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ABSTRACT

Several studies in the 1980s found that Black students were more likely to be enrolled in college-preparatory programs than Whites of equal achievement and family background. These findings contradict suspicions that tracking systems create more Black-White inequality than would occur without them. However, a weakness of one study supporting this view was its reliance on self-reporting by students concerning track location. A follow-up study used student's course records and High School and Beyond data. Results showed that neither Blacks nor Hispanics were more likely to be assigned to the college track than they were when tracking was indicated by self-reports. Compared to Whites, Blacks were more likely to erroneously regard their programs as college-preparatory than were Whites, and less likely to erroneously describe their programs as noncollege-bound. When the course-based indicator and self-reports are both included as predictors of mathematics achievement, only the former indicator implies that tracking has no impact on net racial differences in achievement. However, because race is correlated with socioeconomic status and prior achievement, tracking tends to magnify gross racial differences in achievement. Eight tables are attached. (Contains 32 references.) (JPT)

RACE AND TRACK ASSIGNMENT: A RECONSIDERATION WITH COURSE-BASED INDICATORS OF TRACK LOCATIONS

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ABSTRACT

This paper reassesses Gamoran and Mare's (1989) claim that the net black-white achievement gap is smaller under current tracking systems than it would be in the absence of tracking. A weakness of the earlier study was its reliance on self-reported indicators of students' track locations. The present work makes use of a new tracking indicator created from coursework indicated in students' high school transcripts (Lucas, 1990). Our analyses using High School and Beyond data show that when the course-based indicator is used, neither blacks nor Hispanics exhibit the advantage in the probability of assignment to the college track that appeared when tracking was indicated by self-reports. Compared to whites, blacks are more likely to "erroneously" regard their programs as college-preparatory than are whites, and less likely to "erroneously" describe their programs as noncollege-bound. When the course-based indicator and self-reports are both included as predictors of mathematics achievement, only the course-based indicator yields significant effects, and using the course-based indicator implies that tracking has no impact on *net* racial differences in achievement. However, because race is correlated with socioeconomic status and prior achievement, which are significant predictors of track assignment, tracking tends to magnify *gross* racial differences in achievement.

A recent study of curriculum tracking in U.S. high schools found that black students were more likely to be enrolled in college-preparatory programs than whites of equivalent achievement and family background (Gamoran and Mare, 1989). This finding led to the startling conclusion that current tracking systems produce less net black-white inequality than would obtain in the absence of tracking. The finding is not restricted to a single study or data set; rather, it has appeared repeatedly in national and regional survey studies (Alexander, Cook, and McDill, 1978; Alexander and Cook, 1982; Rosenbaum, 1980; Wolfle, 1985). Gamoran and Mare's (1989) conclusion has major implications for educational policy writers, who commonly call for eliminating tracking as part of a strategy of reducing racial inequality in education (e.g., Quality Education for Minorities, 1990; Dentzer and Wheelock, 1990; Oakes, 1990). Given its possible importance, the finding deserves close scrutiny.

A potentially serious weakness of Gamoran and Mare's (1989) study was its reliance on self-reported indicators of students' track locations. Because tracking was measured by asking students what program they were in, one may question whether the assignment pattern favoring blacks reflected differences in the actual curricula followed by blacks and whites, or resulted instead from differences in how blacks and whites perceive their curricular programs.

This paper reassesses the Gamoran-Mare finding using an indicator of tracking based on students' courses as recorded on their high school transcripts. In addition to black-white differences, it also considers Hispanics' likelihood of assignment to the college track. We explain the conceptual as well as statistical implications of using varied tracking indicators, and show that Gamoran and Mare (1989) overstated the advantages of tracking for blacks. Finally, we explore the implications of tracking for both net and gross achievement inequality among racial and ethnic groups.

Tracking in U. S. High Schools

The survey question typically used in American studies assumes that high school tracking has a fairly simple tripartite structure, consisting of academic or college-preparatory, general, and vocational programs. For example, the High School and Beyond survey (Jones et al., 1983) asked, "Which of the following best describes your high school program?" Students were required to indicate one of the categories. Although this structure may have been prevalent at one time (see Conant 1967), by the 1980s it appears that most high schools did not have such clearly marked tracks. The word "tracking" was generally avoided, and students tended to be divided on a subject-by- subject basis instead of for all subjects at once (Oakes, 1985; Moore and Davenport, 1988; Oakes, Gamoran, and Page, 1992). In a study of Boston, Chicago, New York, and Philadelphia, Moore and Davenport (1988) reported that:

> In 1965, all four school systems had a rigid tracking process in which most students were assigned to a track that defined all of their courses. Subsequently, such formal tracks were abolished, but the reality of tracking has been preserved in many schools through a variety of mechanisms (pp.11-12).

Thus, it seems that both the formal labels and the programmatic assignment procedures of high school tracking have largely been discarded. These structural changes raise ambiguity about the meaning of students' responses to the survey question. Because students are not formally divided into tracks, it is not clear what basis they use to decide which category best describes their high school programs. One obvious possibility is that students who think they are going to college describe their program as "college-preparatory," whereas those who have not thought about college call their program "general". With respect to race differences in track assignment, black students may be more likely to describe their programs as academic because, other things being equal, they are more likely to anticipate entering college. This notion is supported by previous work showing higher educational plans among blacks as compared with whites of similar achievement and family background (Wolfle, 1985).

