How Many Students Really Graduate from High School? The Process of High School Attrition

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This study, along with other research based on administrative data from schools, concludes that the conventional portrait of almost universal high school graduation in the United States is an artifact of measurement biases in standard household surveys. This study applies life table models to estimate the risks of retention, dropout, and graduation with school administrative records from a West Coast metropolitan school district. High school attrition is a process with failure and retention often preceding dropping out. Some students return, but it is much easier to descend than to return and catch up. For many students, poor academic performance in the first semester of the 9th grade is the critical experience that leads to subsequent failure and attrition.

Introduction

The near universality of high school graduation is considered one of the major achievements of the American education system. National 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, Curtin, Owings, Kaufman, Alt, and Chen, 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. 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) and Swanson (2004) conclude that the "on-time high school graduation rate" in the United States is only 68 to 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 graduation rates as low as 60% in New York and in other states (Seastrom, Hoffman, Chapman, and Stillwell, 2005: 5). Another careful study estimates that 72% of students graduated from American high schools in 2002 (Warren 2005).

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, Entwisle, and Kabbani, 2001; Astone and McLanahan 1991, Rumberger and Thomas 2000). Other research suggests early academic performance, including poor grades and high rates of retention in primary and middle schools, as the major factor that eventuates in high school dropouts (Alexander, Entwisle, and Dauber, 2003; Ensminger and Slusarcick, 1992. Another stream of research emphasizes deficiencies in the organization, structure, and size of American high schools (Lee and Burkam 2003).

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 programs) 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—administrative data on the numbers of enrolled students. Analyses based on administrative data yield more pessimistic accounts of high school 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.

For 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 on-time and 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 the graduation of all the students who move to other school districts, we estimate that only about 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 school district studied here, we contend that the conventional portrait of almost universal high school graduation in the United States is a mirage which assumes that delayed and alternative high school equivalency programs are comparable to regular on time high school graduation.

The other objective of this study is to posit and test a comprehensive model of school attrition that includes background "at risk" characteristics as well as intervening measures of early educational performance. Dropping out is not an event, but a process. Administrative data linked across years allow us to study this process and measure how background factors are mediated by 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. Much of the impact of these characteristics is mediated by signs of poor academic performance as early as the 9th grade. The impact of poor academic performance extends beyond the transmission of risk factors. It seems that many students are just not ready for the expectations and demands of high school. They stumble early in the 9th grade, and very few of them ever recover in time to graduate from high school. The debate over the causes of educational failure—whether it is due to poverty of the family of origin, academic performance, or the structural features of schooling is somewhat artificial, since these factors are highly correlated and comprehensive analyses are necessary to understand the process.

Measuring High School Dropouts and Completion

The measurement of educational attainment in the United States is generally based on retrospective census and survey questions. 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 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 before being interviewed (at age 25-29), this trend represents high school graduation rates for about a 50 year period from the early 1940s to the last decade of the 20th century. High school graduation rose steadily from about 50% in the early 1940s to about 80% plus around 1970, with only modest changes 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 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 the "West Coast metropolitan school district" that is the focus of this study. Figure 2, based on enrollment data (averaged over 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 in this school district 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.

[Figure 2 About Here]

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. Since retained students (and in-transfers) are also reported in the enrollment figures for the 10th, 11th, and 12th grades, the crude estimate of a 50% graduation rate of entering 9th graders is still a reasonable approximation.

Might these figures of only half as many high school seniors as freshman be an aberration? These data are from only one metropolitan school district, which admittedly has an above average high school dropout rate (Bylsma and Ireland 2005). However, national administrative data also show that there are many fewer enrolled seniors than freshmen. In 2002-2003, there were over 4.1 million high school freshmen in public schools, but less than 3 million high school seniors (Hoffman, Sable, Nam, and Grady, 2005: 41). Census data show that there

were between 4.0 and 4.1 million youths in each single year cohort corresponding to this age range (ages 11 to 15 in 2000, see U. S. Census Bureau 2001). The most plausible inference is that about 25% (or about one million youth) of each cohort that begins 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 noted by specialists in educational research (Hauser 1997, Kaufman 2004), but have only recently come to be recognized as a critical issue for the larger policy debate on high school graduation (Mishel and Roy 2006, Orfield 2004, Warren and Halpern-Manners 2006). 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 et. al., 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 earned 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.

Given the time-lag in estimating high school completion with attainment date, Kominski (1990) proposed a simple method to estimate the current dropout rate based on enrollment status. The dropout rate is the number of persons, age 16-19, who were enrolled last year, but are not currently enrolled and have not graduated from high school, divided by the population age 16-19. The dropout rate can be estimated for students for a single year age or for a specific high school grade (dropouts from 10th grade, 11th grade, etc.). Using this method and time series data from the October CPS, Komimski (1990) shows that about 5 percent of high school students drop out each year (rates are slightly higher for black and Hispanic youth). The implied high school completion rate, computed from the grade-specific dropout rates, is about 17%, which is slightly higher than the figures from longitudinal surveys such as NELS (National Educational Longitudinal Surveys), but well below the estimates from administrative data.

The most important factor accounting for the lower estimates of dropouts from survey data (relative to administrative data) is the conflation of high school graduation and high school equivalency certification. When directly asked about GED (or other certification of high school completion), 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 et al.2002:14).[1] 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

[1] GED certificates are underestimates of the numbers of students who complete high school equivalency programs. In our "West Coast metropolitan school district" some students who are counted as enrolled in high school administrative records are former dropouts who are enrolled in high school equivalency programs in local community colleges.

