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ABSTRACT

This paper suggests that students' opportunities to learn may b. stratified both between and within schools. Schools serving a more affluent and able clientele may offer more rigorous and enriched programs of study, and students in college preparatory curricular programs may have greater access to advanced courses within schools. This notion is tested with a longitudinal, nationally representative sample of public school students from the High School and Beyond data set. The results show few effects of school composition and offerings between schools, but important within-school influences of curricular tracking and course taking. In most cases, the difference in achievement between tracks exceeds the gap between students in school and dropouts, suggesting that students' choice of courses in school may be even more important for the development of cognitive skills than whether one is in school or not. References and 10 data tables are included. (Author/TE)

THE STRATIFICATION OF HIGH SCHOOL LEARNING OPPORTUNITIES*

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ABSTRACT

This paper suggests that students' opportunities to learn may be stratified both between and within schools: schools serving a more affluent and able clientele may offer more rigorous and enriched programs of study; and students in college-preparatory curricular programs may have greater access to advanced courses within schools. This notion is tested with a longitudinal, nationally-representative sample of public-school students from High School and Beyond. The results show few between-school effects of school composition and offerings, but important within-school influences of curricular tracking and coursetaking. In most cases, the difference in achievement between tracks exceeds the gap between students in school and dropouts, suggesting that where one is in school is even more important for the development of cognitive skills than whether one is in school or not.

THE STRATIFICATION
OF HIGH SCHOOL LEARNING OPPORTUNITIES

How do high schools structure learning opportunities for their students? What prompts or enables students to take advantage of opportunities? And what effects do opportunities such as curricular programs and instructional experiences have on student achievement? Despite a fair amount of research on these questions, writers do not agree about the answers. One area of particular disagreement concerns high school tracking, the procedure of dividing students into curricular programs according to their purported interests and talents. Originally researchers assumed that students in college-preparatory tracks learned more than students in other programs, an advantage that derived both from the fact that their achievement was greater at the start, and from better school experiences that appeared to be associated with their track position. Research seemed to bear out this notion (Schafer and Olexa, 1971; Heyns, 1974; Alexander and McDill, 1976; Alexander, Cook, and McDill, 1978; Rehberg and Rosenthal, 1978). But others did not concur, and some of the first set of authors changed their minds when better controls for prior ability were utilized (Jencks and Brown, 1975; Alexander and Cook, 1982).

Although there is disagreement about its effects, it appears that one way secondary schools structure opportunities is by allocating students to separate tracks, and providing courses, textbooks, and other resources that vary by curricular program. In this system, opportunities are stratified within schools. But opportunities may also be stratified between schools, if some schools allow more students to enter a rigorous program, or provide more advanced academic courses, and especially if such differences are tied to school achievement or socioeconomic levels. While there is little evidence that differences between schools have much influence on individual achievement (see Averch et al., 1972 for a comprehensive review of this literature; for a dissenting opinion see Brookover et al., 1979), researchers have not focused on this sort of between-school difference: variation in the provision of opportunities for students to learn. In this paper I will examine the allocation of learning opportunities as it differs between as well as within schools. In both cases I will be concerned with discovering whether such variation exists, and whether it influences the achievement of individual students.

Opportunity to Learn

It seems obvious that students can learn only if they are exposed to the material being tested; and that the more time they spend with and the more intensively they cover the material, the more of it they will learn. But it is only recently that researchers have begun to consider opportunities to learn a critical constraint on the production of school achievement. Much of this work has been done at the elementary-school level: research on the allocation of time suggests that students learn more when they are given more instructional time (Bloom, 1976; Harnischfeger and Wiley, 1976; Gamoran and Dreeben, 1985; for reviews and criticism, see Fisher and Berliner, 1985); they learn more when in school than when school is not in session (Heyns, 1978); and students who are taken farther in the curricular materials learn more than others, even when their initial achievement levels are held constant (Barr and Dreeben, 1983; Rowan and Miracle, 1983; Gamoran, 1984).

This line of research has been extended to the secondary level as well. Sociologists have proposed general models of school achievement that incorporate learning opportunities as key variables (Wiley and Harnischfeger, 1974; Sørensen and Hallinan, 1977). In addition, Alexander and his colleagues have examined the impact of enrolling in academic courses on high school achievement. Alexander and Cook (1982) found that coursework explained little of the effect of tracking on achievement, which they described as small to begin with once prior ability had been properly controlled. On the other hand, Alexander and Pallas (1984) found that achievement could be improved if students took a core curriculum of academic courses, at least for B-average students or better.

Certainly prior research gives us reason to believe that learning opportunities vary within high schools, and perhaps between them as well. In a case study of a working-class high school, Rosenbaum (1976) found that teachers spent more time preparing and used more interesting material when teaching college-bound students. Other case studies in England and the U.S. have shown that when students are divided into tracks, streams, or ability levels, they are exposed to different curricula by teachers who are more interested and enthusiastic with higher-track students (Lacey, 1970; Ball, 1981; Finley, 1984; Guthrie and Leventhal, 1985). Moreover, Oakes' (1985) work suggests that such differences occur systematically across American high schools. Studying 25 middle and high schools, she found a variety of instructional differences between high- and low-track classes. Students in high-track English classes were more likely to read classic literature and write essays, for example; students in high-track mathematics classes were more likely to cover the ideas behind operations instead of simply drilling on computation.

Despite these within-school, between-track differences in instructional experiences, researchers at the secondary level have not established a clear empirical link between exposure to instruction and learning. The case studies would have been unable to do so because their focus on one or two schools precludes distinguishing between instructional and other effects of tracking. While such analyses may be possible with Oakes' (1985) data, they have not been carried out.

The only work to connect prior achievement, school experiences, and learning is that of Alexander and others. While they found effects of coursework in one paper (Alexander and Pallas, 1984), these effects were not linked to tracking (see further Alexander and Cook, 1982), so it is not clear that the important coursework differences occurred within schools--they may have occurred <u>between</u> them. In contrast to the many case studies that describe within-school differences in student experiences, we have little information on how experiences vary across schools. Hanson (1985) and Guthrie and Leventhal (1985) found that the curriculum for college-preparatory students is not the same in different schools, even in the same district. Whether such curricular differences are tied to variation in learning is not known.

In sum, although we have good reason to believe that students in different tracks encounter varied instructional experiences, we have yet to establish that these opportunities for learning exert significant effects on student achievement. And we know little about how curricula and teaching vary between schools, although it is possible that they do, and that such variation produces between-school differences in learning. (We know more about the upper bound of this effect: because achievement varies far less between schools than within them, we know that between-school curricular differences could at most account for a small portion of individual variation in learning.)

The Effects of Schools and Schooling

The perspective guiding this research is one that has developed in response to the well-known findings of the "school effects" literature, that variation in average school characteristics had little impact on variation in individual learning when individual background characteristics were controlled (e.g., Coleman et al., 1966; Jencks et al., 1972; for a review see Averch et al., 1972). More recent authors have advocated distinguishing between the effects of *schools*, which provide a context for instruction, and those of *schooling*, the instructional processes occurring in schools that contribute to learning (Bidwell and Kasarda, 1980). This perspective suggests, first, that between-school differences in learning will be more readily explained by the experiences that students actually undergo, than by the average levels of resources in a school, which students may or may not encounter personally (see further Barr and Dreeben, 1977, 1983). But given that student achievement varies within far more than between schools, a more valuable contribution of this perspective is in pointing toward examination of differences in student experiences that occur inside schools (Heyns, 1974; Summers and Wolfe, 1974, 1977; Brown and Saks, 1975, 1980; Murnane, 1975; Alexander and Cook, 1982; Barr and Dreeben, 1983; Rowan and Miracle, 1983; Gamoran, 1984). These differences include the opportunities that students have for learning, as well as how students actually make use of those opportunities.

Why has prior sociological research concentrated much more on between-school than on within-school effects? In part, this focus is the result of a mistaken belief that only between-school effects have useful policy implications: in order to improve schools, we need to know what makes some schools more successful than others. But within-school differences may have policy implications as well. If some subsets of schools (e.g., curricular tracks, classrooms) are found to produce higher achievement than others, then educators can be urged to modify other areas within schools in the direction of the more successful subunits. Within-school effects are particularly likely to appear if we examine not just the availability of opportunities, but how students experience them; not only the resources of schools, but the processes of schooling.

As is well known, only about 15-20% of the variation in student achievement typically lies between schools; the rest lies within (Jencks et al., 1972). Still, if one could discover school-level opportunities that account for even a portion of the between-school variation in individual achievement, one would have discovered a potentially useful mechanism for raising achievement scores (for similar comments at the elementary level, see Rowan, Bossert, and Dwyer, 1983). But even if between-school variation cannot be accounted for by systematic differences in opportunities, the discovery of within-school effects would still have important policy implications. Thus, both between-school and within-school influences on achievement have practical as well as theoretical significance.

A Conceptual Model of the Distribution of Learning Opportunities

School systems can be viewed as a series of nested organizational layers, where the decisions made at one level constrain the conditions and processes at the next (Barr and Dreeben, 1977, 1983). In this conception, opportunities made available by the school--for example, offering advanced placement science courses--set the bounds for student experiences. Whether or not students take advantage of opportunities is thus contingent on availability at the school level, as well as on being or perceiving oneself to be in a track level where that opportunity is appropriate, and on actually deciding or being told to grasp the opportunity that is at hand. Track position may itself be viewed as an opportunity, as well as a location where further opportunities exist (such as advanced academic courses).

This perspective leads to a conceptual model of schools and schooling that considers opportunities at a variety of organizational levels, but especially at the level of the school and the curricular track. Examining the effects of schools and tracks is one way of observing effects that occur between and within schools. But we can get even closer to the individual learner than the curricular track by observing within-track differences, such as variation in the courses in which students enroll.