Structural and Social-Psychological Dimensions of Tracking

Despite the ambiguity of present-day tracking systems, one may still argue that students' reports of their track positions provide essential data. Gamoran (1987) suggested that because students often select their courses in high schools (Powell, Farrar, and Cohen, 1985), students' perceptions of tracking may be better predictors of achievement and attainment than school reports. Tracking as measured by self-reports has been shown to exert one of the strongest and longest-lasting school-related influences on long-term educational attainment (see Gamoran and Berends, 1987, for a review). Hence, it seems unwise to dismiss self-reports as "merely" perceptual.

Instead, we suggest that student-reported track indicators may tap the social-psychological dimension of tracking. Writers have claimed that tracking affects achievement in part because it differentiates students in their attitudes toward school and their values toward education. Students located in high-status positions tend to accept the demands of schooling as legitimate and conform, whereas students in the lower ranks more often turn away from academic work (Lacey, 1970; Ball, 1981; Abraham, 1989). To the extent that track effects operate by leading some students to work hard in the courses they take while leading others away from academic aspirations, self-reported data appear to be useful indicators.

At the same time, self-reports are weaker measures of the structural dimension of tracking. As a system for dividing students into organizational subunits, tracking physically separates groups of students from one another, and this structural differentiation has implications for educational outcomes. Observers have reported that students attending different courses are exposed to different instructional regimes, with high-track students learning more complex material at a faster pace, from teachers who are more enthusiastic and who spend more time preparing (Keddie, 1971; Rosenbaum, 1976; Ball, 1981; Finley, 1984; Oakes, 1985; Gamoran and Nystrand, 1990). Moreover, students located in different curricular programs tend to form different friendship networks, which may affect their attitudes toward schooling and their aspirations for the future (Hauser, Sewell, and Alwin, 1976). Given the absence of formal labels, asking students which categories best describe their curricular programs provides an imprecise measure of such structural differentiation.

Thus, we maintain that tracking has different dimensions which may be variously perceived (see further Gamoran and Berends, 1987). Our approach contrasts with that of Rosenbaum (1980) who, in comparing 1972 track reports from students and school personnel, termed the former "perceived track" and the latter "actual track." Although Rosenbaum's approach may have been appropriate at the time, the absence of formal tracks in most contemporary schools means that in more recent data there would be ambiguity about school reports just as there is about student reports.

Course-based Indicators of Track Positions

A more precise way of identifying the structural aspects of tracking is by examining the courses in which students have enrolled (Lucas, 1990). Typically, high schools offer courses at a variety of levels, such as honors, regular, and remedial. In some subjects, students are also differentiated by their rate of progress through curricular sequences (Garet and DeLany, 1988). In math, for example, ninth graders may be divided among geometry, algebra, pre-algebra, and basic math. In tenth grade, those who have taken geometry may be admitted to algebra II, while those who have completed algebra enroll in geometry, and so on. By the end of four years, students who started farther up the ladder have had the opportunity to progress farther (Garet and DeLany, 1988).

Little is known about the impact of race and ethnicity on course enrollment. In a sample from Wisconsin, Hauser, Sewell, and Alwin (1976) derived tracking indicators from coursework data, but did not examine racial or ethnic differences. Garet and Delany (1988) found mixed results when predicting students' math and science tenth-grade course enrollments in four California high schools. Controlling for prior achievement, black students were more likely than whites to take general math (the lowest level), but were also more likely to be found in advanced math (the highest level), with not taking math as the reference category. Black students' net probability of enrolling in general science was lower than that of whites. There were no marked differences comparing Hispanics and non-Hispanic whites in either subject. In a recent report, Oakes (1990) argued that black and Hispanic students have less access than others to high-status math and science courses such as calculus and physics. However, this finding was based on gross differences in enrollment rates, and did not take into account students' socioeconomic or cognitive backgrounds. It is not clear whether Oakes' finding actually differs from that produced by self-reported data, because the self-reports also show disadvantages for blacks and Hispanics if socioeconomic status and previous achievement are ignored (Gamoran and Mare, 1989). No national study has examined probabilities of course enrollment for students from different racial and ethnic groups whose family backgrounds and initial achievement levels are similar.

If course-based indicators of track locations do not show the net advantage for minority students that appears when self-reports are used, Gamoran and Mare's (1989) conclusion that tracking reduces racial inequality in achievement will need to be revised. The extent of revision required will depend on the complex relations among students' backgrounds, their initial and subsequent achievements, and their self-reported and course-based indicators of track location. Rather than viewing one measure as "true" and the other as "false," we maintain that the two are jointly determined, and thus we simultaneously assess their determination and their implications for outcomes.

Secada (1992) suggested that blacks' apparent track-assignment advantage may reflect differences in the schools attended by blacks and whites (see also Garet and DeLany, 1988; Oakes, 1990). Although Gamoran and Mare (1989) took into account the racial and ethnic compositions of the schools in their sample, they did not deal with this issue explicitly. Hence, in this study we take special note of the importance of the demographic compositions of schools for understanding race and ethnic differences in assignment patterns.

