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ABSTRACT

This paper attempts to determine whether increased levels of involvement among socially advantaged parents accounts for children's track placements. Research has shown that students of higher social classes have a greater advantage in attaining placement in elite math sequences. Data from the National Educational Longitudinal Survey (1988) was used to look at sophomore-year track placements in math sequences. The results indicated that highly educated parents were more involved in their child's education. The sole indicator that was not positively correlated was when parents requested students to be held back. The results support the idea that social class has an effect across all of the math sequence transitions. Social class operates regardless of the level of student achievement, although the effect on math sequence placement was strongest, regardless of the level of student achievement. An investigation of the relationship between direct parent involvement and trait placement suggests that an ordered categorical model is appropriate. Appendix is "Coding Procedures for Transcript File." (Contains 8 tables and 32 references.) (Author/JDM)

Do increased levels of parental involvement account for social class differences in track placement?

By

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The objective of this paper is to determine whether increased levels of involvement among socially advantaged parents account for their children's advantage in track placement. Researchers have long noted that students from economically privileged backgrounds are more often placed in high track classes than their less advantaged counterparts (Heyns, 1974). Even after statistically controlling for test scores and other measures of academic achievement, this finding persists (Gamoran & Mare, 1989; Lucas, 1999). Other scientists have concluded that middle-class parents play a more active role in managing their children's academic careers compared to parents who are less educated or financially well off (Lareau, 1989). To what extent are these two findings linked? Can differences in parental involvement account for differences in track placement?

In most schools track assignment is formally based on "objective" criteria such as test scores and classroom grades. However, the tracking structure is hardly a perfect response to the ability distribution of the students as measured by standardized tests. Rather, researchers have documented substantial overlap in the ability distributions of adjacent track levels (Hallinan, 1992), and that parental social class is associated with different track placements among students with similar test scores (Gamoran, 1992a).

Parents can influence the track placement of their children directly, but are also involved in the more general management of their youth's academic career. In this paper I distinguish between two sets of parental involvement, direct involvement and a more general involvement I am calling indirect involvement. Indirect involvement is that involvement which is expected to have an impact not on track placement directly, but on test scores and classroom achievement. For example, parental involvement with homework[1] may increase academic achievement, but is unlikely to result directly in higher track placements. In a model that controls for these student characteristics, indirect involvement would not be expected to mediate the effect of parental social class. Nor is the NELS88 dataset conducive to an indirect path analysis using sophomore year track placement, since there is only one wave of data collection prior to that year. Hence achievement controls would be unavailable for the analysis of 8th grade achievement as a function of indirect involvement. In previous studies that did not explicitly distinguish between types of involvement, indirect measures were shown to have no effect on track placement (Baker & Stevenson, 1986; Oswald, Baker & Stevenson, 1988).

Early research on the relationship between parental education and track placement did

1 Or it may not! See Balli et al (1998), "Family Involvement with Children's Homework: An intervention in the Middle Grades."

focus on direct involvement. In a study of the transition to high school, Baker & Stevenson (1986) hypothesize that highly educated mothers may intervene to override the school's placement decision "irrespective of the child's performance." They confirmed this hypothesis by examining parental involvement at a single school with rigorous controls for prior ability. In a larger study of two school districts, Useem (1991,1992a&b) sought to elaborate on the relationship between track placement, parental education, and involvement. Again, it was discovered that parental education was highly correlated (.58) with parental involvement. Further, she concluded that controlling for involvement reduced the effect of parental education on track placement. More educated parents were more involved with the school and had a greater knowledge of the school's track structure. Useem concluded that it is the insider knowledge of more educated parents that gives them an edge in dealing with the school. In these two analyses, both education and involvement are significant, though some of the zero-order correlation between education and track placement is really due to involvement.