To say that learning opportunities are not simply differentiated, but stratified, implies that they are ordered hierarchically. It is not difficult to make this case for tracking; writers agree that tracking is an instance of vertical differentiation where positions in the college track carry both higher status and greater opportunities than other track locations (Heyns, 1974; Alexander, Cook, and McDill, 1978; Rosenbaum, 1980a, 1984).[1] But how can opportunities that vary between schools be viewed as stratified? I will argue that opportunities are stratified between schools as well as within them if the availability of opportunities corresponds to characteristics of school populations. Schools whose students are white, middle-class, and relatively high achieving may offer more chances for enriched and rigorous academic experiences. This is a type of between-school effect that has not been examined in the past; it does not focus on general resources, but on the availability of opportunities such as track positions and course offerings. To the extent that such opportunities are tied to the characteristics of the school's student body, I consider them to be stratified in society.

Discovering the existence of such opportunities will not be enough, however; if they affect student learning they must be traced to learning through their impact on student experiences. This means that I am not interested so much in the direct effects of school conditions on student outcomes as in their total effects, which I expect to operate indirectly, mediated by their impact on student

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[1] There is less agreement about status differences between general and vocational tracks. For this reason, researchers generally group them together for analysis (Heyns, 1974; Alexander and McDill, 1976; Alexander, Cook, and McDill, 1978; Alexander and Cook, 1982).

experiences (Alwin, 1976). Figure 1 displays a conceptual model of how learning opportunities vary between schools, how they are made available to students within schools, how students take advantage of opportunities and are affected by them.

Four types of effects are evident in Figure 1. The first is **background effects.** As researchers know, the strongest predictor of subsequent achievement is prior achievement (Lavin, 1965); in addition, ascribed characteristics such as gender, socioeconomic status, race, and ethnicity are known to affect achievement (e.g., Coleman et al., 1966). Background effects, indicated by (a) on two paths in Figure 1, may influence achievement indirectly as well, through their influence on student experiences.

A second type of constraint on achievement is the influence of the school's **setting**, such as its location in an urban, suburban, or rural area, and in a particular region in the country. While the school setting may appear to have direct effects, I expect its impact to occur indirectly, by influencing school offerings and perhaps the use students make of the available opportunities (paths indicated by [b]).

In terms of this paper's focus, however, background and setting effects are of less interest than the effects of schools and schooling. I will consider two sorts of **school effects:** the influence of school composition on programmatic offerings, student experiences, and achievement, and the impact of offerings on experiences and achievement. The total effects of school conditions are those that run through the intervening variables; although direct effects on achievement are included in Figure 1, I am most interested in the indirect effects. Researchers have recently suggested that a school's SES, racial, and ethnic composition affects the availability of track positions (Jones, Vanfossen, and Spade, 1985), and that students are more likely to be enrolled in an academic track in schools where more "vacancies" are available, even after their own achievement levels have been taken into account (Jones, Vanfossen, and Spade, 1985; Sørensen, 1985; see also Hallinan and Sørensen, 1983, for a discussion of "vacancy competition" in schools). Because this paper use the same data as Jones, Vanfossen, and Spade's (1985) and Sørensen's (1985), it cannot be regarded as testing their hypotheses, but it elaborates the conceptual model by tracing the effects of schools through student experiences to achievement. In Figure 1, school effects are paths labeled (c).

The effects of schooling are produced by students' instructional experiences. These experiences are constrained by schools because schools create the framework in which schooling occurs, but they are highly varied within schools, and even within tracks. In schools with a similar range of programs, some students enroll in a college-preparatory track, others are found in the general track, and still others pursue vocational programs. Not only does coursework vary between these tracks, but it differs within tracks across schools and in the same school. I will discuss the operation of tracking at greater length below.

Schooling effects (labeled [d]) constitute the most important direct effects on achievement in this model. It will be particularly interesting to compare the effects of schooling to the effects of background characteristics. In most prior research on school effects, the only independent variables allowed to vary within schools were background characteristics; items connected to schools were typically averaged across the school (e.g., Coleman et al., 1966). Within-school differences in student experiences were unmeasured, so to the extent that experiences affected achievement and were associated with background, such effects were attributed to background variables. The current plan permits one to measure the total effects of background variables, to observe whether such effects are mediated by school experiences, and to assess the relative importance of background and experience variables by comparing their direct effects. For example, some authors argue that at least part of the reason for manifest gender and ethnic differences in high school achievement is that females and Hispanics enroll in fewer academic courses (Pallas and Alexander, 1983; Moore and Smith, 1985).

Because Figure 1 is an abstraction and oversimplification of reality, it is important to be clear about what is simplified here so that this study can be properly interpreted, and so that future work can add increasing complexity where appropriate. First, some relations will not be analyzed; only those associations indicated by solid lines in Figure 1 will be estimated. I intend to measure total and direct effects on achievement; from this I will be able to comment on indirect effects and to speculate on some of the unmeasured paths, but I will not focus on them directly. This paper's object will be limited to tracing the impact of school conditions on achievement through within-school differences in student experiences, as well as the impact of those experiences on achievement. It is not designed to measure the intervening paths.

Second, the provision of learning opportunities is a more complex process than Figure 1 reveals. Tracking can be understood in a variety of ways, and I must rely on only one of them (to be described below). Also, course offerings and enrollments are but a gross measure of opportunities for instructional experiences. I would prefer to have information on specific course content and instructional methods as well. Finally, tracking may affect achievement for a variety of reasons, but my focus on opportunities has led me to concentrate on coursework as the chief intervening variable between tracking and achievement. If tracking effects appear, future work might test the importance of coursetaking differences while also considering other mechanisms such as student attitudes and expectations.

Data and Methods

The data I will use to estimate the model described by Figure 1 come from High School and Beyond, a data set collected by the National Center for Education Statistics from a large national sample of high school students. In the first wave, data were collected from sophomores and seniors in 1980. I use the 1980 public school sophomore data, as well as data from a 1982 follow-up, a 1980 survey given to these students' schools, and data from some of these students' high school transcripts. My sample is limited to about 18,000 public school students who were surveyed and tested in both waves and whose schools filled out questionnaires. In addition to excluding private school students, who might be examined in a separate but similar study, I also excluded early graduates and transfer students because of missing data on most of the key variables. I did not exclude dropouts.

High School and Beyond drew its sample in a two-stage, stratified probability process. First, schools were sampled from the national population of schools, with some strata oversampled to ensure adequate numbers in cells of particular interest (e.g., Cuban Hispanic Schools). Then students were randomly sampled within schools. The stratified nature of the selection of schools resulted in the need to weight the sample in order for analyses to represent the national population of schools and students. All analyses in this paper use the weights for students who took the tests in both years (see Jones et al., 1983a for further description of the sample).

Variables

Table 1 contains a list of variables, their means and standard deviations, and brief descriptions. Students completed six achievement tests in 1980 and 1982: in mathematics, science, vocabulary, reading, writing, and civics. Heyns and Hilton (1982) reported reliabilities for the 1980 tests that range from .53 for civics to .85 for the first part of the math test (see Heyns and Hilton, 1982 for additional details). The 1982 tests will serve as the dependent variables in my analyses, with the 1980 tests included as controls.

Socioeconomic status (SES) was estimated by a linear additive composite of father's occupation and education, mother's education, family income, and home artifacts (all student-reported), with equal weight given to each element. Female, Black, and Hispanic are coded by dummy variables scored 1 for the status indicated, 0 otherwise. Following the HSB convention, students who described themselves as both black and Hispanic are coded Hispanic (Jones et al., 1983a). Two aspects of the schools' surroundings were measured: its urbanicity, described as urban, suburban, and rural; and its region in the country (see Table 1).

Indicators of school conditions were taken both from school questionnaires and by aggregating variables in the student questionnaire. **School Math Achievement** and **School Reading Achievement** are school mean scores on the 1980 math and reading tests. **School SES** is the mean for each school of its students' SES scores.

School % Black and **% Hispanic** were available in school questionnaires as well as aggregated student responses. Each way of operationalizing these school-level variables involves its own measurement problems: the school questionnaire may contain inaccuracies, but so might student codings, and moreover the student reports do not come from all students in the school, but from a random subsample of up to 36 students. Because the different measures of these constructs were highly correlated (.944 for % Black, .833 for % Hispanic), it probably does not matter which one is used. I used the items from the school questionnaire.

School composition variables such as mean achievement, SES, and racial and ethnic makeup may influence student achievement by affecting programmatic offerings at the school level. The school questionnaire provided information on whether or not the school offered a **Gifted Program, Advanced Placement (AP) Courses**, certain **Advanced Science Courses** (chemistry and physics), and **Advanced Math Courses** (algebra II, geometry, trigonometry, and calculus). The Gifted and AP offerings are dummy variables, coded 1 if they were available. Advanced coursework offerings are measured by summing the number of these courses that were available, to a maximum of two in science and four in mathematics.

Like the percent Black and Hispanic variables, the percentage of students in a college-preparatory curriculum (**School % Academic Track**) could be indicated by both school and aggregated student responses. In this case, however, the school and aggregated student measures were only moderately related (r=.380), so it seemed important to consider both of them. Varied tracking reports reflect differences in perception that should not simply be ascribed to measurement error, because they involve substantively real differences in what students and school administrators regard as "a college-preparatory program." The school reports of the proportion of students in the academic track were higher on the average than the aggregated student reports (39% to 30%, see Table 1).

For this study, the issue of track perceptions is even more salient at the individual level. There are at least two ways that a student's track position might be measured: by asking him or her, or by checking school records. Only the former information is available in the HSB data, but both were included in the National Longitudinal Survey (NLS) data, where Rosenbaum (1980b) found a correlation of only .60 between the two. Rosenbaum argued that this indicated that students were frequently misinformed about their own track placements, and that analyses relying on student reports used inaccurate data (see also Rosenbaum, 1984). But student track perceptions may be exactly what is called for in the present study. Because high school students typically have some choice in the courses they select, students' perceptions of their curricular programs are likely to govern their learning opportunities as much if not more than the school's view. This formulation considers high-school learning opportunities as deriving from social-psychological ,tates as well as from structural conditions. A student who believes him- or herself to be in an academic program is more likely to take an advanced mathematics course (if it is offered by the school) than a student who perceives his or her program to be a general or vocational one.