Data and Methods

We use data from High School and Beyond (HSB), a national longitudinal study of high school students that began in 1980. Our analyses rely on data from students who were sophomores in 1980, drawing on the base-year survey, the 1982 first-follow-up, and the transcript survey (Jones et al., 1983). Initially about 30,000 students were included in the sample, but transcript data were gathered for a random subsample of nearly 16,000 cases. We use the 12,198 cases with non-missing data for the two measures of track location and twelfth grade mathematics achievement.

Measures of Track Positions

We obtained a self-report of track location from students' sophomore-year responses to the question of which category best describes their high school programs. We collapsed the responses into two categories: college-preparatory and non-college- preparatory. Our focus on the dichotomy is warranted for several reasons. First, previous work has shown that the college/non-college distinction is much more consequential for achievement than are distinctions among the non-college programs (Gelb, 1979; Gamoran, 1987). Second, debates about tracking's impact on racial and ethnic inequality have centered on access to academic courses (e.g., Oakes, 1990). Third, restricting our focus to the college/non-college division permits us to replicate the Gamoran-Mare study.

We used course-based indicators of track positions (CBIs) which were constructed from transcript data. The CBIs classify students' math, science, English, social studies, and foreign language courses into five categories: elite college, regular college, junior college, business/vocational, and remedial. The categorization is based on course titles and descriptions. CBIs classify some courses differently depending on when they were taken; for example, algebra 1 is coded regular college in grades nine and ten but junior college in grades eleven and twelve.

Students' track positions in each subject in each year were then indicated by the categorization of the courses they had taken. Students who took more than one course in the same subject in a given year are scored according to the course that ended later in the year, or that took the longest time if they ended simultaneously, or according to the higher-ranked course if all else was equal. We use a summary version of the CBI based on courses taken in ninth and tenth grade. The summary CBI counts students as belonging to the college-preparatory track if they were enrolled in regular or elite college courses in math, English, and two of the other three subjects (science, social studies, and foreign language). Further details on the creation of the course-based indicators are provided by Lucas (1990).

Table 1 presents a cross-tabulation of the self-reported and course-based indicators, showing that about seventy percent of the students are placed in the same categories by the two schemes. Means and standard deviations for track locations as well as for other variables are provided in the appendix.

Background and Achievement Data

Background data are drawn from student questionnaires. Blacks, Hispanics, and other non-whites are indicated by three dummy variables. Sex is coded 1 for males, 0 for females. Socioeconomic status is indicated by a standardized unweighted composite consisting of the non-missing elements of mother's and father's education, father's occupation, family income, and home resources.

Prior achievement is assessed with tests administered in the spring of the sophomore year (1980) in six subjects: math, science, reading, vocabulary, writing, and civics. As reported by Heyns and Hilton (1982), the tests vary in their reliability, ranging from .53 for civics to .82 for the advanced portion of the math test. Gamoran and Mare (1989) found that controlling for all six tests substantially reduced the impact of selection bias in the analysis of track effects.

The same tests were administered in the spring of the senior year (1982), and we focus on the senior-year math test as an outcome variable when we assess the implications of tracking for achievement inequality. The math test is the most reliable and the most sensitive to school-related influences (see further Lee and Bryk, 1989). In addition, examining math scores allows us to compare our results with those of Gamoran and Mare (1989).

School composition was indicated by aggregate measures of mean SES, and mean tenth grade math achievement, as well as principal reports of the percentage of black students, percentage of Hispanic students, and percentage of sophomores in the college track. The aggregate measures were constructed using the full base-year sample, which included a random sample of up to 36 sophomores in each school.

We substituted mean values when data were missing, and for every variable with missing data we created a binary variable as a control for missing data. The appendix lists the percentage of missing cases for all of the variables.

Methods

We first construct a four-category variable from the two-way cross-classification of self-reported track and CBI. We use this four-category measure as a dependent variable in a multinomial logit equation to investigate the net association of race/ethnicity and jointly-determined self-reported and structural measures of track position.

Next we address possible race and ethnic differences in the probability of college-track assignment, and the implications of such differences for achievement. We begin by estimating probit models to address whether the substantive finding of greater black probability of college-track assignment is invariant to the measure of track location. We norm the probit models by setting the variance of the dependent variable to equal one, rather than setting the error variance equal to one, in order to facilitate comparison of full and reduced models of track assignment (Winship and Mare, 1984). In these models, we first assess the effects of student characteristics alone, and then consider whether apparent student-level effects actually reflect in part the composition of schools attended by different types of students.

To investigate the effects of track placement on achievement, we use ordinary least squares (OLS) regression to model the net association of the self-report and course-based indicators with twelfth grade mathematics achievement. We close the analysis by estimating the model of joint track location/achievement determination selected by Gamoran and Mare (1989), except that we use the CBI as the measure of track location.

Several writers have commented that standard errors generated by HSB analyses are understated, because the clustering of students within schools in the sample means that cases within schools are not independent of one another (e.g., Goldberger and Cain, 1982). Jones et al. (1983) estimated that in the transcript data, standard errors should be adjusted on the basis of a design effect of 3.7. For all results we provide adjusted standard errors.