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 16 to 19 year old males were 10% of whites, 16% of blacks, and 13% of Hispanics (U.S Census Bureau 2002: 16-2). Rates were even higher for men in their twenties. Under-enumeration of females was much lower. Although CPS data are weighted to adjust for undercoverage by age, sex and race/ethnicity, the adjusted data rely on the assumption that the characteristics of those not interviewed in each population segment are the same as persons who are interviewed in the same group (Kaufman 2004: 116).

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 et. al. 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 unavailable on survey days because they were absent, reported to be 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 some sort of high school certification—there is an urgent need to measure and understand the process and causes of high school attrition.

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, Alt, and Chapman, 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 (Alexander et al. 2001, Lareau 2003, Rumberger 1983, 1987). Children from

single parent families are at very high risk of educational failure, including high school dropout (McLanahan and Sandefur 1994).

Another important predictor of high school completion is student engagement, which is measured by positive attitudes toward school, regular attendance, paying attention in class, timely completion of assignments, and participation in extra-curricular activities (Alexander, Entwisle, Horsey 1997, McNeal 1995, Rumberger 2004). 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, Goertz, Pollack, and Rock, 1986). Students who are engaged (or who have peers 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).

Sorting out the inter-relationships among the potential causes, correlates, and mechanisms that affect student educational progression through schooling has been a major challenge for researchers. One of the important conceptual leaps in the field has been the formulation of the life course perspective that attempts to measure the events and influences over the span of years from childhood to adolescence (Alexander et. al. 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 begins 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 outcome. 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), educational expectations (Entwistle, Alexander, and Olson, 2004), and parenting style and parental attitudes (Rumberger, Ghatak, Poulus, Ritter, and Dornbusch, 1990; Alexander et al 1997). Changes in family structure can interact with residential mobility and vary by student's age in its effect on the probability of educational failure (Astone and McLanahan 1991, 1994, Alexander et al. 1997, Haveman, Wolfe, and Spaulding, 1991; Sandefur, McLanahan, and Wojtkiewicz, 1992).

The other major challenge for the field has been the lack of integration of risk factors with early educational performance. Educational performance, at all stages of the student's educational career, is highly predictive of dropping out of high school. Poor grades in grade school and middle school, even after controlling for many other risk factors, are one of the strongest predictors of dropping out of high school Alexander et al. 1997, Ekstrom et al. 1986). One of the strongest predictors of high school dropout is grade retention in primary or middle school (Alexander, Entwisle, Dauber, 2003: Chapter 11).

The increased effect of being retained during middle school may be due to an increasing concern during adolescence to "fit in" and to participate in the social aspect of school, such as extracurricular activities and friendships. Retained students may find it hard to be accepted if they are 'over age' for their grade. The combination of a lack of social bonds and the difficulties associated with the transition to high school may lead students to opt out of environments perceived to be unfriendly.

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. Students attending public and central city high schools are much more likely to drop out than students in private schools and schools in suburbs and in smaller places (Bryk and Thum 1989; Hauser, Simmons, and Pager, 2004; Rumberger and Thomas 2000). Students in schools with high percentages of minorities and students 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, do more homework, and were less likely to skip school (Bryk and Thum 1989, Rumberger and Thomas 2000). 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 with few staff problems and where the teachers had positive attitudes towards the student body (Bryk and Thum 1989, Lee and Burkham 2003).

Lee and colleagues have emphasized the potential impact of the size and structure of secondary schools on educational outcomes (Lee and Smith 1995, Lee and Burkham 2003). Students attending larger high schools are more likely to drop out than those in smaller schools, perhaps because large schools tend to be more bureaucratic and impersonal. Larger schools are associated with less contact and rapport between students and teachers (Lee and Burkham 2003). The dearth of high quality teacher-student relationships in larger schools is particularly harmful to at-risk students, as they appear to be more dependent on encouragement and informal guidance from teachers (Cronninger and Lee 2001).

These structural factors of schools may be particularly important for students experiencing the transition from middle school to large and impersonal high school institutions (Roderick 1993, Roderick and Camburn 1999). In most high schools, students must adapt to a larger and more heterogeneous school composition as well as to more teachers with diverse teaching styles. In contrast to middle school, high schools expect more from students – to meet higher academic demands, to be self motivated and organized, and to be able to avoid the risks and temptations from older students. Many young students may not have the skills and maturity to handle the complexity of demands of high school life. A study of 9th graders in Chicago noted that at least 40% failed a course during their first semester of high school (Roderick and Camburn 1999). Academic failure may be the first step leading to disengagement and dropping out of school.

An influential theory suggests that students with high levels of social capital are more likely to have the necessary support to make a successful transition to high school (Coleman 1988). Social capital includes familial resources, such as an engaged parent, or another person in his or her kinship or social network to provide assistance with homework and other problems. 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 responsibilities. (Roderick and Camburn 1999).

Data and Methods

This research literature suggests that it is not just risk factors or school performance that predict high school attrition, but both. Moreover, it is important to track the process of high school failure—how and when background factors affect academic performance and early departure from high school. Linked administrative records provide a novel analytical approach to the study of the process of high school attrition. 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.[2]

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 the complete universe of 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. With enrollment data from all institutions within the district, local transfers (within the school district) do not pose a problem for tracking students from year to year. However, students who transfer out of the school district "exit" from the database and are confounded with dropouts. Short of searching administrative records of other school districts, there is no way to identify transfers from dropouts at the individual level. However, at the aggregate level, we estimate that about 8 to 16% of students who begin the 9th grade have transferred out of the district before high school graduation.

Our estimate of the aggregate out-transfer rate is 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 of students in the school district is fairly steady from year to year, this seems to be a reasonable assumption. On average (over four cohorts), about 8% of each senior class have transferred into the school district during high school (they did not begin 9th grade in the school district). This estimate of 8% is a net figure because it measures only in-transfers who have not dropped out before their senior year.