This model is more appropriate for schools in which choices are available (e.g., Powell, Farrar, and Cohen, 1985) than schools where students are placed in clearly marked tracks and assigned to a specified array of classes largely on the basis of their track positions (e.g., Rosenbaum, 1976). Recent observations of high schools suggest that the former are most common (Oakes, 1985; Powell, Farrar, and Cohen, 1985). Moreover, in schools where tracking is rigid and well-specified, student perceptions are likely to agree with school records, so the use of student perceptions is unlikely to introduce inaccuracies in estimating effects on opportunities and learning. Although it would have been useful to examine school records had they been available, I believe that the use of student track perceptions brings a substantively meaningful variable to bear on the issue of stratified learning opportunities.

The HSB student questionnaire asked respondents whether their program of study was best described as **Academic** or college-preparatory, **General**, or as one of a variety of **Vocational** programs. -oded students 1 if they said they were in a given program and 0 otherwise. In contrast to prior research on tracking with survey data, I have distinguished between general and vocational programs instead of grouping them together as nonacademic.

Prior survey research on tracking has measured track position at a single point in time, usually in the eleventh grade (Jencks and Brown, 1975; Heyns, 1974; Alexander and McDill, 1976; Alexander, Cook, and McDill, 1978; Alexander and Cook, 1982; Waitrowski et al., 1982). If students' positions or their perceptions of them shift during high school, one could predict opportunities and achievement more accurately by measuring track positions at several points in time. HSB asked students about their curricular programs in both 1980 and 1982, and I have included both responses in my analyses. Correlations between the two points in time were not high (highest r=.518 for the academic track), so it appears that the perceptions of many students changed.* The commonness of these shifts further argues in favor of using student perceptions to indicate track positions, for it rases an additional question: how do students' use of available opportunities change as their track perceptions shift?

One problem in prior research on tracking has been selecting a standard by which to judge whether tracking effects are substantively meaningful (Alexander and Cook, 1982; Rosenbaum, 1984). I will use two kinds of criteria, in addition to the usual statistical ones. First, I will compare the effect of tracking on achievement to the average performance on the test, and to the standard deviation of test performance. Ceteris paribus, how much higher would a student have scored if he or she had been in the academic track in 1980? In 1982? Second, I will compare achievement differences between tracks to the difference between

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* Only about half the students reported the same program in 1982 as they had in 1980; just over one third had shifted, and the rest had dropped out of school.

dropouts and students who remained in school. If track differences are as large or larger than in-school/dropout differences, they must be considered substantively meaningful. More than 2500 students who dropped out at some time between their sophomore and senior years were included in the second HSB wave. They are coded 1=Dropout, as a fourth position in which a student could have been in 1982 (in addition to academic, general, or vocational track in school).

I expect track differences in achievement to occur primarily as a result of differential coursetaking. Students who report being in a college-preparatory program are more likely to select or be assigned to more academic courses, and more advanced academic courses. To predict math and science achievement, I used student reports of the total **Number of Math Courses** and the total **Number of Science Courses** they had taken between the tenth and twelfth grades, as well as the **Number of Advanced Science Courses** (chemistry and physics) and the **Number of Advanced Mathematics Courses** (algebra II, geometry, trigonometry, and calculus) they had encountered. To predict achievement in reading, vocabulary, writing, and civics, I used the total **Number of Courses** students reported in **English** and in **History and Social Studies**, and whether they had been in an **Honors English** class.

Dropouts were not asked about their coursework. Presently I have assumed that dropouts took two English and social studies courses, one course in math and one in science, and no advanced science, advance math, or honors English classes. This is a conservative estimate of their coursetaking, so in-school/dropout differences may be slightly understated after coursework has been controlled. Note that the total effects of tracking and dropping out (i.e., effects before coursetaking is considered) will be unaffected by these assumptions. In later drafts of this paper I intend to use data from the transcript files on dropouts' actual coursetaking experiences. NCES attempted to gather transcript data on all the surveyed dropouts (Jones et al., 1983b).

Methods

For each of the six dependent variables (the 1982 achievement tests) I estimated a series of regression equations. In the math and science equations, I used the 1980 tests of both math and science as input controls, to reduce the possibility that selection biases would contaminate the estimates of school, track, and coursework effects. Similarly, I included the 1980 tests of both reading and vocabulary as controls in the reading, vocabulary, writing, and civics equations, as well as the corresponding 1980 test in the latter two analyses.[3]

Goldberger and Cain (1982) argued that because HSB selected schools randomly, but then sampled students within schools, the sample of students does not contain truly independent cases as it would if students had been selected completely at random. This may cause standard errors to be understated, and they suggest using a t-ratio of greater than 3 or 4 as the criterion of statistical significance.[4] I will consider coefficients more than three times

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[3] Willms (1985) and Jencks (1985) argue that such controls are needed. Unlike Willms, however, I did not control for math achievement in the reading/vocabulary equations, nor vice versa. Also following Jencks (1985), I did not adjust the test scores for KR-20 reliabilities as did Alexander and Pallas (1985) and Alexander, Natriello and Pallas (1985).

[4] Or alternatively, to multiply standard errors by a design effect of 1.5 or 2.

their standard errors to be statistically significant. However, I will be more concerned with substantive than statistical significance. With a sample of this size, even very small effects can achieve statistical significance, and we will also need to note whether they bear substantive meaning.

I will report the results from regressions in which missing values were deleted listwise. I find listwise deletion more clearly interpretable than pairwise, because it reduces the risk of unknown missing value patterns destabilizing the estimation. Listwise deletion resulted in a sample that was only about two-thirds the size of the initial sample: 12386 cases in the math and science equations, and 12571 in the reading, vocabulary, writing, and civics equations. The listwise samples were slightly higher in SES, mean achievement, and other compositional indicators, but presented no unsettling differences. As a check, I also ran the regressions with pairwise deletion, and found no meaningful differences in the results.

Results

The results of the regressions are presented in Tables 2-7. I estimated seven models for each dependent variable. The first two columns ("Student Characteristics" and "School Setting") are presented in order to distinguish real effects of background and setting from apparent ones that are associated with school composition, although background and setting effects are not actually regarded as "prior" to school composition. Models 3 and 4 ("School Composition" and "School Offerings") reveal the effects of schools, in the form of total effects on achievement of conditions at the school level. The effects of these conditions may be mediated by within-school differences in "Student Experiences" (models 5a, b, and c), which may also contribute to achievement independently of school-level effects. Tables 2-7 are best approached in two ways: first, by examining the effects of variables in the equation in which they first appear; and second, by tracing variables across equations to discover how the effects are mediated by intervening variables.

Background and Setting Effects

As expected, student characteristics are strongly related to achievement. The first column in each table can by itself account for nearly all the variance that will be explained; the largest increase in R^2 from the first to the last column is only .051 (in the math regressions, Table 2). But the strength of the association of background characteristics with outcomes can be misleading, for although subsequent variables explain little or no additional variance, they may serve as mechanisms for prior variables. For example, although math achievement appears highly stable over time (b=.775, column 1), Table 2 shows that high achievers maintain their advantage in part because they attend higher achieving schools, are more likely to stay in school and in the college-bound track, and to enroll in advanced math and science courses. Although the total effect of math achievement is .767 (column 3, controlling for other background, setting, and composition effects), the direct effect is only .576 (column 5c). Interestingly, while achievement in other areas exhibits similar stability (except for civics, which is less stable) with direct effects around .5, aside from math the total effects of prior achievement are not much larger than the direct effects. This indicates that although schools and schooling increase the association between prio and subsequent achievement in mathematics, they have less power to maintain the advantage of tenth grade high achievers in other areas.

Four of the eight tests show a gender difference in performance, but the direction of the difference varies. Boys outperform girls in math and science (Tables 2 and 3); girls score higher in writing and civics (Tables 6 and 7); and they are about even in reading and vocabulary (Tables 4 and 5). Neither the boys' nor the girls' strengths can be explained by the experiences of schooling, for the total effects of being female (column 3) are nearly the same as the direct effects (column 5c) in each table. This finding contributes to the debate over the importance of coursework in explaining gender differences in math and science achievement (e.g., Pallas and Alexander, 1983; Benbow and Stanley, 1983), suggesting that the higher achievement for males does not result from taking more advanced courses.[5] Similarly, the female advantage in writing and civics cannot be ascribed to differences in school-leaving, tracking, or coursework, because the gap does not close when these variables are taken into account.

Patterns observed in Tables 2-7 for the effects of SES suggest

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[5] Some ambiguity exists in the case of math achievement here. Tracking and dropout effects appear to suppress part of the gender difference, which increases when tracking and dropping out are controlled in column 5a. This increase is eliminated in columns 5b and 5c when coursework is controlled. This pattern may indicate that girls are more likely to stay in school or be placed in the academic track, but then to take fewer math and science courses than boys in similar school programs, resulting in lower achievement. However, all of the original (reduced-form) achievement difference remains unexplained.

that the stratified nature of schools and schooling contributes to the association of student socioeconomic status with achievement. First, a small portion of the apparent effect of SES is actually produced by its association with school setting and composition; the effects of SES on achievement are slightly less when the effects of school setting and composition, including school mean SES, are held constant (compare column 1 SES effects with those in column 3). This decline appears for each outcome except science achievement. The largest drop is a 20% decline in the effect of SES in the civics equations (.166 to .133). Similar drops are found in the math estimations (15% decline, .801 to .679) and vocabulary regressions (17% decline, .546 to .452). These findings suggest that the effects of individual SES may be artificially magnified when relevant contextual conditions are neglected.

Even more important than the association of SES with school-level conditions is its relation to within-school variation in student experiences. As soon as controls for tracking and dropping out are introduced (column 5a), most of the effect of SES on achievement disappears. When coursework is controlled, the impact of SES declines even further (columns 5b and 5c), resulting in statistically insignificant effects on achievement in most cases. Thus, high SES students achieve more because they have more advantaged schooling experiences. This does not indicate that students are prejudicially assigned to tracks and classes on the basis of their SES, but it does reflect the fact that SES covaries with dropping out, tracking, and coursework. When experiences are held constant, SES makes little difference for student achievement.[6]

By contrast, schooling experiences cannot be held to account for the achievement deficit of blacks and Hispanics. In fact, controlling for dropping out, track perceptions, and coursework increases the disadvantage for blacks. Holding constant other background, setting, and school conditions, blacks may be more likely to perceive themselves to be in an academic track, but then to perform less well than others in the same program. It is possible that blacks and whites rely on different criteria to signify curricular programs, and that given the same situation, a black may view him- or herself in a college-bound program when a white would not. But these findings are not simply the result of perceptual differences, because the black deficit continues to grow as coursetaking is taken into account, although the increase is less dramatic. For example, the black/white difference in science achievement is .732 points with background, setting, and school conditions controlled; it rises to .864 when tracking and dropping out are held constant, and .886 when all information on coursework is included.[7] In other words, I find the gap between blacks and whites in the same programs of study to be larger than the overall gap between blacks and whites.