Throughout this discussion we refer to students as either "correct" or "in error", and as "over-reporting" and "under-reporting" their track assignments. We do so only to ease the presentation of results. As mentioned earlier, we do not claim that the CBI is correct and the self-reports are incorrect. The CBI may be a better measure of track location for some purposes, but it is not invariably correct.[1]

Results

Comparing the CBI indicators to self-reports, Table 1 shows that more students "under-reported" than "over-reported" their track positions (18.2% to 12.6%). Table 2 reveals that this pattern holds for whites, and to a lesser degree for Hispanics, but the relation is somewhat different for blacks, who show a slightly greater tendency to "over-report" than "under-report" (14.8% to 13.5%). Among students not taking college-preparatory courses, however, blacks are no more likely than whites to "over- report" (blacks: 14.8 / (56.7 + 14.8) = 20.7%; whites: 12.2 / (43.4 + 12.2 = 21.9%). Among students taking college-bound courses, blacks and whites show comparable levels of "under-reporting," while Hispanics are actually more likely to "under-report" than to "correctly" report their track as academic. Hence, the raw proportions do not reveal sharp tendencies for black or Hispanic students to "over-report" or for non-Hispanic whites to "under-report."

Gross tendencies in Table 2 may yet mask important differences that occur for students of similar socioeconomic and achievement levels. In Table 3 we control for these factors as well as gender in a multinomial logit model. To highlight the contrast between "under-" and "over-reporters", we make all comparisons to the category of students who (1) claim to be in a non-college program while (2) the course-based indicator assigns them to the college track (i.e., "under-reporters").

This analysis shows that compared to whites, black students are more likely to claim academic-track location while taking non-college courses than to claim non-college enrollment while taking college-preparatory courses. In short, blacks are more likely to "over-report" than to "under-report" college-track assignment. At the same time, blacks are more likely to "correctly" report than to "under-report" membership in the college track (column 3), compared to whites of similar socioeconomic and achievement levels.

Higher-SES students are also more likely than low-SES students to "over-" than "under-report," and to "correctly" report when they are taking college-track courses. Hispanics are not significantly different than whites in these tendencies. Indeed, for the key contrast in this model--"under-reporters" versus "over-reporters"--race and SES are the only statistically significant parameter estimates. The "under-" and "over- reporters" are not discernibly different on measured achievement, gender, or ethnicity.

More so than the simple cross-tabulations, the multivariate analysis shows some tendency for black students to more often "over-report" and less often "under-report" their track assignment, compared to whites. Hence, we have reason to anticipate that the two indicators may lead to different conclusions concerning the net effects of race on track assignment. This issue is addressed in Tables 4 and 5. First we estimate models using only individual-level characteristics, presented in Table 4. An analysis based on the self-report measure would lead one to conclude that blacks, Hispanics, and females are more likely to be enrolled in the college track, as are students of higher socioeconomic status. An analysis using the CBI reveals an advantage in track assignment for blacks (but not for Hispanics), females, and persons with social background advantages.

In Table 5 we introduce school-level characteristics, to find out whether racial differences in assignment patterns are influenced by differences in the compositions of schools attended by students of different races. Adding school-level variables to the prediction equation for self-reported track lessens the effects of socioeconomic status, gender, and race, while the positive effect of Hispanic ethnicity no longer holds. But the black advantage in track assignment remains. In the full model for the CBI the effect of race on track location is reduced to zero, while students of higher social background and females remain more likely to enroll in the college track net of measured achievement. For both the self-report and the CBI, the gain in R^2 with the addition of school-level variables suggests that school-level characteristics have direct effects and serve as mediating factors in determining track locations.

It appears that assessment of racial differences in the probability of assignment to the college track are sensitive to the measure of track location one uses. But given the complex patterns of reporting, it may be that the differences in reporting do not greatly affect our understanding of track effects on achievement. To investigate the possibility that errors in reporting cancel each other, we estimated the model of mathematics achievement presented in Table 6.

The major finding in Table 6 is that the parameter estimate for self-reported track effects on mathematics achievement are not discernibly different from zero. This finding is somewhat surprising because in previous analyses of overall achievement the CBI and the self-report have nearly equal and non-zero effects (Lucas, 1990).

From the multinomial logit model in Table 3 it appears that using the self-report for analyses of track assignment probabilities is questionable because of race and ethnic differences in track perceptions. From the probit models in Tables 4 and 5 it appears that assessments of track placement probabilities are sensitive to the measure used. From the OLS model in Table 6 it appears as if using the self-report for the analysis of twelfth grade math achievement may be problematic because the social-psychological dimension of tracking, as captured by the self-report, does not have an effect on twelfth grade math achievement that is independent of the structural dimension.

Differences in the perception of college-track location, coupled with the absence of a net association of self-reported track and twelfth grade math achievement, justify re-estimation of the Gamoran-Mare model of the joint determination of track assignment and achievement. In table 7 we present the model they selected, a general model of track assignment and achievement.[2] A first important finding is that, unlike Gamoran and Mare who found small but non-zero effects of unmeasured factors on selection into the college and non-college tracks, we find no effects of unmeasured characteristics on track assignment. This suggests that selection bias is not a problem for standard OLS analyses of track effects using these data.