To complicate the picture, it must be stated that schools vary in their placement procedures. Researchers have sometimes dealt with the relative electivity of the placement scheme (Jones, Vanfossen, & Ensminger, 1995), or the extent to which students are able to choose their own track. One would expect that there would be more "room" for parental involvement in a school with high electivity. The notion of electivity is hard to operationalize though, and there is evidence that students rarely have any real "choice" in the matter of track placement (Rosenbaum, 1976). More specifically, schools vary in the placement criteria used (Spade, Columba, & Vanfossen, 1997). These criteria can be described as more or less objective, and have a higher or lower tolerance for parental input. Schools also differ dramatically in the relative size of different tracks. The probability that any given student will be enrolled in a calculus class for instance, will depend on the school's policy toward more or less inclusiveness (Jones, Vanfossen, & Ensminger, 1995; Sørenson, 1970) in upper track math classes.

By including a range of schools in her study, Useem was able to address the interaction of school alignments and tracking policies with parental involvement. She found that school personnel often resisted parental efforts to raise track placements. Parental overrides of the school's track placement decision were less frequent in the district that relied more heavily on standardized test scores for placement decisions (Useem, 1991). In a study of West German schools, Oswald, Baker, and Stevenson (1988) showed that parental involvement varies depending on the charter of the school. While the charters of American schools may appear more uniform on the surface, schools certainly differ in the extent to which they provide an elite curriculum.

Qualitative research (Lareau, 1987) suggests further, that even given a similar level of involvement, parents of higher social class will be more successful. This interaction between involvement and social class was found to be part of a basic middle class alignment toward schooling, "parents saw education as a shared enterprise and scrutinized, monitored, and supplemented the school experience of their children." (Lareau, 1987; pp. 81). Thus it may not be the level of parental involvement that leads to higher track placements, but the skills of the parents who are involved.

The research to date however, does not lead to conclusions about how parental involvement works on a national scale. In Baker & Stevenson's analysis (1986) they considered a single unusual school where parents had complete control over the youth's track placement. As the tracking structures and academic climates vary from school to school, so does the capacity for parents to intervene on behalf of their children. While Useem was able to study these differences in detail, she was not able to control for student ability in examining the relationship between involvement, parental SES, and track placement. What is needed is a quantitative analysis of a national database to adequately represent the effect of parental involvement.

Data & Methods[1]

The data used come from the National Educational Longitudinal Survey, base year 1988. An indicator of sophomore year track placement (*Math Sequence*) is the dependent variable. *Math Sequence* is an ordinal variable with five categories, which codes which math sequence the student is in. The math sequence variable was generated using the 9th and 10th grade transcript data. Using the Classification of Secondary School Courses (NCES, 1982) individual courses were assigned to one of five codes, and individuals were assigned to math sequences based on the combination of classes taken. The coding process was very similar to the one used by Stevenson, Schiller, and Schneider (1994). The major difference is that additional math sequences were coded for the upper and lower end of the scale. Table 1 provides frequency counts for the math sequences. A detailed description of the coding procedure for *Math Sequence* appears in appendix 1.

Past researchers have sometimes concluded that the student assessment of the college/noncollege distinction is an adequate indicator of track placement (Gamoran & Mare, 1989; Gamoran, 1987). They report that course-taking indicators have relatively high agreement with the student assessment, and that course taking differs dramatically by the college/noncollege distinction). Other researchers prefer structural measures of track placement (Lucas, 1999; Garet & Delany, 1988). Structural indicators have several desirable properties over more subjective assessments. First, many schools do not formally track students comprehensively across all subjects (Moore & Davenport, 1988). It may make more sense to utilize this indicator on only a subset of schools. Second, any variation in structural location beyond the three-category distinction is lost in the available subjective assessment. Third, subjective assessment measures confound the within school and between school component of track placement. In other words, we have no knowledge of the comparison groups being evoked by the respondent. Finally, there is evidence from comparisons of student and course based indicators that variance in reporting is non-random across social groups (Lucas & Gamoran, 1993). I have chosen to analyze math placement in particular, since school tracking policies may be subject specific, and because mathematics course sequences are *relatively* easy to code without explicit knowledge of the school's tracking structure. The spearman rank order correlation coefficient for the 11,560 cases with data on both *Math Sequence* and the traditional student measure of overall track placement was only .396.