While the Hispanic deficit shows indications of this pattern, the fluctuations are much smaller. Unlike Moore and Smith (1985),

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[6] The drop in the SES effect when experiences are controlled occurs even when dropouts, and the effects of dropping out, are excluded from the analysis. Thus it is not only dropping out, but tracking and coursework that allow high SES students to achieve more.

[7] Again, the pattern remains even if dropouts are excluded.

who found slight reductions in the Hispanic/Anglo gap after controlling for coursetaking, I find no reductions at all.

No consistent pattern of effects appears for the measures of school setting. The urban and suburban variables (rural is the omitted category) almost never reach statistical significance. The regional variables exhibit scattered effects, but they are always small and do not consistently favor one over the others.

The Effects of Schools

I had little success in discovering school-level influences on achievement, even though I was most interested in total effects that would appear in columns 3 and 4 and be reduced in the direct effects listed in the final column. Only in the case of vocabulary achievement did the pattern of effects approximate my expectations. There, School Mean SES appeared to raise test scores by 1/3 of a point (b=.334, column 3). This effect was reduced when School Offerings were controlled (School SES b=.216, non-significant, column 4). Apparently, higher SES schools have more students in the academic track (School % Academic Track b=.878, column 4), which explains the School SES effect. The achievement advantage of attending a school with more students in the academic track is itself explained by the increased likelihood of being in the academic track, as the effect of School % Academic Track declines to .185 (non-significant, see column 5a) when individual track positions are controlled. The significant total effects are small but probably meaningful; 1/3 of a point is nearly 20% of the 1.69 average gain on the vocabulary test, and .878 points is more than half the average 1980-1982 gain. Thus opportunities for vocabulary achievement gains do appear to be stratified between schools; students in higher SES schools have better chances of gaining access to the academic track, where their achievement is raised.

However, School Mean SES did not exhibit effects on achievement in any other subject, nor do significant effects appear for School Mean Achievement. School % Black and % Hispanic occasionally affect achievement, but the effects are invariably tiny and they are not consistently explained by the introduction of variables measuring school offerings.

Recall that the proportion of students in the academic track was indicated by data from the school questionnaire and by aggregating student responses. The school questionnaire item is never associated with opportunities nor with achievement. The aggregate School % Academic Track variable displays small effects on achievement in math, science, and reading, in addition to its substantial effect on vocabulary achievement. In math, science, and reading, an initial insignificant or weak positive total effect (column 4) becomes negative as the student experience variables are added. Results for writing and civics achievement follow this pattern without ever reaching statistical significance. Except for the case of reading achievement, the negative effects are minute and disappear when coursework is controlled. Although it appears slightly beneficial on the average to be in a school with more college-bound students, the benefit may accrue only to those students who are actually in the college track, and other students may even be harmed unless they enroll in advanced or honors courses.

Schools that offer programs for the gifted or advanced placement courses do not produce higher achievement. Students in schools offering more advanced math course score slightly higher in science achievement, but it is not clear why, for the effect is not explained by their enrolling in more advanced math courses.

The Effects of Schooling

In contrast to the weak and inconsistent effects of opportunities at the school level, within-school differences in opportunities to learn exert substantial effects on achievement in all six subjects. Column 5a presents the total effects of tracking. Perceiving oneself to be in a college-preparatory program is clearly associated with higher achievement, even with controls for prior achievement and other background variables, school setting, composition and offerings. For math and science achievement, a student's position in 1982 was far more important than where he or she was in 1980, while in the other areas the 1980 and 1982 academic track effects were more similar. The academic track advantage is considerable for all six subjects. It is largest in the case of math achievement, where a student who described his or her program as college preparatory in both survey waves would score 3.43 points higher (2.55 + .88) than a comparable student in a similar school who remained in the vocational track (the omitted category) throughout high school. This advantage amounts to 42% of the standard deviation of the math test and it is more than $2^{1/2}$ times the average gain in math achievement (1.278; see the 1980 and 1982 means and standard deviations listed in Table 1). Moreover, the advantage of 1982 academic track students over those in the vocational track (b=2.55) and over those in the general track (2.55 - .489 = 2.061) is about three times the size of the gap between dropouts and vocational track students (dropout b=-.707). In other words, where one is in school matters even more than whether or not one is attending school.

This pattern is repeated for science and reading achievement, where the 1982 academic track advantage is about double the dropout deficit. In vocabulary and civics, academic track students are about as far ahead of vocational track students as dropouts are behind them, and the dropout deficit is much greater than the academic track advantage in writing achievement. Compared to test score standard deviations, the academic-track advantage ranges from 20-34% aside from the 43% advantage in math, and the advantage is between six-tenths and one and a half times the 1980-1982 average gain, besides the benefit in math of two and a half times the average gain as noted above.

General track students exhibit a statistically significant advantage over vocational track students in most cases, although the gaps are small enough to be of less substantive import. Except for writing achievement, the gap between academic and general track students is far greater than the general-vocational difference, so researchers have probably not lost much by grouping all nonacademic-track students together.

In the case of math and science achievement, most of the effects of the track and dropout variables can be explained by differential coursetaking. In other words, the advantage of academic over general, general over vocational, and vocational over dropping out is caused by greater access to courses of study that produce high achievement. This is just what one would expect if the track reports represent real differences in curricular programs.

Table 2 (Math Achievement) shows that after coursework is controlled, only 1982 academic track has a direct effect on achievement. In Table 3 (Science Achievement) we see that both the 1982 academic track variable and dropping out affect achievement even after coursework is held constant. These effects are considerably smaller than the total effects found in column 5a.

The coursetaking influences presented in columns 5b and 5c show, first, that taking additional math and science courses raises math achievement, and taking additional science courses adds to science achievement. But the influence of advanced math and science courses is more powerful than the effect of simply adding any course. Advanced study in both areas contributes to achievement on both tests.

With regard to reading, vocabulary, writing, and civics achievement the final picture is somewhat different. In these subjects, merely taking additional courses does not contribute to achievement, except for a small positive effect of history and social studies courses on civics achievement. Information on specific course topics was not available (except for marginal courses such as psychology and economics, which were unrelated to achievement). However, enrolling in honors English contributed to achievement in each area. These smaller coursework effects do little to explain track and dropout differences in achievement. Unlike the results for math and science, the direct effects of tracking in column 5c of Tables 5-7 are nearly as large as the total effects reported in column 5a.

The contrast in the mediating effects of coursework when math and science are compared with other subjects results from two sources. First, we have better information about coursework in math and science than in English and social studies. Second, students in different tracks vary little in the number of English and social studies courses they take, but contrasts in their math and science coursework are sharper, especially for advanced courses. Table 8 displays the average coursework experiences for students who passed through nine different patterns of curricular tracking. Comparisons between rows 1, 5, and 9, which present data for students who remained in an academic, general, or vocational program, are particularly revealing. Little variation is evident for English and social studies coursework: academic "stayers" (students who started and ended in an academic track) averaged 3.16 English and 2.47 social studies classes, general track stayers averaged 2.98 and 2.28, and the means for vocational track stayers were 2.90 and 2.17. By contrast, students who remained in the academic track enrolled in 2.70 math courses and 2.40 science courses, while their peers in the general track averaged only 1.81 and 1.46 and vocational track stayers reported 1.70 and 1.43. The contrasts in <u>advanced</u> math and science courses are even more distinct. Of the data available for English, only enrollment in honors courses varies between track levels to a noticeable extent.

Table 9 also reveals interesting differences in the importance of sophomore and senior track positions. Students who reported being in the academic track solely in 1982 took almost as many math courses as students who had been in the academic track the whole time, demonstrating the greater importance of the senior track position. This pattern is approximated for the number of courses taken in science, advanced science and advanced math, and in honors

English enrollment, although the sophomore position carries greater weight in those cases than in the first. These patterns indicate that students who enter the academic track subsequent to their sophomore year can close the curricular gap with students who had been there all along. But they do not catch up entirely, for having begun on a different trajectory they run out of time to enroll in the most advanced courses.

Because the 1982 track data were gathered at the same time as the coursework information, it is possible that a student's track report is the result of coursetaking rather than its cause. This notion raises the additional point that it may be inappropriate to consider track perceptions and coursework as independent phenomena; instead they might be conceived of as two different aspects of the same construct. In that case the total effects of track perceptions reported in column 5a of Tables 2-7 might be disregarded in favor of concentrating solely on the final column. I have not made this choice, because despite the link between tracking and coursework they do vary independently. But even if one considers tracking and coursework as a single package, one finds considerable evidence of within-school differences in student experiences that explain variation in student achievement.

Discussion

This study has had more success in identifying the effects of schooling than in discovering effects of schools. I found few school-level conditions that contribute to achievement, even among ones that I expected to set constraints for within-school effects. But variation in student experiences that occurs within schools has important effects on achievement. Most of the significant within-school differences are tied to differential coursetaking.

The substantial tracking effects I discovered here contrast with the meager effects found by Alexander and Cook (1982). In their study, track effects on math achievement were larger than for other subjects, as I found, but the math effects were small and effects for other achievement areas were nonexistent in Alexander and Cook's research. The differing results may be due in part to a peculiarity of the Alexander and Cook sample: apparently, 69.3% of the students were in the academic track (Table A, p.639). In addition, their measure of track perceptions came from a single point in time (eleventh grade). They also grouped vocational- and general-track students together as nonacademic, although that does not seem to have made much difference. Finally, their sample was limited to three school districts, while the HSB data reflect the national population. As Rosenbaum (1984) has argued, tracking effects may vary in different locations.