Because selection and later achievement are unrelated, the process of selection turns out to be the same as was found in the single-equation probit equations presented earlier. Females and those with social background advantages are advantaged in track assignment. Students at schools with more blacks, Hispanics, and students in the college track are also more likely to be enrolled in a college-track program. But blacks, Hispanics, and other non-whites are neither advantaged nor disadvantaged in track assignment.

Within the non-college and college tracks, blacks, Hispanics, other non-whites, and whites have equivalent achievement levels. The effects of prior achievement are basically equal across the two tracks. These results imply a track effect of .5: a typical student's achievement would be about half a point higher in the college than in the non-college track. This result, which is comparable to the effect derived from the model in Table 6, is less than half the size of the effect reported by

Gamoran and Mare (1989), but it is greater than zero.[3]

Discussion

First, we found that black, Hispanic, and white tenth graders with similar coursework experiences do not always respond in the same way to the survey question about track locations. Moreover, when tracking is measured by a course-based indicator, and when school compositions are taken into account, we find no minority advantage in track assignment, contrary to Gamoran and Mare's (1989) earlier work.

Gamoran and Mare's (1989) argument was directed purely at the issue of net inequality, that is, inequality of results given similar initial levels of background and achievement. We find no net racial differences in track assignment chances, and equivalent achievement levels for blacks and whites in both programs once background factors and prior achievement are controlled. Thus, net racial inequality seems unaffected by the process of tracking.

While race may appear to be a non-factor, socioeconomic status has persistent effects on track assignment. Students from disadvantaged social backgrounds, whatever their race or ethnicity, are less likely to follow a college track program than are students from advantaged social backgrounds, once achievement is controlled. Social background does not affect achievement within the tracks. But, owing to higher achievement levels for the college track, the negative association of social background and track assignment leads to an increase in achievement inequality with respect to social background.

Although tracking is unrelated to net racial inequality, gross black-white achievement differences are affected by tracking. Because blacks have, on average, lower prior achievement and socio-economic status than whites, and because tracking increases the advantage of those with higher achievement and socio-economic status, tracking works to the overall disadvantage of blacks. The same holds for Hispanic versus non-Hispanic whites. According to our results, these disadvantages are not the result of racial or ethnic differences per se, but occur because race and ethnicity are tied to economic disadvantages in the larger society.

For research on tracking, the most important finding concerns our initial conjecture that different measures of track position tap different dimensions of tracking. We did not test this conjecture directly. However, that the two indicators do not exert independent effects on math achievement suggests that the two-dimensional view of tracking may be incorrect or limited in its application. Had we found differences in track perceptions but independent effects of those perceptions, it would be possible to argue for the importance of both dimensions in analyses of achievement inequality. But taken together, the complexities of racial differences in reporting of track assignment and the dissolution of social-psychological track effects once structural measures are introduced call into question the use of self-reports in black-white comparisons. Since the association between self-reports and achievement dissipates when the CBI is taken into account, and since the relation of self-reports to structural track placement varies by race and social background, attempting to draw inferences about race and tracking from self-reported data may be unwarranted. Though perceptions may be an important aspect of tracking, track perceptions may not be uniquely associated with the effects of tracking for every outcome of interest.

Another potential advantage of the CBI over the traditional self-reports is that it can be used to indicate separate and distinct track locations for varied subjects and at different points in students' high school careers (Lucas, 1990). We did not take advantage of this feature in the present study because our emphasis was on the overall implications of tracking for racial inequality. In the future, however, it would be worth re-examining tracking's effects on achievement with a more fine-grained indicator of tracking than has been possible with self-reports.

Notes

1. All statistical analyses were performed using a VAX11/780 and a MicroVAXII at the Social Science Computing Cooperative of the University of Wisconsin-Madison. We used SPSSx version 3.0 for data management and cross-tabulations, Hotztran for the probit models and switching regressions, LIMDEP 5.1 for the multinomial logit models, and GLIM version 3.77 for OLS estimation.

2.We have also estimated the Ascription model, which fits no worse than the general model. We have not estimated any models that constrain the slopes to be equal across the track positions.

3.Since the effects of selection were not discernibly different from zero, we used the ascription model (which posits that the effects of selection are zero) in calculating the decomposition of effects.

References

Abraham, J. 1989. "Testing Hargreaves' and Lacey's Differentiation-Polarisation Hypothesis in a Setted Comprehensive." *British Journal of Sociology* 40:46-81.

Alexander, K. L., and Cook, M. A. 1982. "Curricula and Coursework: A Surprise Ending to a Familiar Story." *American Sociological Review* 47:626-640.

Alexander, K. L., Cook, M. A., and McDill, E.L. 1978. "Curriculum Tracking and Educational Stratification." *American Sociological Review* 43:47-66.

Ball, S. J. 1981. *Beachside Comprehensive: A Case-study of Secondary Schooling*. Cambridge: Cambridge University Press.

Conant, J. B. 1967. *The Comprehensive High School*. New York: McGraw-Hill.

Dentzer, E., and Wheelock, A. 1990. *Locked in/locked out: Tracking and Placement Practices in Boston Public Schools*. Boston: Massachusetts Advocacy Center.

Finley, Merrilee K. 1984. "Teachers and Tracking in a Comprehensive High School". *Sociology of Education* 57:233-43.