The second method is to assume that the "true" out-transfer rate is represented by the proportion of students with a GPA of 3.0 who exit from the school district. GPA is measured for

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

the semester immediately prior their exit. This estimate is based on the assumption that relatively few students with a GPA above 3.0 are dropouts. On average (over four cohorts), almost 16% of high achieving (GPA above 3.0) students who began 9th grade exit from the school district before graduation. These indirect estimates suggest that 8 to 16% of the freshmen cohort transfer to another school district before graduation. Since more than half of all freshmen exit the school system, we estimate that 2/3 to 3/4 of students who exit are dropouts, either temporary or permanent.

With the exception of not being able to identify out transfers (from the school district) at the individual level, matched administrative records provide a unique data source to estimate an individual-level longitudinal model of the process of high school completion. We have tracked students for six years after entry into 9th grade and can estimate on time and delayed high school graduation rates. Moreover, with annual data, we can estimate life table probabilities of staying "on track," being retained, or exiting schooling—"the life history" of high school careers.

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 1996 to 1999. 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.

At the micro-level, we are able to measure year to year survival (still enrolled or exited) as well as on time and delayed high school graduation. Given the binary nature of these outcome variables we employ binary logistic regression to examine the effects of the independent variables on the log-likelihood of school progression and high school graduation. 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 mediating and explanatory variables to a baseline model of ascriptive characteristics.

Although missing data are very modest (no more than 4% of any independent variable is missing), we have used stochastic regression methods to impute missing values for the explanatory variables. This method samples from the error distributions in order to maintain the natural variance of each variable and provides a predicted value for the missing data point (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 Life Table Model of High School Progression and Attrition

Figure 3 presents a graphic representation of the educational pathways through high school of 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[3] that entered high school from 1996 to 1999 to their eventual graduation outcome status. With life-table logic, this model traces the "survival" (remaining enrolled, either on track or retained) 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 status (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 summary measure of final 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 majority of non enrolled students are dropouts, but some fraction, perhaps one in four of those exiting the school system may have transferred to another school district (within district transfers are matched). Since we cannot identify transfer students at the individual level, the nonenrolled students are labeled as "exits," not dropouts. Some students who have exited (either as dropouts or transfers) do return as students to the school system, the figures in the top row are "net exits" or former students who are currently not enrolled (and not all those who ever-exited).

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 8% to 16% of the "net exits" transferred and graduated from another school, then perhaps two-thirds (46% + 11% + 12%) of the entry cohort of 9th graders eventually graduated from high school. This figure is roughly comparable to national estimates based on administrative records.

Student retention and student exits are evident at every stage of the schooling 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%

[3] First time 9th graders are students that are in 9th grade for the first time. This population excludes students who were enrolled in 9th grade the previous year. For students that transferred into the school district for 9th grade, we were unable to verify that they were first time 9th graders.

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 (35% of expected 10th graders, 41% of expected 11th graders, and 34% of expected 12th graders). 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 to re-enter the schools, most likely behind their expected grade level. A few rare students leave the school system and return to on-time status (about 1%).

If students remain on track for four years, then the odds are more than 90% that they will graduate in four years. About 51 percent of the cohort reaches their senior year on time, and 92% of on-time seniors are on-time graduates. About one-quarter of students in each cohort will experience grade retention sometime during their high school career, and less than half of these students make it to their senior year. 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 is exceedingly complex and represents many possibilities for causal analysis. In Table 1, we summarize the basic patterns of enrollment and graduation (akin to life table measures of survival or l_0) for the 6 years after entering 9th grade.

[Table 1 about Here]

The first row identifies enrollment status in the spring of the first year (of their freshman year). At this point, 93% of the entering cohort of 9th graders is still enrolled, and by definition, all enrolled students are on track. By the spring of the second year, only 81% of the original cohort was still in school, and only 67% were classified as 10th graders—the balance of 14% had been retained in the 9th grade. In the spring of the 3rd year, only 70% of the cohort remained in school, which include 16% who were classified below their expected grade level. Only a little over half of the cohort was on track as high school juniors.

By the spring of what should have been the senior year (the 4th year after entering 9th grade), another 10% of the cohort had exited school. Of the remaining 60%, 1 percent had graduated, 49% were on track as seniors, and 10% was classified as juniors or lower. Five years after entering 9th grade, half of the students had graduated and 4 percent was still enrolled. After six years, the graduate number increased by one percent, and 2 percent was still enrolled.

The life table approach also allows for estimation of annual exit rates (akin to probabilities of mortality or q_x values). These rates are shown the first column of Table 2, which contains the probabilities of exiting from school (non-enrollment) for each year, conditional on survival (still enrolled) to the prior year.

[Table 2 about Here]

During the first year of high school, about 7% of the enrolled students exit—have disappeared from school data base. During each of the next three years, about 14-16% of still enrolled students will leave school (mostly dropout) annually. The risk of "mortality" varies by the enrollment status of student. The third column shows the exit probabilities for "never retained students", those who are promoted to the next highest grade each year and who entered 9th grade before their 15th birthday. We assume that students who entered 9th grade after their 15th birthday had been retained in primary or middle school. These previously retained students have higher exit rates—generally double those of never retained students.