The coursework influences, combined with absence of effects for the school offerings variables, evoke a metaphor recently used to describe secondary schools: the shopping mall high school (Powell, Farrar, and Cohen, 1985). In my results, schools seem like malls, each offering a similar array of stores (programs and courses), and allowing students to find the store in which they make their purchases (achievement). It is not what the malls have to offer that makes a difference, but how students are able or choose to shop. Students who get into the curricular Bloomingdale's, either by assignment, motivation, encouragement, or luck, will benefit, while their fellows in the J. C. Penney's of the education world--not bad, but ordinary--lag behind them.

But even if all malls have similar stores, might some of them do a better job of getting customers to buy from the expensive ones? This might be easy for malls in rich suburbs, but how about if community composition were held constant? In other words, even if school offerings vary little, and constrain coursetaking even less, there may still be between-school differences in student course-taking patterns that are independent of school composition and that affect achievement. To examine this possibility, I included school mean values for student coursetaking in the regressions described by column 4 in Tables 2-7. These regressions included background, setting, composition, and offerings variables, but not the indicators of individual experiences. They test for the presence of school-level coursetaking effects on achievement, net of school composition and offerings.

As Table 9 reveals, school-level variation in coursetaking does influence achievement. Students score higher in math, reading, vocabulary, writing, and civics achievement when they attend schools where more students enroll in advanced math and science courses, in more English and social studies courses, and in honors English. The influence of the mean number of English courses is subsequently explained by controlling for dropouts, indicating that it does not represent a true coursework effect, but the fact that students in some schools achieve more because they stay in school longer; in other words, the mean number of English courses is a proxy for the proportion of students not dropping out, because practically everyone in school takes English each year. But the effects of the mean advanced math, advanced science, history and social studies courses, and honors English variables are not explained by tracking or dropping out, but only by individual coursework: students achieve more in high-coursetaking schools because they themselves take more courses or more advanced courses.

How do some schools manage to get more students to enroll in more advanced courses? We know that it is not because their students are brighter or economically advantaged; those variables were statistically controlled. And we know they do not get more students into courses simply by offering more; that was my initial hypothesis, and it was not supported. One must be wary of concluding that high schools should simply require students to take more academic courses, for the anticipated achievement advantage may only accrue if the courses are academically rigorous, if students are motivated to take advantage of them, and if new requirements do not cause marginal students to drop out. Still, increased levels of advanced coursetaking appears to be a potentially important school "lever" for raising achievement, and future research should examine how it might profitably be brought about.

The lack of school-level mechanisms for producing high achievement in my results does not indicate that such levers do not exist. Recent research on school effectiveness has suggested school variables that I did not consider (for a recent favorable review, see MacKenzie, 1983; for a more critical review, see Rowan, Bossert, and Dwyer, 1983). Some of these conditions, such as leadership exerted by the principal and a school-wide consensus on academic goals, may be related to school-wide levels of coursetaking.

One further caveat must be registered before I conclude: my finding that coursework improves achievement on the average does not mean that all students would benefit equally from additional coursework. There may be nonlinearities in the coursework effects that my linear model has ignored. One reason academically weak students are not typically found in honors or advanced courses is because they are not expected to benefit from them. Is this true?

Table 10 presents the coursework effects for students who scored at least one standard deviation below the mean on the sophomore tests in math (math and science regressions) or reading (reading, vocabulary, writing, and civics regressions). These coefficients suggest that low achieving students are less likely to benefit from additional or more advanced courses. The only significant effect is the influence of advanced math courses on math achievement, and it is smaller that in the full sample (b=1.104, compared with b=1.343 in Table 2, column 5c). In the full sample, eleven of these coursework variables produced significant effects on achievement. But the results for low achievers are not unambiguous, because in several cases the coefficients are as large as the coefficients in the original regressions, but they fail to reach statistical significance because the samples are smaller and the standard errors are larger (compare with Tables 2-7, column 5c). This is especially true for the effects of honors English. It may be the case that some initial low achievers do benefit from advanced coursework, although many do not. In any case, Table 10 shows that one cannot simply thrust all students into advanced courses and expect their achievement to rise. What may be called for is increasing levels of academic rigor for all students, but not the same level of academic work. While most students would benefit from taking more advanced or honors courses, low achieving students may benefit from greater academic challenge even if they are not simply to be assigned to trigonometry and calculus classes.

Recall finally that while coursetaking accounted for much of the effects of tracking, some of the academic track advantage remains to be explained. A variety of social-psychological mechanisms that were not considered here may have produced the unexplained influence of tracking on achievement. In addition there may be important unmeasured aspects of academic work that that could have contributed to achievement. Not all geometry courses are alike, and the difference between the course content of geometry in an academic track and one in a general track may produce achievement differences.[8] This issue is especially pressing for English and social studies classes because in those subjects, students in different tracks vary little in the number of courses they take, but observational research reports extensive differences in course content (Oakes, 1985). In contrast to math and science, we had no useful information on course topics in English and social studies, and only small portions of the track effects on reading, vocabulary, writing, and civics were explained by available coursework data.

This study leaves us with implications for between- and within-school research: it suggests that finding out how some schools manage to engage more students in advanced courses would be a worthy topic for future study, and it urges attention to additional curricular as well as social-psychological conditions in explaining track effects on achievement, and for predicting achievement itself. An understanding of both between- and within-school differences may contribute to the improvement of educational practice.

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[8] However, I tested for track x coursework interactions and did not find significant effects.

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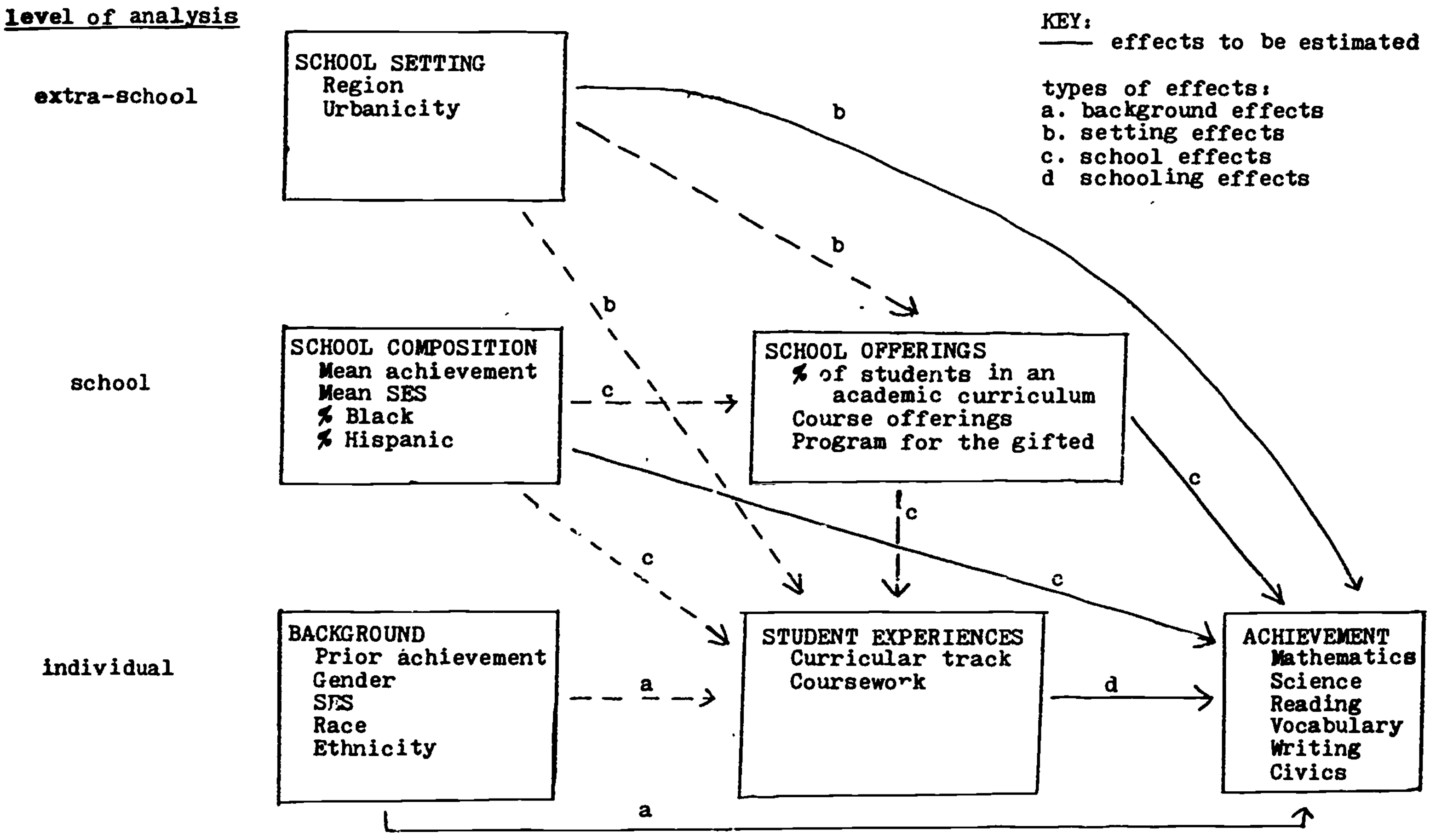

Figure 1 - A conceptual model of the distribution of learning opportunities.

Table 1 - Means, standard deviations, and description of variables.