Table 1: Cell Frequencies of Dependent variable

Math Sequence:	**N**	**Proportion**	**Weighted Prop.**
Greater than Algebra II or Geometry	855	6.31 %	4.75 %
Algebra II & Geometry	2022	14.92 %	13.36 %
Algebra II or Geometry but not both	5414	39.96 %	40.04 %
Algebra I	2996	22.11 %	23.90 %
Less than Algebra I	2261	16.69 %	17.95 %

Extensive controls will be used to isolate the effects of education and involvement from student ability. Student reported grades from the 8th grade on math, English, science, and social science are included in the models, as well as scores on standardized tests in reading, math, science, and history. Race dummy variables for non-Hispanic blacks, Hispanics, and other nonwhites, as well as a gender variable are also included. Parental background variables include a variable coding for parent's highest educational level, and SES, which can be thought of as the residual effect of occupation and income in a multivariate framework. Dummy variables are also included for the marital status of the parent, and for whether or not the student has an older sibling.

It is important to note that I will not be controlling for prior track placement, because what I am interested in is the cumulative effect of the students parental characteristics. Adding prior track placement to the model would only allow the parental characteristics across one transition to be considered. In fact, prior track placement is itself a function of the same variables at an earlier time plus an error term. The downside is that the error is then cumulative as well. In other words, some students could be in a high math track merely because at some earlier point they got lucky and were enrolled in a high track. Thus the models presented will be far less efficient than one that controlled for prior track placement. The positive aspect of not including prior track placement is that the effects of the independent variables will be much stronger as they are really the cumulative effect over the course of the child's schooling.

School Level Variables

At the school level, several variables measure the academic climate of the school. To determine differences across sector, dummy variables for school sector were included. Inclusiveness is considered to be the percentage of students enrolled in a college-preparatory curriculum as reported by school administrators (Gamoran,1992b). The percent of students receiving free lunch is also included as a proxy for school SES, which has been shown to influence the offering of math courses (Useem, 1992a). Also included are variables measuring the percentage of tenth graders who drop out, the percentage of 88-89 graduates who attend a four-year college, and the percent of black and Hispanic students.

Missing values at the school level were handled by using aggregated student data to impute values, mean substitution, and by regression imputation. Dummy variables were included in the models to account for missing value substitutions. Similar techniques were used for student level variables.

Parental Involvement

Parental involvement is not so easily measured, for a parent may be involved in a student's education in a number of ways. Baker & Stevenson (1986) consider four dimensions of involvement; knowledge of child's schooling, contact with school, homework strategies, and general academic strategies. The first two I am calling direct measures, the second two I am calling indirect measures. Homework strategies were found to be unassociated with course selection, while the use of general academic strategies by parents was found to be negatively correlated with the selection of higher track courses. Knowledge of child's schooling and parental contact with school were positively correlated with high track course selection. These findings illustrate that there are measures of involvement relevant to track placement, and measures of involvement that are not relevant to track placement. For example, while homework strategies may have an impact on academic achievement, and thus an indirect effect on track placement, they will not necessarily lead to intervention in favor of higher track placement. Further, measures that appear to get at the propensity to intervene in behalf of a child during course placement may be representing something else. For example, Ho and Willms (1996) show that a measure of school contact has a negative impact on achievement. They interpret this as showing that parents may be forced to interact with the school when their children are at risk of academic failure.

Direct measures of parental involvement entail those things that relate directly to the parent's ability to influence the **placement** of the student into the tracks given the student's performance as measured by grades and test scores.

The first set of variables attempts to measure the parent's propensity to intervene on behalf of the student. Two measures of past parental intervention include either having the youth skip a grade, or holding the youth back. Also included are dummy variables coding for the parent "deciding which courses a student will enroll in" and for the parent requesting that the student be in their current math class. These are variables with a low frequency of occurrence. The second set of variables relates to the parent discussing school, and about course-taking in particular, with the student. Three parent indicators and two student indicators are averaged to achieve two indicators of the level of discussion about school between the student and parent. These are similar to one of the variables that Oswald, Baker, & Stevenson (1988) found to be significant in analyzing school charters. The third set of variables measure parent initiated contact and involvement with the school. I distinguish between three types of contact with the school. Neutral contact is contact that does not involve academics such as contact about school fund-raising or volunteer work. An indicator of three types of neutral contact is included in the analysis, as well as an indicator of specific involvement in Parent-Teacher Organization related activities. Also included is contact specifically related to the academic program of the student. Excluded from the analysis are types of contact related to misbehavior or academic distress. While there have been negative findings about the relationship between parental contact with school and track placement (Ho & Willms, 1996), others have shown a positive effect (Baker & Stevenson, 1986). Finally, I included a measure of the number of friends at the same school known by the parent (*Parental Networks*). The higher a parent scores on this variable the more knowledgeable they are likely to be about the track structure of the school. Useem (1992b) found a .69 correlation between parental education and the extent to which parents were connected to "informal parent networks" that helped facilitate knowledge of the school's course structures.