The balance of Table 2 shows the conditional exit rates for each year (after entering 9th grade) for students retained during high school by the year of their first retention (excluding those retained prior to high school). Since a student is only retained at the end of the year (even if the signs of failure were evident during the year), we can only estimate the impact of retention on the year following retention. Thus, non promotion to 10th grade (retention in the 9th grade) can only be measured for students in year 2 after entering 9th grade and the impact on exit can only be measured for the following period—from the 2nd to the 3rd year after entering 9th grade. This lag in measurement leads to an underestimate of effect of retention on exit. For example, the risk of exiting among students who drop out in the same year as they were retained is attributed to the column of "never retained" students. This bias narrows the gap between the reported exit rates of never-retained and retained students. Even with this bias, the exit rates of those who are first retained in high school is three or four times those of never retained students. Annual exit rates of 30 percent or more for students who fail 9th or 10th grade mean it is very unlikely that such students will ever graduate from high school. The probability of exiting among students still enrolled 5 or 6 years after entering 9th grade (the probability of delayed graduation) for those who fail their junior or senior years is even bleaker.

Four Year Graduation Rates

In the balance of the paper, we model educational outcomes with a primary focus on "on time graduation," which represents the probability that a student entering 9th grade will graduate four years later.[4] 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 every years 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 a 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.

Measures of delayed high school graduation are also computed for 5 and 6 years after entering 9th grade. 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.

[4] In this measure, a relatively small number of "out transfers" are confounded with dropouts.

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.[5]

Basic Descriptive Patterns

The analysis is based on the administrative records of almost 9,000 students, who were enrolled as first-time 9th graders in a West Coast metropolitan school district from 1996 to 1999. The first column in Table 3 shows summary measures—largely in the form of percentages—of 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.

Four educational outcomes are presented in Table 3. 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 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 8 to 16 percent of each cohort transferred to another school district, and some, but not all, graduated from high school.

[Table 3 about Here]

But even with these generous assumptions, we estimate that less than 65 percent of students who began 9th grade graduate from high school. There will also be some (perhaps 10% of the cohort) who will obtain a GED or complete a high school equivalency program through a community college or alternative educational program. Our initial analysis is focused on graduation within 4 years after entering 9th grade.

The balance of Table 3 shows the descriptive statistics for the independent variables in our analysis. Social, ethnic, and economic diversity are characteristic features of this school district. 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% 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

[5] 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.

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.

Drawing on prior research on the transition to high school we have identified several measures to represent the conditions or experiences in the 9th grade that 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 et. al. 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 only one-third of these students were in all (or mostly) special education classes. These figures on special education students corresponds very closely to national data, which show that about 12% of public school students have an individualized educational plan (IEP) that makes them eligible for special education services (Ingles and Quinn 1996: 2). 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.[6] The balance of the students—about 70%— are in a traditional curriculum as evidenced by their enrollment in a regular 9th grade 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 4, which shows the percentage point differences

[6] About 3 to 6% of students nationally are classified as limited English proficient (LEP), see Ingles and Quinn 1996: (2).

across social origin categories for the educational outcomes, "Four-Year Graduation" and "Six-Year Graduation"[7].

[Table 4 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.[8] 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 4 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 prone to experience geographic mobility, differential placement in school tracks, or below average academic performance, the links between social origins and the processes of educational stratification are revealed. Students who transfer into the school district at ninth grade are 22 percentage points less likely to graduate in four years than students who were enrolled in the school district the previous year. 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 who 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 been doing poorly in school. Failing one or more classes in the first semester of high school (indexed here by having a GPA below 1.0) resembles a death sentence in terms of high school graduation. Although some students with very poor grades 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.

[7] Although not included, we estimated the bivariate relationship between the social and economic characteristics in table 4 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 4.

[8] The lower likelihood of American Indian students graduating 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).

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 On-Time High School Graduation

The multivariate analyses, presented in Table 5, assume that high school graduation is a product of exogenous "risk factors" and intervening school experiences. Table 5 presents the results from a series of logistic regressions of "on time" graduation in four years. Models were also run for delayed high school graduation, and the results are broadly similar to those presented here.

[Table 5 about 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, measured here as 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. The transfer students reflect family geographic mobility as well as students who shift from nearby local private or other public school districts. As noted in the review of the literature, mobility is a potential risk factor, depending on the family resources and support. In addition to mediating the observed ethnic disparities, measured in Model 1, the additional variables added in Model 2 may have direct or independent effects on educational outcomes.

In the third model, two 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 mean GPA from the first semester of the 9th grade is added as a covariate. The model shows how much of the effects 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 block of variables.

Gender has a strong and significant effect that is entirely mediated by early schooling experiences and early high school grades, perhaps reflecting differences in behavior such as attentiveness and completion of assignments. 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 differential socialization or differences in maturation. As observed in Table 5, race/ethnicity is strongly associated with high school graduation. The baseline model (1) in Table 5, 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 most of the observed black-white disparity in on time graduation rates and about one third of the gap faced by Hispanic and American Indian/Pacific Islander students. Socioeconomic inequality, which is only partially measured by these variables, is an important reason for race/ethnic differentials in high school completion (Hauser et al. 2004). The observed advantage of Asian American students (relative to whites), however, is increased in Model 2, when socioeconomic and neighborhood characteristics are held controlled. This finding shows that it is possible that other factors (not measured here) can compensate for disadvantaged origins.

The inclusion of early educational experiences and 9th GPA in Models 3 and 4, reveals interesting insights into the mechanisms of race/ethnic differentials in high school graduation rates. The higher graduation rates of Asian Americans and lower graduation rates of American Indian/Pacific Islander students are completely mediated by early schooling experiences. These patterns do not explain the ultimate reasons for success in schooling, but they do tell us that the reasons for differential high school completion are the same as those that would explain differences in high school grades (which can be identified as early as 9th grade). 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. Hispanic students face additional obstacles to the completion of high school, above and beyond those of getting good grades.

The most complex finding is that African American students would be more likely to graduate from high school if they had comparable grades to white students. One interpretation of this finding is that African American students, who have below average graduation rates, have even lower average GPAs in the 9th grade. Some African American students appear to be able to bounce back from these low grades and make it through high school.