Variable	Mean	S.D.	Description
1982 Math Score	19.935	8.090	38 items in 2 parts, basic and advanced.
1982 Science Score	11.819	3.790	20 items: scientific knowledge and reasoning.
1982 Reading Score	10.166	4.129	20 items: comprehension of short passages.
1982 Vocabulary Score	12.622	4.531	21 items: synonyms.
1982 Writing Score	11.612	3.916	17 items: writing ability, grammar.
1982 Civics Score	6.663	2.126	10 items: on law, gov'mt, social behavior.
1980 Math Score	18.657	7.351	
1980 Sci. Score	11.094	3.696	All 1980 tests were repeated
1980 Reading Score	9.212	3.836	in 1982; see descriptions
1980 Vocabulary Score	10.932	4.268	above.
1980 Writing Score	10.401	3.889	
1980 Civics Score	5.876	2.025	
Female	.503	.500	Dummy variable scored 1 for girls, 0 for boys.
SES	-.094	.714	Composite (see text); range -2.781 to 1.962.
Black	.109	.311	Dummy variable scored 1 for blacks,0 for others.
Hispanic	.126	.332	Dummy variable scored 1 for Hispanics, others 0.
Northeast	.206	.404	New England, Mid-Atlantic.
West	.159	.366	Mountain, Pacific.
North Central	.301	.459	East North Central, West North Central.
South	.334	.472	So. Atlantic, East So. Central, West So. Central
Urban	.180	.384	
Suburban	.443	.497	
Rural	.337	.485	
School Math Achievement	18.540	3.183	Aggregated from 1980 student scores.
School Reading Ach.	9.056	1.425	Aggregated from 1980 student scores.
School SES	-.088	.352	Aggregated from 1980 student scores.
School % Black	13.103	21.892	From school questionnaire.
School % Hispanic	4.532	12.468	From school questionnaire.
Schl. % Academic Track (School Questionnaire)	39.355	25.029	From school questionnaire.
Schl. % Academic Track (Aggreg. Stu. Resp.)	30.919	17.450	Aggregated from student reports.
Advanced Sci Courses Off.	1.948	.276	From school questionnaire.
Advanced Mth Courses Off.	3.416	.728	From school questionnaire.
Gifted Program Offered	.532	.499	From school questionnaire; 1=yes, 0=no.
AP Courses Offered	.428	.495	From school questionnaire; 1=yes, 0=no.
Academic Track (1980)	.315	.465	
General Track (1980)	.472	.499	Track and dropout status
Vocational Track (1980)	.213	.410	are self-reported;
Academic Track (1982)	.328	.470	coded 1 if student was in
General Track (1982)	.289	.453	that position; 0 otherwise.
Vocational Track (1982)	.226	.418	
Dropping Out (1982)	.157	.364	
# Science Courses Taken	1.618	.989	Student report.
# Math Courses Taken	1.914	1.024	Student report.
Advanced Science Taken	.478	.718	Student report: chemistry, physics.
Advanced Math Taken	1.128	1.321	Student report: algebra II, geom., trig., calc.
# English Courses Taken	2.866	.755	Student report.
# History, Soc. Studies Courses Taken	2.273	.781	Student report.
Honors English Taken	.231	.422	Student report, coded 1=yes, 0=no.

Note - From listwise deletion of missing values as used in regressions (see "Methods," below): n=12386 (math and science equations), n=12571 (reading, vocabulary, writing and civics equations). Except for achievement and coursework in the latter equations, means and standard deviations reported here come from the data used in the math and science equations. Because of small differences in missing value patterns, some of the descriptive statistics for other variables differ slightly; they are available from the author upon request.

Table 2 - Effects on mathematics achievement.
Metric regression coefficients (standard errors), n=12386.

Dependent Variable - <u>1982 Math Achievement</u>

Independent Variable	Model						
	Student Characteristics (1)	School Setting (2)	School Composi- tion (3)	School Offerings (4)	Student Experiences (5a)	(5b)	(5c)
1980 Math Score	.775***	.774***	.767***	.767***	.693***	.666***	.576***
	(.007)	(.203)	(.008)	(.008)	(.008)	(.008)	(.008)
1980 Sci. Score	.303***	.772***	.309***	.309***	.266***	.264***	.247***
	(.015)	(.007)	(.015)	(.015)	(.014)	(.014)	(.014)
Female	-.340**	-.306***	-.353**	-.353**	-.535***	-.385***	-.391***
	(.079)	(.015)	(.079)	(.079)	(.076)	(.075)	(.072)
SES	.801***	.743***	.679***	.682***	.274**	.201*	.085
	(.061)	(.061)	(.066)	(.066)	(.065)	(.064)	(.062)
Black	.050	.023	-.222	-.227	-.669**	-.828***	-.848***
	(.134)	(.141)	(.160)	(.160)	(.155)	(.153)	(.147)
Hispanic	-.876***	-.882***	-1.049***	-1.050***	-1.137***	-1.223***	-1.169***
	(.125)	(.126)	(.131)	(.132)	(.127)	(.125)	(.120)
Northeast		.531**	.534**	.405*	.346	.208	-.015
		(.113)	(.121)	(.126)	(.121)	(.120)	(.116)
West		.239	.129	.130	.183	.342	.346
		(.122)	(.134)	(.136)	(.131)	(.129)	(.125)
North Central		.110	.165	.233	.264	.401*	.211
		(.102)	(.113)	(.114)	(.110)	(.108)	(.105)
Urban		.477***	.224	.162	.226	.205	.159
		.115	(.125)	(.129)	.124	(.122)	(.118)
Suburban		.388**	.278	.219	.222	.204	.140
		(.089)	(.094)	(.097)	(.093)	(.092)	(.088)
School Math Achievement			.027	.014	.056	.060	.070*
			(.022)	(.023)	(.022)	(.023)	(.021)
School SES			.426	.285	.376	.286	.145
			(.191)	(.202)	(.195)	(.192)	(.185)
School % Black			.011*	.009*	.008	.004	-.000
			(.003)	(.003)	(.003)	(.003)	(.003)
School % Hispanic			.016**	.016**	.014*	.010	.007
			(.004)	(.004)	(.004)	(.003)	(.003)
Schl. % Acad. (Schl. Questionnaire)				-.002	-.002	-.003	-.004
				(.002)	(.002	(.002)	(.003)
Schl. % Acad. (Aggreg. Student Responses)				.009*	-.011*	-.010*	-.004
				(.003)	(.003)	(.003)	(.002)
Advanced Science Courses Offered				-.369	-.421	-.365	-.038
				(.151)	(.146)	(.144)	(.138)
Advanced Math Courses Offered				.071	.082	.044	.012
				(.062)	(.060)	(.059)	(.057)
Gifted Program Offered				.024	.048	.075	.102
				(.086)	(.083)	(.082)	(.079)
AP Courses Offered				.144	.206	.149	.092
				(.090)	(.087)	(.085)	(.082)
Academic Track (1980)					.880***	.702***	.258
					(.126)	(.124)	(.120)
Academic Track (1982)					2.550***	1.883***	.964***
					(.120)	(.123)	(.123)
General Track (1980)					.235	.215	.174
					(.102)	(.100)	(.097)
General Track (1982)					.489**	.340*	.302
					(.109)	(.107)	(.103)
Dropping Out (1982)					-.707***	-.134	.084
					(.125)	(.126)	(.122)
# Science Courses Taken						.187*	-.093
						(.048)	(.052)
# Math Courses Taken						.869***	.274***
						(.048)	(.051)
Advanced Science Taken							.513***
							(.079)
Advanced Math Taken							1.343***
							(.051)
R^2	.713	.715	.716	.737	.737	.746	.764

*coefficient is three times its standard error
**coefficient is four times its standard error
***coefficient is five or more times its standard error

Table 3 - Effects on science achievement.
Metric regression coefficients (standard errors), n=12386.

Dependent Variable - 1982 Science Achievement

Independent Variable	Model: Student Characteristics (1)	School Setting (2)	School Composition (3)	School Offerings (4)	Student Experiences (5a)	(5b)	(5c)
1980 Math Score	.120***	.119***	.121***	.121***	.100***	.098***	.084***
	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)	(.005)
1980 Sci. Score	.515***	.513***	.510***	.511***	.499***	.494***	.491***
	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)
Female	-.538***	-.536***	-.536***	-.534***	-.587***	-.566	-.559***
	(.044)	(.044)	(.044)	(.044)	(.044)	(.044)	(.044)
SES	.303***	.292***	.304***	.303***	.182**	.163**	.146*
	(.034)	(.035)	(.037)	(.037)	(.038)	(.038)	(.038)
Black	-1.069***	-.938***	-.729***	-.732***	-.864***	-.882***	-.886***
	(.076)	(.079)	(.091)	(.090)	(.090)	(.090)	(.090)
Hispanic	-.842***	-.813***	-.768***	-.763***	-.792***	-.798***	-.796***
	(.070)	(.071)	(.074)	(.074)	(.074)	(.074)	(.073)
Northeast		.160	.124	.099	.082	.048	.006
		(.064)	(.068)	(.071)	(.070)	(.070)	(.070)
West		.331**	.273*	.263*	.282*	.305**	.314**
		(.069)	(.076)	(.077)	(.076)	(.076)	(.076)
North Central		.275**	.217*	.216*	.222*	.237*	.206*
		(.056)	(.064)	(.064)	(.064)	(.064)	(.064)
Urban		-.166	-.056	-.066	-.043	-.028	-.024
		(.065)	(.071)	(.073)	(.072)	(.072)	(.072)
Suburban		-.019	-.007	-.009	-.007	.005	.002
		(.050)	(.053)	(.055)	(.054)	(.054)	(.054)
School Math Achievement			-.021	-.024	-.014	-.015	-.014
			(.013)	(.013)	(.013)	(.013)	(.013)
School SES			-.020	-.053	-.026	-.009	-.035
			(.108)	(.114)	(.113)	(.113)	(.113)
School % Black			-.008***	-.008**	-.008***	-.009***	-.009***
			(.002)	(.002)	(.002)	(.002)	(.002)
School % Hispanic			-.002	-.002	-.003	-.003	-.004
			(.002)	(.002)	(.002)	(.002)	(.002)
Schl. % Acad. (Schl. Questionnaire)				-.001	-.001	-.001	-.001
				(.001)	(.001)	(.001)	(.001)
Schl. % Acad. (Aggreg. Student Responses)				-.000	-.005*	-.005	-.004
				(.002)	(.002)	(.002)	(.002)
Advanced Science Courses Offered				-.126	-.140	-.116	-.122
				(.086)	(.085)	(.085)	(.084)
Advanced Math Courses Offered				.168**	.170**	.162**	.161**
				(.035)	(.035)	(.035)	(.035)
Gifted Program Offered				-.084	-.076	-.076	-.072
				(.049)	(.048)	(.048)	(.048)
AP Courses Offered				-.006	.015	.010	.002
				(.051)	(.050)	(.050)	(.050)
Academic Track (1980)					.230*	.181	.122
					(.073)	(.073)	(.073)
General Track (1980)					.059	.044	.042
					(.059)	(.059)	(.059)
Academic Track (1982)					.675***	.530***	.386***
					(.070)	(.073)	(.075)
General Track (1982)					.152	.114	.113
					(.063)	(.063)	(.063)
Dropping Out (1982)					-.367***	-.335**	-.302*
					(.073)	(.074)	(.074)
# Science Courses Taken						.215***	.125**
						(.028)	(.032)
# Math Courses Taken						-.018	-.086
						(.029)	(.031)
Advanced Science Taken							.246***
							(.048)
Advanced Math Taken							.136**
							(.031)
R^2	.585	.586	.587	.588	.596	.598	.600

*coefficient is three times its standard error
**coefficient is four times its standard error
***coefficient is five or more times its standard error

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Table 4 - Effects on reading achievement.
Metric regression coefficients (standard errors), n=12571.

