary school catchment areas. Neighborhoods are measured by 38 dummy variables, but only 5 categories are presented here: the neighborhoods that are closest to values of the 90th, 75th, 50th (reference category), 25th and 10th percentiles of students graduating from high school in four years.

Table 3. Odds-Ratios from Logistic Regressions of Social and Economic Characteristics on Graduating from High School in Four Years with Robust Standard Errors (N= 8,948).

	Model 1		Model 2		Model 3		Model 4	
Independent Variables [A]	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**
Risk Factors:								
GENDER								
Female	**1.37**	.00	**1.39**	.00	**1.20**	.00	1.05	.32
Male	--	--	--	--	--	--	--	--
RACE/ETHNICITY								
Hispanic	**.49**	.00	**.64**	.00	**.62**	.00	**.76**	.04
African American	**.75**	.00	.94	.36	1.00	.98	**1.39**	.00
Asian	**1.26**	.00	**1.53**	.00	**1.32**	.00	1.07	.40
American Indian/ Pac Isl.	**.47**	.00	**.66**	.02	.74	.08	.98	.90
White	--	--	--	--	--	--	--	--
FAMILY INCOME								
Less than or 185% of the federal poverty level			**.67**	.00	**.74**	.00	**.78**	.00
Greater than 185% of the federal poverty level	--	--	--	--	--	--	--	--
NEIGHBORHOOD [B]								
90th Percentile			1.34	.15	1.35	.15	1.11	.66
75th Percentile			1.09	.63	1.02	.91	.89	.61
50th Percentile (Median)	--	--	--	--	--	--	--	--
25th Percentile			**.71**	.04	.82	.23	.96	.86
10th Percentile			**.66**	.04	**.64**	.04	**.59**	.03
TRANSFERRED SCHOOLS								
Transferred into district for 9th			**.42**	.00	**.41**	.00	**.28**	.00
Did not transfer into district	--	--	--	--	--	--	--	--
Educational Experiences								
PRIOR GRADE RETENTION								
Retained: 1st to 8th grade					**.77**	.00	.91	.13
Never Retained	--	--	--	--	--	--	--	--
9th GRADE CLASS TYPE								
College bound classes					**4.18**	.00	**2.29**	.00
Special education: full time					**.40**	.00	**.45**	.00
Special education: part time					**.63**	.00	.85	.11
ESL Student					**1.59**	.00	1.17	.33
Traditional Curriculum	--	--	--	--	--	--	--	--

Table 3 (Cont). Odds-Ratios from Logistic Regressions of Social and Economic Characteristics on Graduating from High School in Four Years with Robust Standard Errors (N= 8,948).

	Model 1		Model 2		Model 3		Model 4	
Independent Variables [A]	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**
9th GRADE GPA								
GPA less than 1.0							**.02**	.00
GPA 1.0 to 1.99							**.13**	.00
GPA 2.0 to 2.99							**.46**	.00
GPA 3.0 to 4.0	**--**	--	**--**	--	--	--	--	--
Took only Pass/Fail classes							**.09**	.00
Pseudo R-Squared	.01		.09		.14		.28	

Notes:

[A] Specific variables definitions are included in the appendix

[B] Neighborhood is a set of 38 geographic areas in the school district which correspond to elementary school catchment areas. Neighborhoods are measured by 38 dummy variables, but only 5 categories are presented here: the neighborhoods that are closest to values of the 90th, 75th, 50th (reference category), 25th and 10th percentiles of students graduating from high school in four years.

Table 4. Odds-Ratios from Logistic Regressions of Social and Economic Characteristics on Graduating from High School in Six Years with Robust Standard Errors (N= 8,948).