Measures of family resources, including income, neighborhood in which student lives, and transfer status, have significant and persistent effects on high school graduation. These effects are only slightly mediated through early schooling experiences and by 9th grade school marks. 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 areas. Transfer status has a very strong negative effect, which is not mediated by 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. 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, primarily because of their higher grades.

As important as these background factors are, their impact on high school graduation is dwarfed by the impact of early high school grades. The inclusion of GPA in the last model doubles the pseudo-R squared 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.

There are two possible interpretations of the huge impact of 9th grade GPA on high school graduation. The most straightforward interpretation is that 9th grade GPA is simply a measure of low academic ability or performance. Poor grades at any prior stage of schooling might show the same phenomenon—low performing students are less likely to make it through high school. The second interpretation is the transition to high school (entering 9th grade) is a shock for many students who are not ready for the independence and maturity expected in high schools, relative to middle schools. To test between these interpretations, we substituted 8th grade GPA for 9th grade into Model 4 of Table 5, and then ran an additional model with 9th grade GPA included in a saturated model with 8th grade GPA.[9] The results strongly support the second interpretation. Although 8th grade GPA is an important predictor of high school graduation (and is highly correlated with 9th grade GPA), the change in GPA on entering high school is the single most important predictor of high school graduation (or dropout).

Additional Multivariate Models of High School Progression

Four year high school graduation is the culmination of continued progress from grade 9 to grade 12. There may be differential risks over the high school career. Some students may encounter major problems in the transition to high school in grades 9 and 10, while other students may encounter greater risks and potential diversions from their continued schooling at grades 11 and 12. To evaluate whether the results of the multivariate model presented in Table 5 can be generalized to each stage of the educational ladder, Tables 6 and 7 present a replication of the multivariate models on five educational transitions: (1) Still enrolled in the spring of year 1 of students who entered 9th grade, (2) Still enrolled in the spring of year 2 of students who were enrolled in the spring of year 1, (3) Still enrolled in the spring of year 3 of students who were

[9] This analysis could only be estimated for the subset of the sample that were enrolled in the school district in 8th grade (excluding in-transfers). The full results are not presented here, but available on request from the authors.

enrolled in the spring of year 2, (4) Still enrolled in the spring of year 4 of students who were enrolled in the spring of year 3, and (5) Graduation of students who were enrolled in the spring of year 4. These outcomes are educational continuation ratios or conditional probabilities generated from the preceding life table analysis. Table 6 shows the results of Model 2 (as in Table 5) that contains the exogenous variables of gender, race/ethnicity, poverty, neighborhood, and transfer status. Table 7 shows results of Model 4, which adds the three educational performance variables of prior retention, 9th grade English class placement, and 9th grade first semester GPA.

[Tables 6 and 7 about Here]

Recall that Table 5 showed that male students were less likely to graduate in four years than female students because of differential school performance, primarily GPA. The multivariate analyses of the education transition rates in Tables 6 and 7, show a much more complex gender pattern of educational progression through high school. Girls are less likely to continue enrollment in 9th and 10th grades than boys, but this pattern is only evident when all other determinants, including school performance, are held constant in Table 7. Teenage boys, on the other hand, experience problems of continuation through grades 11 and 12 and to graduation. The male deficit is largely explicable because of differential school performance. The problem of males (relative to females) continuing through high school is not centered on the transition to high school, but in slipping behind (or out) during the latter years of high school.

This Hispanic educational problem is also clarified in Tables 6 and 7. Hispanics are less likely (than whites) to continue through the early years of high school, but this is largely due to academic difficulties. If Hispanic students were able to catch up academically (GPA, placement), they would be no more likely to drop out. However, Hispanic students who are enrolled for four years are much less likely to graduate from high school. This final Hispanic-white gap is not explained by any of the educational performance variables measured here. American Indian and Pacific Islander students also experience low rates of educational progression at all levels, especially at years 1, 2, and 3. This ethnic gap disadvantage is largely mediated by lower rates of academic achievement.

African American students are less likely to make it though high school than whites but this is primarily due to socioeconomic status and family factors (Table 5). When these factors are adjusted to population levels, African American students progress through high school at comparable levels to whites (Table 6). Table 7 shows the resilience of African American students who are able to persevere and graduate from high school in spite of academic difficulties (GPA) that would handicap other students. Asian American students are less likely to dropout of high school than whites at each year of high school. This advantage is entirely explained by the school performance variables measured here.

Students from households in poverty and who live in impoverished neighborhoods are much less likely to make it through high school, though the results on neighborhoods rarely rise to the level of statistical significance. The patterns from Tables 6 and 7 are consistent with those from Table 5. This high risk of educational failure associated with poverty is generally mediated by educational performance. Transfer students also have problems remaining in school in most years, including graduation. This handicap is, however, not due to problems of academic

achievement. Perhaps transfer students are less engaged in school and school activities. Transfer status is not a random variable, but may be associated with other problems that may make it more difficult for students to have a successful high school experience.

Students who experienced a prior retention in primary or middle school (indexed by age at entry into high school) continue to have higher risks of school dropout throughout each year of high school that is not mediated by academic performance. Yet, strangely this risk is reversed at the transition to graduation. Since most of these retained students have already left school within four years, the reversal may be due to some selection process among the very few students remaining at this stage.

The students who were placed into advanced English classes in their freshman year continue to be less likely to drop out at each stage of the educational ladder. Most strikingly, they are 3 times more likely to graduate from high school after 4 years of high school than are students who were placed in regular English classes.