Dependent Variable - 1982 Reading Achievement

Independent Variable	Model: Student Characteristics (1)	School Setting (2)	School Composition (3)	School Offerings (4)	Student Experiences (5a)	(5b)	(5c)
1980 Reading	.545*** (.009)	.545*** (.009)	.543*** (.009)	.543*** (.009)	.505*** (.009)	.505*** (.009)	.500*** (.009)
1980 Vocabulary	.264*** (.008)	.265*** (.008)	.263*** (.008)	.263*** (.008)	.238*** (.008)	.237 (.008)	.234*** (.008)
Female	.028 (.047)	.030 (.047)	.029 (.047)	.027 (.047)	-.022 (.047)	-.024 (.047)	-.048 (.047)
SES	.331*** (.037)	.328*** (.037)	.301*** (.040)	.301*** (.040)	.126* (.041)	.125* (.041)	.108 (.041)
Black	-.381** (.080)	-.372** (.084)	-.359* (.097)	-.357* (.097)	-.496*** (.096)	-.495*** (.096)	-.502*** (.096)
Hispanic	-.574*** (.075)	-.554*** (.076)	-.554*** (.080)	-.556*** (.080)	-.586*** (.079)	-.586*** (.077)	-.589*** (.079)
Northeast		-.047 (.068)	-.086 (.071)	-.103 (.075)	-.124 (.074)	-.134 (.074)	-.119 (.074)
West		-.106 (.074)	-.166 (.081)	-.165 (.083)	-.146 (.081)	-.148 (.082)	-.161 (.082)
North Central		.028 (.061)	-.010 (.066)	-.007 (.066)	-.012 (.065)	-.012 (.066)	-.021 (.066)
Urban		-.016 (.069)	-.025 (.075)	-.015 (.077)	.033 (.076)	.037 (.076)	.027 (.076)
Suburban		.070 (.054)	.045 (.058)	.051 (.059)	.054 (.058)	.054 (.058)	.049 (.058)
School Reading Achievement			.041 (.027)	.035 (.029)	.058 (.028)	.057 (.028)	.062 (.028)
School SES			.107 (.111)	.079 (.118)	.156 (.116)	.161 (.116)	.182 (.116)
School % Black			.001 (.002)	.001 (.002)	.000 (.002)	.000 (.002)	.000 (.002)
School % Hispanic			.002 (.002)	.002 (.002)	.002 (.002)	.002 (.002)	.001 (.002)
Schl. % Acad. (Schl. Questionnaire)				.000 (.001)	-.000 (.001)	-.000 (.001)	-.000 (.001)
Schl. % Acad. (Aggreg. Student Responses)				.067 (.172)	-.741** (.178)	-.743** (.178)	-.728** (.178)
Gifted Program Offered				-.101 (.052)	-.088 (.051)	-.091 (.051)	-.082 (.051)
AP Courses Offered				.093 (.054)	.114 (.053)	.114 (.053)	.112 (.053)
Academic Track (1980)					.550*** (.078)	.545*** (.078)	.510*** (.078)
General Track (1980)					.197* (.063)	.195* (.063)	.198* (.063)
Academic Track (1982)					.854*** (.074)	.847*** (.074)	.774*** (.075)
General Track (1982)					.179 (.067)	.174 (.067)	.179 (.067)
Dropping Out (1982)					-.442*** (.078)	-.420** (.085)	-.368** (.085)
# English Courses Taken						.018 (.039)	.005 (.039)
# History, Social Studies Courses Taken						.031 (.033)	.034 (.033)
Honors English Taken							.438*** (.061)
R^2	.593	.593	.593	.594	.607	.607	.609

*coefficient is three times its standard error
**coefficient is four times its standard error
***coefficient is five or more times its standard error

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Table 5 - Effects on vocabulary achievement.
Metric regression coefficients (standard errors), n=12571.

Dependent Variable - 1982 Vocabulary Achievement

Independent Variable	Student Characteristics (1)	School Setting (2)	School Composition (3)	School Offerings (4)	Student Experiences (5a)	Student Experiences (5b)	Student Experiences (5c)
1980 Reading	.279***	.283***	.280***	.282***	.248***	.248***	.243***
	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)
1980 Vocabulary	.586***	.578***	.574***	.572***	.548***	.545***	.543***
	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)
Female	.084	.080	.080	.075	.026	.021	-.001
	(.047)	(.047)	(.047)	(.047)	(.047)	(.047)	(.047)
SES	.546***	.518***	.452***	.454***	.283***	.280***	.264***
	(.037)	(.037)	(.040)	(.040)	(.041)	(.041)	(.041)
Black	-.819***	-.752***	-.583***	-.593***	-.719***	-.718***	-.724***
	(.081)	(.084)	(.097)	(.097)	(.096)	(.096)	(.096)
Hispanic	-.827***	-.830***	-.764***	-.793***	-.815***	-.816***	-.819***
	(.076)	(.076)	(.080)	(.080)	(.079)	(.079)	(.079)
Northeast		.529***	.425***	.328**	.319**	.289*	.304**
		(.069)	(.071)	(.075)	(.074)	(.074)	(.074)
West		.414***	.251*	.307*	.319*	.316*	.304*
		(.074)	(.081)	(.063)	(.082)	(.082)	(.082)
North Central		.173	.051	.077	.071	.072	.065
		(.062)	(.066)	(.066)	(.065)	(.066)	(.066)
Urban		.055	.108	.134	.193	.203	.193
		(.069)	(.076)	(.077)	(.076)	(.076)	(.076)
Suburban		.054	-.018	-.033	-.026	-.026	-.031
		(.054)	(.058)	(.059)	(.059)	(.059)	(.058)
School Reading Achievement			.032	-.008	.007	.002	.008
			(.028)	(.029)	(.028)	(.028)	(.028)
School SES			.334*	.216	.285	.297	.317
			(.111)	(.118)	(.116)	(.116)	(.116)
School % Black			-.004	-.005*	-.006*	-.006*	-.006*
			(.002)	(.002)	(.002)	(.002)	(.002)
School % Hispanic			.001	-.001	-.001	-.002	-.002
			(.002)	(.002)	(.002)	(.002)	(.002)
Schl. % Acad. (Schl. Questionnaire)				.001	.000	.000	.000
				(.001)	(.001)	(.001)	(.001)
Schl. % Acad. (Aggreg. Student Responses)				.878***	.185	.181	.195
				(.172)	(.179)	(.171)	(.178)
Gifted Program Offered				-.002	.014	.005	.013
				(.052)	(.051)	(.051)	(.051)
AP Courses Offered				-.056	-.036	-.035	-.038
				(.054)	(.053)	(.053)	(.053)
Academic Track (1980)					.609***	.593***	.560***
					(.078)	(.078)	(.078)
General Track (1980)					.337***	.332***	.334***
					(.063)	(.063)	(.063)
Academic Track (1982)					.760***	.737***	.669***
					(.074)	(.074)	(.075)
General Track (1982)					.230*	.214*	.219*
					(.067)	(.067)	(.067)
Dropping Out (1982)					-.548***	-.469***	-.420**
					(.073)	(.085)	(.085)
# English Courses Taken						.069	.057
						(.040)	(.039)
# History, Social Studies Courses Taken						.092	.095
						(.033)	(.033)
Honors English Taken							.410***
							(.061)
R^2	.657	.660	.661	.661	.672	.673	.674

*coefficient is three times its standard error
**coefficient is four times its standard error
***coefficient is five or more times its standard error

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Table 6 - Effects on writing achievement.
Metric regression coefficients (standard errors), n=12571.