Gamoran, Adam. 1987. "The Stratification of High School Learning Opportunities. *Sociology of Education* 60:135-55.

Gamoran, Adam, and Berends, Mark. 1987. "The Effects of Stratification in Secondary Schools: Synthesis of Survey and Ethnographic Research." *Review of Educational Research* 57:415-435.

Gamoran, Adam, and Robert D. Mare. 1989. "Secondary School Tracking and Educational Inequality: Compensation, Reinforcement, or Neutrality?" *American Journal of Sociology* 94:1146-83.

Gamoran, Adam, and Martin Nystrand. 1990. *Tracking, Instruction, and Achievement*. Paper presented at the World Congress of Sociology, Madrid, Spain.

Garet, M., and DeLany, B. 1988. "Students, Courses, and Stratification." *Sociology of Education* 61:61-77.

Gelb, Joel. 1979. *Beyond the Academic, Non-Academic Dichotomy: High School Curriculum Effects and Educational Attainment* Report Number 273, March 1979. Center for Social Organization of Schools, The Johns Hopkins University. Baltimore.

Goldberger, A. S., and Cain, G. G. 1982. "The Causal Analysis of Cognitive Outcomes in the Coleman, Hoffer, and Kilgore Report." *Sociology of Education* 55:103-122.

Hauser, Robert M., William Sewell, and Duane Alwin. 1976. "High School Effects on Achievement". In Sewell, Hauser, and Featherman (eds.), *Schooling and Achievement in American Society*. Academic Press, Inc. New York.

Heyns, B., and Hilton, T. L. 1982. "The Cognitive Tests for High School and Beyond: An Assessment." *Sociology of Education* 55:89-102.

Jones, Calvin, Shirley Knight, Marjorie Butz, Ioanna Crawford, and Bruce Stephenson. 1983. *High School and Beyond Transcripts Survey 1982: Data File User's Manual.* National Center for Education Statistics. Washington, D.C.

Keddie, N. 1971. "Classroom Knowledge." In M.F.D. Young (ed.), *Knowledge and Control.* London: Collier-Macmillan.

Kerckhoff, Alan C. 1986. "Effects of Ability Grouping in British Secondary Schools." *American Sociological Review* 51:842-58.

Lacey, C. 1970. *Hightown Grammar.* Manchester: Manchester University Press.

Lee, V. E., and Bryk, A. S. 1989. "A Multilevel Model of the Social Distribution of High School Achievement." *Sociology of Education* 62:172-192.

Lucas, Samuel R. 1990. *Course-Based Indicators of Curricular Track Locations.* Unpublished M.S. thesis, University of Wisconsin-Madison.

Moore, D. R., and Davenport, S. 1988. *The New Improved Sorting Machine.* Madison, WI: National Center on Effective Secondary Schools.

Oakes, J. 1985. *Keeping Track: How Schools Structure Inequality.* New Haven, CT: Yale University Press.

Oakes, J., Gamoran, A., & Page, R. N. 1992. "Curriculum Differentiation: Opportunities, Outcomes, and Meanings", pages 570-608 in P. W. Jackson (Ed.), *Handbook of Research on Curriculum.* Washington, DC: American Educational Research Association.

Oakes, Jeanie. 1990. *Multiplying Inequalities: Opportunities to Learn Science and Math.* Santa Monica, CA: Rand.

Powell, A., Farrar, E., and Cohen, D. K. 1985. *The Shopping Mall High School.* Boston: Houghton-Mifflin.

Quality Education for Minorities Project. 1990. *Education that Works: An Action Plan for the Education of Minorities.* Cambridge, MA: Quality Education for Minorities Project.

Rosenbaum, James E. 1980. "Track Misperceptions and Frustrated College Plans: An Analysis of the Effects of Tracks and Track perceptions in the National Longitudinal Survey." *Sociology of Education* 53:74-88.

Secada, W. 1992. "Race, Ethnicity, Social Class, Language, and Achievement in Mathematics", pages 623-660 in D. Grouws (Ed.), *Handbook of Research on Mathematics Teaching and Learning.* New York: Macmillan.

Winship, Christopher, and Robert D. Mare. 1984. "Regression Models with Ordinal Variables". *American Journal of Sociology* 49:512-25.

Wolfle, L. 1985. "Postsecondary Educational Attainment among Whites and Blacks." *American Educational Research Journal* 22:501-525.

Table 1 -- Cross-tabulation of sophomore track assignment measures. N=12,198 students.

	COURSE-BASED INDICATOR	
	Non-college	College
SELF-REPORT		
Non-college	47.2%	18.2%
College	12.6%	22.0%

Note: Figures in the table report percentages of all cases in the sample that appear in each cell. All analyses use the HSB transcript sampling weights (Jones et al., 1983).

Table 2 -- Cross-tabulation of sophomore track assignment measures for blacks; Hispanics; non-black, non-Hispanic, non-Whites; and non-Hispanic whites. Total n=12,198 students.