Special education students continue to progress through high school each year until it comes to graduation. They are 75% less likely to graduate after 4 years of high school than students in regular 9th grade English classes. Their likelihood of graduation improves after 6 years of high school (results not show here), but there is still a substantial gap. It is interesting and important to note that ESL status is not associated with a higher risk of dropping out at any stage of high school. Indeed, ESL students are more likely to graduate after four years of high school than other students.

In Table 7, as in Table 5, the single most powerful predictor of high school progression in 9th grade is first semester GPA. The strength of early grades is evident in the magnitude of the effect as well as in the sharp jump in (pseudo) R-squared in the final model. We repeated the additional analyses reported earlier to test whether 8th grade GPA would work just as well as 9th grade GPA in terms of predicting survival through high school. As before, the evidence points to the high level of failure on entering 9th grade rather than just low academic ability or performance (indexed by 8th grade GPA) as the primary cause of high school attrition at each level.

We also conducted additional analyses to see if current GPA (or academic failure) might be a better predictor of dropping out the following year than 9th grade GPA. We found that the impact of 9th grade first semester GPA on continuation through each year of high school and to high school graduation is comparable to the GPA measured during the immediate prior year (analyses not shown here). This means the impact of early failure continues to affect students years later.

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 to 75% of adolescents achieve “on time “graduation from high schools. Our study found that less than 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 69%. This school district undoubtedly has an above average dropout rate, but we believe that the portrait of high school attrition presented here is similar to many other metropolitan school districts in the United States.

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 surprisingly high fraction of students drop out 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 reinforces 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 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 are 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 only 1 in 5 students who fail a class will graduate after 6 years (analysis not shown here). 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 the 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, but the odds are against it.

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Table 1. Proportions by Enrollment Status of All First Time 9th Graders by Years Since Entering 9th Grade for 4 Cohorts of 9th Graders (1996 to 1999)

		Enrollment Status		
Spring of:	All Enroll/Graduated	Graduated	On Track	Retained
Year 1	.93	.00	.93	na
Year 2	.81	.00	.67	.14
Year 3	.70	.00	.54	.16
Year 4	.60	.01	.49	.10
Year 5	.54	.50	.00	.04
Year 6	.52	.51	.00	.01

Table 2. Conditional Probability of "Exit" of Enrolled Students by Years Since 9th Grade, 9th Grade Given Survival to that Year for 4 Cohorts of 9th Graders (1996 to 1999)

			Year of First Retention				
Spring of:	All Enrolled Students	Never Retained	Prior/MS	Year 1	Year 2	Year 3	Year 4
Year 1	.07	.06	.13	X	X	X	X
Year 2	.14	.13	.19	X	X	X	X
Year 3	.16	.10	.23	.29	X	X	X
Year 4	.16	.08	.21	.37	.35	X	X
Year 5	.11	.03	.11	.29	.35	.54	X
Year 6	.04	.00	.04	.17	.18	.31	.60

Note: Students that exited and later returned to school were not included in the estimation of conditional probabilities for the first year that they re-enrolled. Most of these students returned to school at a lower grade level. For this reason, the probabilities in this table vary slightly from those in figure 3.

Table 3. 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 3 (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 4. Social and Economic Characteristics for 9th Graders by Graduating From High School in Four or Six years.		
Independent Variables[B]	**Percent Graduating in Four Years**	**Percent Graduating in Six Years [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 4 (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 5. 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 5 (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 6. Odds-Ratios from Logistic Regressions of Social and Economic Characteristics on School Enrollment (1 is enrolled) with Robust Standard Errors.

	Enrolled Year 1		Enrolled Year 2		Enrolled Year 3		Enrolled Year 4		Graduated Year 4	
Independent Variables [A]	e^{β}	p-value	e^{β}	p-value	e^{β}	p-value	e^{β}	p-value	e^{β}	p-value
Risk Factors: GENDER										
Female	.92	.36	1.03	.68	1.19	.01	1.45	.00	1.52	.00
Male	--	--	--	--	--	--	--	--	--	--
RACE/ETHNICITY										
Hispanic	.56	.00	.84	.23	.73	.03	1.17	.37	.53	.00
African American	.99	.93	1.07	.45	.86	.12	1.03	.77	.91	.31
Asian	1.40	.03	1.52	.00	1.55	.00	1.24	.06	1.37	.00
American Indian/ Pac Isl.	.48	.00	.54	.00	.63	.04	.68	.10	.84	.46
White	--	--	--	--	--	--	--	--	--	--
FAMILY INCOME										
Less than or 185% of the poverty level	.90	.29	.76	.00	.75	.00	.74	.00	.70	.00
Greater than 185% of the poverty level	--	--	--	--	--	--	--	--	--	--
NEIGHBORHOOD [b]										
90th Percentile	5.83	.09	.86	.62	1.51	.26	1.25	.47	1.58	.15
75th Percentile	.80	.61	1.02	.96	.79	.39	1.80	.07	1.01	.96
50th Percentile (Median)	--	--	--	--	--	--	--	--	--	--
25th Percentile	.41	.01	.88	.59	.63	.06	.81	.38	.83	.46
10th Percentile	.74	.49	.74	.27	.92	.79	1.07	.82	.55	.03
TRANSFERRED SCHOOLS										
Transferred into district for 9th	.40	.00	.60	.00	.87	.17	1.15	.22	.33	.00
Did not transfer into district	--	--	--	--	--	--	--	--	--	--
R-Squared	.16		.12		.03		.04		.07	
Sample Size	8948		8302		7239		6326		5476	