Dependent Variable - <u>1982 Writing Achievement</u>

Independent Variable	Model						
	Student Characteristics (1)	School Setting (2)	School Composition (3)	School Offerings (4)	Student Experiences (5a)	(5b)	(5c)
1980 Writing	.470*** (.008)	.469*** (.008)	.467*** (.009)	.467*** (.009)	.443*** (.009)	.442*** (.009)	.441*** (.009)
1980 Reading	.152*** (.009)	.152*** (.009)	.153*** (.009)	.152*** (.009)	.137*** (.009)	.138*** (.009)	.135*** (.009)
1980 Vocabulary	.144*** (.008)	.143*** (.008)	.141*** (.008)	.141*** (.008)	.128*** (.008)	.128*** (.008)	.126*** (.008)
Female	1.096*** (.048)	1.101*** (.048)	1.099*** (.048)	1.099*** (.048)	1.106*** (.048)	1.102*** (.048)	1.093*** (.048)
SES	.257*** (.035)	.250*** (.036)	.228*** (.038)	.227*** (.038)	.095 (.039)	.092 (.039)	.083 (.039)
Black	-.590*** (.077)	-.502*** (.080)	-.478*** (.092)	-.481*** (.092)	-.605*** (.091)	-.609*** (.091)	-.614*** (.091)
Hispanic	-.565*** (.072)	-.562*** (.073)	-.620*** (.076)	-.622*** (.076)	-.666*** (.075)	-.667*** (.075)	-.671*** (.075)
Northeast		.095 (.065)	.030 (.070)	.052 (.071)	.027 (.070)	.017 (.071)	.025 (.071)
West		.301** (.070)	.208 (.078)	.228 (.078)	.254* (.077)	.266* (.078)	.259* (.078)
North Central		.121 (.058)	.108 (.063)	.099 (.063)	.090 (.062)	.111 (.062)	.107 (.063)
Urban		-.166 (.066)	-.212 (.072)	-.167 (.073)	-.125 (.072)	-.123 (.072)	-.129 (.072)
Suburban		-.086 (.051)	-.139 (.056)	-.109 (.056)	-.113 (.056)	-.113 (.056)	-.116 (.056)
School Reading Achievement			.001 (.027)	-.008 (.027)	.002 (.027)	.002 (.027)	.005 (.027)
School SES			.137 (.110)	.189 (.112)	.233 (.110)	.229 (.111)	.239 (.111)
School % Black			-.001 (.002)	-.000 (.002)	-.001 (.002)	-.001 (.002)	-.001 (.002)
School % Hispanic			.007* (.002)	.007* (.002)	.007* (.002)	.007 (.002)	.007 (.002)
Schl. % Acad. (Schl. Questionnaire)				.000 (.001)	-.000 (.001)	.000 (.001)	.000 (.001)
Schl. % Acad. (Aggreg. Student Responses)				.285 (.163)	-.156 (.170)	-.156 (.170)	-.148 (.170)
Gifted Program Offered				-.129 (.049)	-.117 (.048)	-.118 (.049)	-.113 (.049)
AP Courses Offered				-.058 (.051)	-.036 (.050)	-.035 (.050)	-.036 (.050)
Academic Track (1980)					.404*** (.074)	.393*** (.074)	.358*** (.071)
General Track (1980)					.231* (.060)	.278** (.062)	.279** (.060)
Academic Track (1982)					.383*** (.071)	.361*** (.071)	.323** (.071)
General Track (1982)					-.050 (.064)	-.063 (.064)	-.060 (.064)
Dropping Out (1982)					-.943*** (.075)	-.841*** (.081)	-.814*** (.081)
# English Courses Taken						.109 (.038)	.103 (.038)
# History, Social Studies Courses Taken						.025 (.031)	.026 (.031)
Honors English Taken							.233* (.058)
R^2	.591	.592	.593	.593	.604	.605	.605

*coefficient is three times its standard error
**coefficient is four times its standard error
***coefficient is five or more times its standard error

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Table 7 - Effects on civics achievement.
Metric regression coefficients (standard errors), n=12571.

Dependent Variable - <u>1982 Civics Achievement</u>

Independent Variable	Model: Student Characteristics (1)	School Setting (2)	School Composition (3)	School Offerings (4)	Student Experiences (5a)	(5b)	(5c)
1980 Civics	.227*** (.009)	.226*** (.009)	.224*** (.009)	.225*** (.009)	.211*** (.009)	.210*** (.009)	.209*** (.009)
1980 Reading	.128*** (.006)	.128*** (.006)	.125*** (.006)	.126*** (.006)	.112*** (.006)	.113*** (.006)	.111*** (.006)
1980 Vocabulary	.115*** (.005)	.114*** (.005)	.113*** (.005)	.112*** (.005)	.102*** (.005)	.102*** (.005)	.101*** (.005)
Female	.228*** (.030)	.231*** (.030)	.230*** (.030)	.229*** (.030)	.210*** (.030)	.206*** (.030)	.199*** (.030)
SES	.166*** (.023)	.158*** (.023)	.133*** (.025)	.134*** (.025)	.052 (.026)	.049 (.026)	.044 (.026)
Black	-.141 (.051)	-.089 (.053)	-.145 (.061)	-.145 (.061)	-.209* (.061)	-.207* (.061)	-.210* (.061)
Hispanic	-.231** (.047)	-.214** (.048)	-.240** (.050)	-.242** (.050)	-.257*** (.050)	-.258*** (.050)	-.259*** (.050)
Northeast		.027 (.043)	.005 (.045)	-.018 (.047)	-.026 (.047)	-.053 (.047)	-.048 (.047)
West		.133 (.047)	.088 (.051)	.080 (.052)	.090 (.052)	.084 (.052)	.080 (.052)
North Central		.191** (.039)	.182** (.042)	.185** (.042)	.183** (.041)	.181** (.042)	.178** (.042)
Urban		-.004 (.044)	-.053 (.048)	-.050 (.049)	-.026 (.048)	-.017 (.048)	-.020 (.048)
Suburban		.005 (.034)	-.020 (.038)	-.031 (.037)	-.030 (.037)	-.030 (.037)	-.031 (.037)
School Reading Achievement			.050 (.017)	.043 (.018)	.052 (.018)	.047 (.018)	.049 (.018)
School SES			.102 (.070)	.096 (.074)	.131 (.074)	.144 (.074)	.150 (.074)
School % Black			.003* (.001)	.003 (.001)	.003 (.001)	.002 (.001)	.002 (.001)
School % Hispanic			.004 (.001)	.004 (.001)	.004 (.001)	.004 (.001)	.004 (.001)
Schl. % Acad. (Schl. Questionnaire)				-.001 (.001)	-.002 (.001)	-.002 (.001)	-.002 (.001)
Schl. % Acad. (Aggreg. Student Responses)				.273 (.108)	-.065 (.113)	-.069 (.113)	-.065 (.113)
Gifted Program Offered				-.006 (.033)	.001 (.032)	-.008 (.032)	-.005 (.032)
AP Courses Offered				.021 (.034)	.032 (.034)	.032 (.034)	.031 (.034)
Academic Track (1980)					.256*** (.049)	.242** (.049)	.231** (.049)
General Track (1980)					.104 (.040)	.100 (.040)	.101 (.040)
Academic Track (1982)					.332*** (.047)	.313*** (.047)	.290*** (.048)
General Track (1982)					.084 (.043)	.071 (.043)	.073 (.043)
Dropping Out (1982)					-.335*** (.050)	-.276*** (.054)	-.260** (.054)
# English Courses Taken						.048 (.025)	.044 (.025)
# History, Social Studies Courses Taken						.087** (.021)	.089** (.021)
Honors English Taken							.138* (.039)
R^2	.387	.388	.390	.390	.401	.403	.404

*coefficient is three times its standard error
**coefficient is four times its standard error
***coefficient is five or more times its standard error

Table 8 - Coursework means (standard deviations) for students reporting different patterns of tracking.

Curricular Program 1980	1982	# Math	# Science	# Advanced Math	# Advanced Science	# English	# History, Soc.Studies	Honors English	Percent of students following the pattern*
1) Academic	Academic	2.70(.85)	2.40(.97)	2.55(1.11)	1.18(.77)	3.16(.54)	2.47(.79)	.49(.50)	20.7%
2) General	Academic	2.43(.94)	2.11(1.02)	1.96(1.29)	.87(.81)	3.09(.61)	2.34(.82)	.37(.48)	8.6%
3) Vocational	Academic	2.31(.99)	1.84(1.04)	1.38(1.28)	.65(.77)	3.09(.68)	2.32(.83)	.31(.46)	2.4%
4) Academic	General	2.09(.94)	1.73(.94)	1.35(1.21)	.48(.66)	3.09(.68)	2.40(.84)	.27(.44)	4.5%
5) General	General	1.81(.98)	1.46(.92)	.75(1.02)	.29(.56)	2.98(.74)	2.28(.85)	.15(.36)	19.3%
6) Vocational	General	1.73(.96)	1.35(.87)	.47(.84)	.21(.48)	2.96(.79)	2.22(.89)	.10(.31)	5.0%
7) Academic	Vocat.	1.86(.94)	1.44(.90)	1.05(1.04)	.34(.56)	2.98(.70)	2.28(.83)	.26(.44)	3.4%
8) General	Vocat.	1.64(.94)	1.26(.85)	.57(.86)	.22(.48)	2.89(.81)	2.19(.86)	.13(.33)	10.0%
9) Vocational	Vocat.	1.70(.95)	1.23(.87)	.48(.84)	.22(.49)	2.90(.82)	2.17(.88)	.16(.36)	10.2%

*An additional 16% of the respondants were 1982 dropouts.

Table 9 - Total between-school coursetaking effects on individual achievement. Selected regression coefficients (standard errors).*

School Mean Coursetaking Variable	Math	Science	Reading	Vocab.	Writing	Civics
	Dependent Achievement Variable					
# Science Courses	-.032 (.157)	.043 (.089)				
# Math Courses	.243 (.164)	-.038 (.093)				
# Advanced Science	.944* (.270)	.338 (.153)				
# Advanced Math	.759** (.163)	.247 (.092)				
# English Courses			.047 (.089)	.390** (.090)	.434*** (.085)	.210* (.056)
# Hist., Soc. Stu.			.080 (.062)	.107 (.061)	.123 (.059)	.137* (.039)
Honors English			.655* (.215)	.122 (.215)	.284 (.203)	.094 (.136)

* Each equation controls for the variables entered in column 4 of Tables 2-7 (background, setting, composition, and offerings variables). Controls for individual track, dropout, and coursework variables are <u>not</u> included.

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Table 10 - Individual coursetaking effects for low achievers.[a] Selected regression coefficients (standard errors).[b] N=2228 (math, science); n=2206 (reading, vocabulary, writing, civics).

Coursetaking Variable	Dependent Achievement Variable					
	Math	Science	Reading	Vocab.	Writing	Civics
# Science Courses	.034	.049				
	(.121)	(.083)				
# Math Courses	.073	-.093				
	(.114)	(.079)				
# Advanced Science	-.128	-.101				
	(.219)	(.150)				
# Advanced Math	1.104***	.116				
	(.161)	(.110)				
# English Courses			-.071	.033	.072	.153
			(.078)	(.097)	(.090)	(.059)
# Hist., Soc. Stu.			.056	.229	.146	.013
			(.071)	(.089)	(.082)	(.054)
Honors English			.387	.352	.467	.264
			(.169)	(.211)	(.195)	(.128)

[a] Low achievers are those who scored more than one standard deviation below the mean in the base year math test (math and science equations) or the reading test (reading, vocabulary, writing, and civics equations).

[b] Equations include controls for all variables found in column 5c of Tables 2-7: background, setting, composition, offerings, track, and dropout variables, as well as the coursework variables listed here.

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