Blacks (n=1368)

	COURSE-BASED INDICATOR Non-college	College
SELF-REPORT		
Non-college	56.7%	13.5%
College	14.8%	15.0%

Hispanics (n=1499)

	COURSE-BASED INDICATOR Non-college	College
SELF-REPORT		
Non-college	62.7%	14.1%
College	12.0%	11.1%

Other (n=273)

	COURSE-BASED INDICATOR Non-college	College
SELF-REPORT		
Non-college	41.9%	14.1%
College	16.5%	23.8%

Non-Hispanic Whites (n=9058)

	COURSE-BASED INDICATOR Non-college	College
SELF-REPORT		
Non-college	43.4%	19.5%
College	12.2%	24.8%

Note: Figures in the table report percentages of all cases in the sample that appear in each cell. All analyses use the HSB transcript sampling weights (Jones et al., 1983).

Table 3 -- Multinomial Logit Model of self-reported and course-based indicators of track location. Adjusted standard errors in parentheses. Omitted category is self-reported non-college track/course-based indicator college track

INDEPENDENT VARIABLES / Self, CBI	Non-Coll, Non-Coll	Coll, Non-Coll	Coll, Coll
Intercept	3.605* (0.269)	-0.868* (0.349)	-2.649* (0.340)
1980 Vocabulary	-0.028 (0.020)	0.044 (0.026)	0.069* (0.023)
1980 Reading	-0.022 (0.023)	0.004 (0.029)	-0.014 (0.026)
1980 Math	-0.096* (0.010)	-0.016 (0.012)	0.052* (0.011)
1980 Science	0.034 (0.024)	0.011 (0.030)	0.001 (0.027)
1980 Writing	-0.051* (0.022)	-0.017 (0.029)	0.051 (0.027)
1980 Civics	-0.066* (0.035)	0.020 (0.045)	0.021 (0.040)
SES	-0.199* (0.085)	0.289* (0.105)	0.363* (0.094)
Black	-0.315 (0.194)	0.710* (0.239)	0.783* (0.237)
Hispanic	-0.136 (0.179)	0.444 (0.230)	0.230 (0.233)
Other Non-White	-0.274 (0.374)	0.482 (0.424)	0.226 (0.402)
Male	0.385* (0.119)	0.113 (0.149)	-0.141 (0.134)

* Coefficient is twice its adjusted standard error.

Note: All analyses use the HSB transcript sampling weights (Jones et al., 1983) (n=12,198). Controls for missing data on SES, 1980 Math, 1980 Vocabulary, 1980 Reading, 1980 Science, 1980 Writing, and 1980 Civics were included.

Table 4 -- Probit models of curricular track assignment: comparison of self-reported and course-based indicators. Adjusted standard errors in parentheses.

	TRACK INDICATOR	
PREDICTOR	Self-report	Course-based indicator
Intercept	-2.036*	-1.759*
	(0.093)	(0.093)
1980 Vocabulary	0.037*	0.020*
	(0.008)	(0.008)
1980 Reading	0.002	0.002
	(0.009)	(0.009)
1980 Math	0.040*	0.049*
	(0.004)	(0.004)
1980 Science	-0.008	-0.013
	(0.010)	(0.009)
1980 Writing	0.027*	0.033*
	(0.009)	(0.009)
1980 Civics	0.030*	0.025
	(0.014)	(0.014)
SES	0.221*	0.109*
	(0.033)	(0.033)
Black	0.460*	0.186*
	(0.073)	(0.075)
Hispanic	0.216*	0.039
	(0.073)	(0.072)
Other Non-white	0.257	0.055
	(0.144)	(0.144)
Male	-0.129*	-0.185*
	(0.047)	(0.046)
Error variance	0.702	0.713
R^2	0.298	0.287

* Coefficient is twice its standard error.

Note: Listwise deletion of missing data (n=12,198). All analyses use the HSB transcript sampling weights (Jones et al., 1983). Controls for missing data on SES, 1980 Math, 1980 Vocabulary, 1980 Reading, 1980 Science, 1980 Writing, and 1980 Civics were included. Models normed by setting variance of dependent variable equal to one to allow calculation of an R^2-like measure.

Table 5 -- Probit models of curricular track assignment, controlling for school composition: comparison of self-reported and course-based indicators. Adjusted standard errors in parentheses.

	TRACK INDICATOR	
PREDICTOR	Self-report	Course-based indicator
Intercept	-2.111*	-1.899*
	(0.211)	(0.208)
1980 Vocabulary	0.032*	0.017*
	(0.008)	(0.008)
1980 Reading	0.003	0.001
	(0.009)	(0.009)
1980 Math	0.039*	0.048*
	(0.004)	(0.004)
1980 Science	-0.003	-0.007
	(0.009)	(0.009)
1980 Writing	0.027*	0.034*
	(0.009)	(0.009)
1980 Civics	0.029*	0.024
	(0.014)	(0.014)
SES	0.160*	0.088*
	(0.036)	(0.036)
Black	0.325*	-0.035
	(0.086)	(0.087)
Hispanic	0.150	-0.083
	(0.077)	(0.076)
Other Non-white	0.210	-0.016
	(0.143)	(0.144)
Male	-0.130*	-0.185*
	(0.047)	(0.046)
School mean SES	0.158	0.039
	(0.093)	(0.093)
Schl mean 1980 Math	-0.009	-0.004
	(0.011)	(0.010)
School % Black	0.004*	0.006*
	(0.001)	(0.001)
School % Hispanic	0.003	0.005*
	(0.002)	(0.002)

School % High Track	0.005* (0.001)	0.003* (0.001)
Error Variance	0.676	0.691
R^2	0.324	0.309

* Coefficient is twice its standard error.