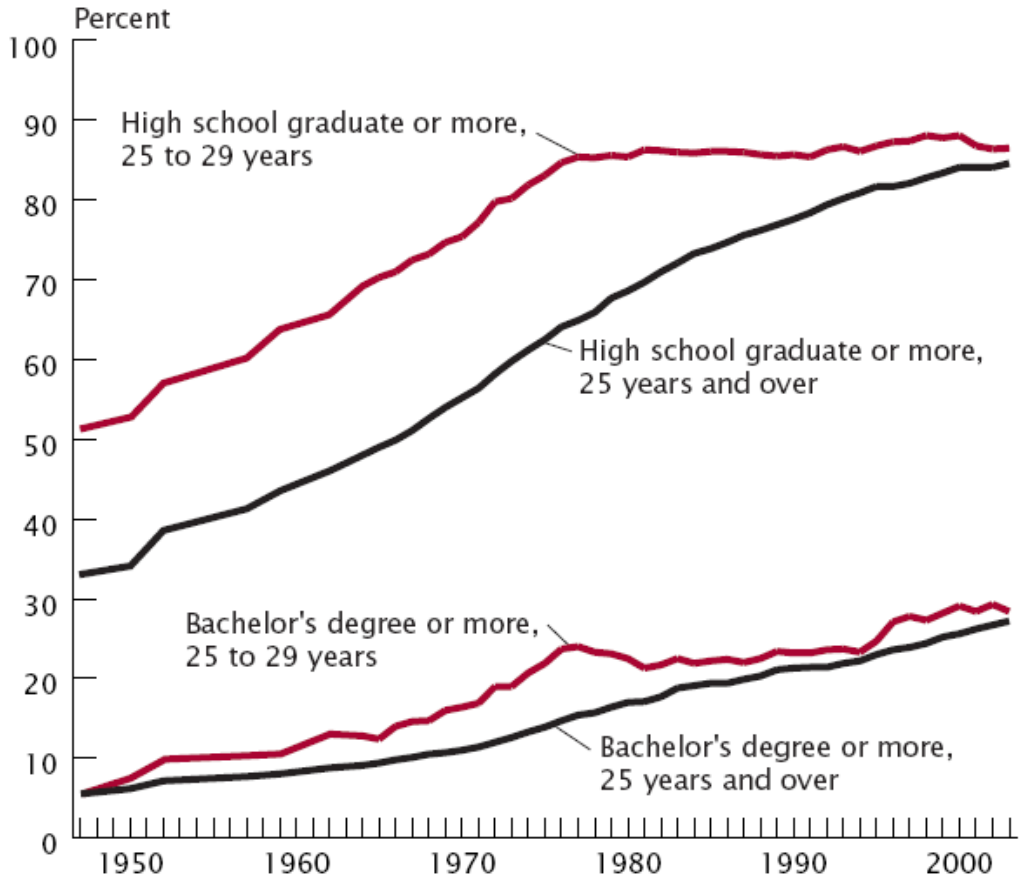
Table 7. Odds-Ratios from Logistic Regressions of Social and Economic Characteristics on School Enrollment (1 is enrolled) with Robust Standard Errors.

	Enrolled Year 1		Enrolled Year 2		Enrolled Year 3		Enrolled Year 4		Graduated Year 4	
Independent Variables [A]	e^{β}	p-value	e^{β}	p-value	e^{β}	p-value	e^{β}	p-value	e^{β}	p-value
Risk Factors:										
GENDER										
Female	.76	.01	.83	.01	.94	.37	1.11	.18	1.24	.00
Male	--	--	--	--	--	--	--	--	--	--
RACE/ETHNICITY										
Hispanic	.71	.06	.97	.85	.86	.35	1.58	.02	.62	.01
African American	1.18	.20	1.30	.01	1.05	.64	1.36	.00	1.31	.01
Asian	1.15	.39	1.21	.10	1.22	.11	.90	.38	.94	.61
American Indian/ Pac Isl.	.70	.13	.67	.06	.80	.37	.91	.72	1.35	.34
White	--	--	--	--	--	--	--	--	--	--
FAMILY INCOME										
Less than or 185% of the poverty level	.96	.70	.87	.09	.87	.09	.90	.22	.87	.09
Greater than 185% of the poverty level	--	--	--	--	--	--	--	--	--	--
NEIGHBORHOOD [b]										
90th Percentile	4.72	.15	.77	.39	1.26	.55	1.03	.94	1.23	.56
75th Percentile	.66	.35	.90	.74	.68	.18	1.44	.30	.86	.63
50th Percentile (Median)	--	--	--	--	--	--	--	--	--	--
25th Percentile	.50	.05	1.02	.92	.75	.26	.87	.61	.98	.93
10th Percentile	.75	.55	.72	.26	.85	.63	.93	.84	.46	.02
TRANSFERRED SCHOOLS										
Transferred into district for 9th	.38	.00	.51	.00	.71	.00	.86	.23	.21	.00
Did not transfer into district	--	--	--	--	--	--	--	--	--	--

Educational Experiences										
PRIOR GRADE RETENTION										
Retained: 1st to 8th grade	.65	.00	.72	.00	.61	.00	.73	.00	1.39	.00
Never Retained	--	--	--	--	--	--	--	--	--	--
9th GRADE CLASS TYPE										
College bound classes	1.20	.37	1.52	.00	1.48	.00	1.76	.00	3.37	.00
Special education: full time	1.20	.48	.86	.45	1.47	.13	.90	.66	.27	.00
Special education: part time	1.20	.28	1.02	.88	1.03	.80	.79	.08	.97	.85
ESL Student	.65	.12	.93	.75	.90	.63	.86	.57	1.76	.02
Traditional Curriculum	--	--	--	--	--	--	--	--	--	--
9th GRADE GPA										
GPA less than 1.0	.09	.00	.14	.00	.09	.00	.06	.00	.04	.00
GPA 1.0 to 1.99	.37	.00	.34	.00	.23	.00	.15	.00	.16	.00
GPA 2.0 to 2.99	.74	.10	.66	.00	.51	.00	.35	.00	.54	.00
GPA 3.0 to 4.0	--	--	--	--	--	--	--	--	--	--
Took only Pass/Fail classes	.07	.00	.26	.00	.14	.00	.17	.00	.23	.00
R-Squared	.27		.19		.13		.17		.23	
Sample Size	8948		8302		7239		6329		5476	

Figure 1.