	Model 1		Model 2		Model 3		Model 4	
Independent Variables [A]	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**
Risk Factors:								
GENDER								
Female	**1.36**	.00	**1.37**	.00	**1.19**	.00	1.06	.33
Male	**--**	--	**--**	--	--	--	--	--
RACE/ETHNICITY								
Hispanic	**.48**	.00	**.63**	.00	**.61**	.00	.77	.08
African American	**.71**	.00	**.**92	.22	.95	.51	**1.40**	.00
Asian	**1.17**	.03	**1.47**	.00	**1.33**	.00	1.11	.29
American Indian/ Pac Isl.	**.33**	.00	**.47**	.00	**.52**	.00	.67	.11
White	**--**	--	**--**	--	--	--	--	--
FAMILY INCOME								
Less than or 185% of the federal poverty level			**.70**	.00	**.78**	.00	**.79**	.00
Greater than 185% of the federal poverty level	--	--	**--**	--	--	--	--	--
NEIGHBORHOOD [B]								
90th Percentile			1.53	.08	1.49	.10	1.12	.69
75th Percentile			1.02	.94	1.04	.89	.87	.62
50th Percentile (Median)	--	--	--	--	--	--	--	--
25th Percentile			.79	.38	.88	.63	.86	.64
10th Percentile			**.56**	.03	.66	.12	.73	.30
TRANSFERRED SCHOOLS								
Transferred into district for 9th			**.77**	.00	**.79**	.00	**.59**	.00
Did not transfer into district	**--**	--	**--**	--	--	--	--	--
Educational Experiences								
PRIOR GRADE RETENTION								
Retained: 1st to 8th grade					**.68**	.00	**.78**	.00
Never Retained	**--**	--	**--**	--	--	--	--	--
9th GRADE CLASS TYPE								
College bound classes					**3.47**	.00	**1.75**	.00
Special education: full time					**.50**	.00	**.61**	.01
Special education: part time					**.75**	.01	1.11	.39
ESL Student					**1.43**	.04	.91	.63
Traditional Curriculum	**--**	--	**--**	--	--	--	--	--

Table 4 (Cont). Odds-Ratios from Logistic Regressions of Social and Economic Characteristics on Graduating from High School in Six Years with Robust Standard Errors (N= 8,948).

	Model 1		Model 2		Model 3		Model 4	
Independent Variables [A]	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**	e^{β}	**p-value**
9th GRADE GPA								
GPA less than 1.0							**.02**	.00
GPA 1.0 to 1.99							**.13**	.00
GPA 2.0 to 2.99							**.38**	.00
GPA 3.0 to 4.0	**--**	--	**--**	--	--	--	--	--
Took only Pass/Fail classes							**.05**	.00
Pseudo R-Squared	.02		.09		.13		.29	

Notes:

[A] Specific variables definitions are included in the appendix

[B] Neighborhood is a set of 38 geographic areas in the school district which correspond to elementary school catchment areas. Neighborhoods are measured by 38 dummy variables, but only 5 categories are presented here: the neighborhoods that are closest to values of the 90th, 75th, 50th (reference category), 25th and 10th percentiles of students graduating from high school in four years.

Appendix

Table 1A. Detailed Description of variables used in the analysis	
Variable	**Description**
Gender	Student's Gender. Females are coded '1' and males '0'.
Race/Ethnicity	Race/Ethnicity of the student. Coded as a series of binary variables for the following racial/ethnic groups: white, African American, Asian, Hispanic, and Native American/ Pacific Islander.
Family Income	Family income of the student during the academic year in which the student began 9th grade for the 1st time. If the income of a student's family was less than or equal to 185% of the federal poverty level the student is coded '1'.
Neighborhood	Neighborhood is a set of 38 geographic areas in the school district which correspond to elementary school catchment areas. Students with missing address data (~5%) are classified in an additional dummy variable. Neighborhoods are measured by 38 dummy variables, but the results from only five categories are presented here: the neighborhoods that are closest to values of the 90th, the 75th, the 50th (median), the 25th, and the 10 percentiles of students graduating from high school in four years.
Transferred into district for 9th grade	Students that transferred into the district for 9th grade are coded '1'. To determine whether a student had transferred into the district, administrative files from prior years were examined to see if the student was previously enrolled in the district.
Retained in 1st to 8th	Students that are overage for 9th grade are coded as 1. Students are over age if they are older than 15 years old on September 1st of the year in which they start 9th grade for the first time.
9th grade classes	The type of classes that the student took their first semester of high school. Coded as a series of dummies for each type of class: Advanced/college bound indicates enrollment in an honors /advanced English class, Full-time special education indicates more than 2/3rds of their classes are special education, Part-time special education indicates less than 2/3rds of their classes are special education, and English as a second language indicates they enrolled in a English as a second language class.
Grade Point Average	Students' grade point average (GPA from their 1st semester of high school (9th grade) on a 0 to 4 scale. Coded as a series of dummy variables: GPA is less than 1.0, GPA is greater than or equal to 1 and less than 2, GPA is greater than or equal to 2 and less than 3, GPA is greater than or equal to 3 and less than or equal to 4, or student took only pass/fail classes.
Cohort-Year	The year in which the student's cohort began 9th grade for the 1st time. Coded as a series of binary variables for each cohort.
Continuously on-track four year high school graduate	Student was continuously enrolled, made normal grade progression for all four years, and graduated from high school in four years.
Six year high school graduate	Student graduated from high school six academic years after beginning high school in this school district.