Note: All analyses use the HSB transcript sampling weights (Jones et al., 1983) (n=12,198). Controls for missing data on SES, 1980 Math, 1980 Vocabulary, 1980 Reading, 1980 Science, 1980 Writing, and 1980 Civics, School mean 1980 Math, percent Black, percent Hispanic, and percent high track were included. Models normed by setting variance of dependent variable equal to one to allow calculation of an R^2-like measure.

Table 6 -- OLS regression of self-reported and course-based indicators of track location on math achievement. Adjusted standard errors in parentheses.

INDEPENDENT VARIABLES	DEPENDENT VARIABLE: 1982 MATH ACHIEVEMENT
Intercept	0.222 (0.322)
1980 Vocabulary	0.082* (0.026)
1980 Reading	0.211* (0.030)
1980 Math	0.443* (0.127)
1980 Science	0.274* (0.030)
1980 Writing	0.282* (0.029)
1980 Civics	-0.100* (0.045)
SES	0.028 (1.066)
Black	-0.111 (0.234)
Hispanic	0.209 (0.220)
Other Non-White	-0.140 (0.457)
Male	-0.239 (0.149)
Academic track (self-report)	0.048 (0.162)
Academic track (CBI)	0.467* (0.157)
R^2	0.724

* Coefficient is twice its adjusted standard error.

Note: All analyses use the HSB transcript sampling weights (Jones et al., 1983) (n=12,198). Controls for missing data on SES, 1980 Math, 1980 Vocabulary, 1980 Reading, 1980 Science, 1980 Writing, and 1980 Civics were included.

Table 7 -- Switching regression of course-based indicator of track location and math achievement. Adjusted standard errors in parentheses.

INDEPENDENT VARIABLES	DEPENDENT VARIABLES PLACEMENT CBI	ACHIEVEMENT Non-College	ACHIEVEMENT College
Intercept	-1.907* (0.147)	0.406 (0.284)	0.938* (0.416)
1980 Vocabulary	0.017* (0.006)	0.078* (0.023)	0.077* (0.028)
1980 Reading	0.001 (0.006)	0.192* (0.028)	0.209* (0.031)
1980 Math	0.048* (0.003)	0.434* (0.012)	0.476* (0.014)
1980 Science	-0.007 (0.007)	0.269* (0.027)	0.268* (0.033)
1980 Writing	0.034* (0.006)	0.272* (0.026)	0.260* (0.032)
1980 Civics	0.024* (0.010)	0.134* (0.041)	0.035 (0.049)
SES	0.088* (0.025)	0.126 (0.098)	-0.020 (0.113)
Black	-0.035 (0.062)	-0.055 (0.199)	-0.440 (0.286)
Hispanic	-0.083 (0.054)	0.298 (0.184)	-0.070 (0.283)
Other Non-White	-0.017 (0.102)	-0.202 (0.423)	0.027 (0.482)
Male	-0.185* (0.033)	0.228 (0.136)	0.188 (0.161)
School mean SES	0.038 (0.066)	-------	-------
Schl mean 1980 Math	-0.003 (0.007)	-------	-------
School % Black	0.006* (0.001)	-------	-------

School % Hispanic	0.005* (0.001)	-------	-------
School % High Track	0.003* (0.001)	------	-------
Error Variance	0.691	13.735* (0.321)	12.753* (0.364)
R^2	0.309	0.675	0.688
Covariance with Probit Equation		-0.100 (0.070)	0.070 (0.062)

* Coefficient is twice its standard error.

Note: All analyses use the HSB transcript sampling weights (Jones et al., 1983) (n=12,198). Controls for missing data on SES, 1980 Math, 1980 Vocabulary, 1980 Reading, 1980 Science, 1980 Writing, and 1980 Civics, School mean 1980 Math, percent Black, percent Hispanic, and percent high track were included. Probit model normed by setting variance of dependent variable equal to one, allowing calculation of an R^2-like measure.

APPENDIX

Means and standard deviations of variables (n=12198). All analyses use the HSB transcript sampling weights (Jones et al., 1983).

VARIABLE	MEAN	STD DEV	% Missing
Track self-report indicator	0.346	0.476	0
Track course-based indicator	0.402	0.490	0
1982 Math	20.359	7.042	0
1980 Vocabulary	11.087	4.156	7.5
1980 Reading	9.317	3.728	7.4
1980 Math	19.200	7.042	8.1
1980 Science	11.169	3.513	8.2
1980 Writing	10.576	3.701	9.2
1980 Civics	5.937	1.922	9.8
SES	-0.033	0.712	3.6
Black	0.112	0.316	0
Hispanic	0.123	0.328	0
Other	0.022	0.148	0
Male	0.482	0.500	0
School mean SES	-0.033	0.380	0
School mean 1980 Math	18.940	3.359	2.5
School % Black	13.078	21.408	4.4
School % Hispanic	5.286	12.693	4.3
School % College Track	43.976	27.393	7.1