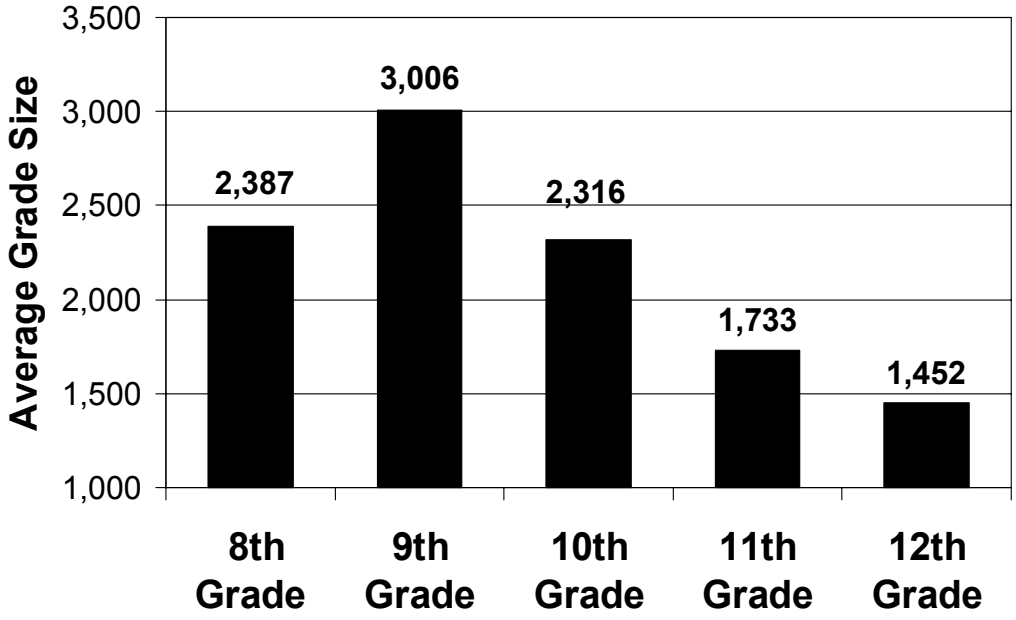
Educational Attainment of the Population 25 Years and Over by Age: 1947 to 2003



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

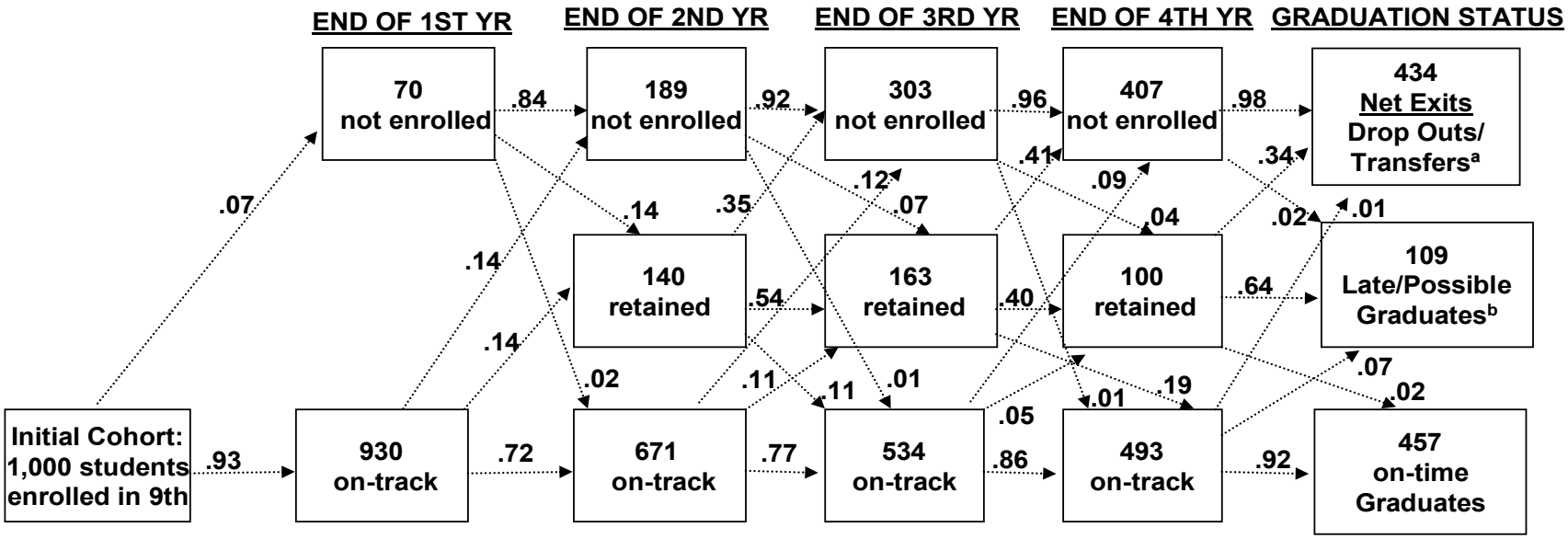
Figure 2. Students enrolled, by Grade Level: Averages for Academic Years from 1997-98 to 2004-05.



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.

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.