Expectations

From the 8th grade survey, there are 7 measures of expectations. Included are; one parent measure, two measures of the child's perceptions of their parent's expectations for them, and four measures of the student's expectations. The parent measure of how far in school do you think the respondent will go is correlated with the equivalent student measure, as well as the three other student measures. Two of these measures are, how sure are you that you will go further than high school, and what track do you expect to be in high school. However, the students do not seem to be able to accurately state their parent's expectations of them, which is kind of curious. For the analysis, only the four student measures will be used. The rational for using student measures of expectations as a proxy for parenting characteristics perhaps needs some explanation. For parental expectations to have an impact on a student's track placement, the student must have internalized the expectations. This is not to say that parents are the only source of a child's expectations, but that some unknown quantity of a child's expectations of their educational success are derived from the educational level of their parents. According to this model, in a comprehensive high school serving a diverse community, some of the students would take for granted the fact that they were bound for higher education, while others would find there position more precarious. It is those students whose parents are highly educated that take higher education for granted. This level of certainty should explain some of the "residual" effect of parental education.

Results

Are parents of higher social class more directly involved in the schooling of their children than parents of lower social class? Table 2 presents the spearman correlation coefficients between parental education and the various types of involvement.

Table 2: Spearman Corr. coefficients between parental education and forms of direct involvement (N=13,548)		
Propensity to directly intervene in track placement:	Skipped a grade	.034***
	Held back a grade	-.020*
	Parent decides which courses student takes	.152***
	Parent requested current math course	.050***
Academic contact with school:	Number of times parent contacted school about academic program of student	.1249***
General contact & involvement with school:	Contact with school about fund raising, volunteer work, or school records	.157***
	Involvement in Parent-Teacher organization activities	.265***
Discussion of schooling with student:	Discussion about school (parent indicator)	.131***
	Talking about school (student indicator)	.156***
Parent knows parents of students friends:	Parent knows parents of students friends (*Parental Networks*)	.176***

*** P > |.001| ** P > | .01| * P > |.05 |

More highly educated parents are in fact more directly involved in the schooling of their 8th grade children. This seems to be true across the range of variables explored here, and refers to both specific involvement with academics and more general involvement. The sole indicator that was not positively significant was the indicator for the parent having *requested* the student be held back at some point in their schooling. Since this variable is negatively correlated with student achievement, it makes sense that it is also negatively correlated with parental education in a bivariate analysis. However, I maintain that this is in fact a potential indicator of the propensity of the parent to be directly involved in the student's track placement. It remains an open question whether this is an indictor of a parental preference for the student to be in a less demanding track, or simply a more general indicator of parental involvement.

Turning now to the multivariate analysis, issues of track placement and social class can be addressed. I first examine the relationship between social class, race, achievement, and school effects in a series of ordered logit models. I also consider separate logit estimates of the social class and race effects. This allows for separate tests of statistical significance on the probability of being assigned to each sequence independently. For this analysis *Math sequence* is recoded for each logit estimate according to the "transition" it refers to (ex. Alg I vs. < Alg I). A similar, but not identical way to analyze the effects of race and social class is to see for which subset of students these characteristics matter rather than for which math sequence transition they matter. Students are sub-classified by achievement, and separate ordered logit models are run. Table 3 displays the initial models.

Table 3: Ordered logit models of math sequence placement. N= 13,548.					
Model:	**1**	**2**	**2.5**	**3**	**4**
Parental education	.17(.034)***	.078(.036)*		.080(.036)*	.076(.037)*
High school grad			-.10(.12)		
Some college			.098(.065)		
College grad			.17(.074)*		
Masters			-.025(.090)		
Phd			.15(.12)		
SES	.78(.062)***	.32(.068)***	.32(.068)***	.33(.068)***	.25(.069)***
Male	.22(.045)***	.071(.050)	.071(.050)	.072(.050)	.078(.049)
Black	-.32(.10)***	.19(.11)	.19(.11)	-.33(.16)*	-.36(.16)*
Hispanic	.023(.088)	.36(.10)***	.36(.10)***	.15(.12)	.065(.12)
Asian	.48(.14)***	.53(.12)***	.53(.12)***	.50(.12)***	.41(.12)***
Other	-.73(.24)**	.071(.21)	.071(.21)	.050(.21)	.075(.20)
Intact family	.22(.059)***	.12(.059)*	.12(.059)*	.14(.059)*	.14(.059)*
Step-parent family	-.11(.077)	-.088(.075)	-.088(.075)	-.075(.075)	-.048(.076)
Older sibling	-.17(.044)***	-.058(.045)	-.058(.045)	-.059(.045)	-.065(.045)
Math grades		-.30(.035)***	-.30(.035)***	-.30(.035)***	-.30(.035)***
Math test		.093(.0038)***	.093(.0038)***	.094(.0039)***	.093(.0040)***
English grades		-.25(.033)***	-.25(.033)***	-.25(.033)***	-.26(.033)***
English test		.023(.0046)***	.023(.0046)***	.023(.0046)***	.021(.0047)***
Science grades		-.24(.033)***	-.24(.033)***	-.23(.032)***	-.24(.032)***
Science test		-.0030(.0083)	-.0030(.0083)	-.0012(.0083)	-.0026(.0083)
Social Studies grades		-.25(.034)***	-.25(.034)***	-.25(.033)***	-.25(.034)***
History Test		.0068(.0090)	.0068(.0090)	.0067(.0091)	.0032(.0090)
Percent Black				.0045(.0022)*	.0060(.0024)*
Percent Black*Black				.0075(.0037)*	.0069(.0036)
Percent Hispanic				.0022(.0025)	.0027(.0027)
Percent Hispanic*Hispanic				.0024(.0034)	.0029(.0033)
Percent in college track					.0052(.0018)**
Percent free/reduced lunch					-.0005(.0024)
Percent drop outs					-.0015(.0044)
Percent attend four-year college					.0022(.0022)
Catholic					.58(.19)**
Private, Religious					.32(.27)
Private, Non-religious					.039(.21)
Private, Unknown					1.035(.13)***

*** P > |.001| ** P > |.01| * P > |.05 |

Considering model one, it is clear that there is a significant social class effect. Also note that parental income and occupation (the SES coeff. in this multivariate model) exert an independent effect on math sequence placement, and have a component of variance that is unexplained by parental education. There is also a negative baseline effect of being black on math sequence placement, as well as a positive effect of being male. Students from intact families (father and mother headed), and Asian students are also more likely to be in the higher math sequences. Model one gives us significance tests for baseline probabilities of being in the higher math sequences, and describes the individual level effects that are to be explained in subsequent models. Note that the variables for family structure are in some sense a measure of the family's ability and propensity to be involved in their children's schooling. A single parent family will literally have fewer units of parent time to spend being involved with schooling. While two parent families are the same in regards to units of parent time available, a family headed by both biological parents is different from a stepparent family. This is because parental schooling effects are due in part to the willingness of the child to be influenced by their parents. A stepparent is presumed to have less authority and respect with which to influence, and potentially less desire to do so as well. In this analysis I am considering parental involvement holding family composition constant, though it is clear from the intact family coefficient in the above models that children in homes with two biological parents have an advantage in math sequence placement.

Table 4: Baseline Probabilities of track placement by categories of race and social class (from model one)

	Black	Non-black	≤ High school	≥ College Deg
Greater than Algebra II or Geometry	2.40 %	5.52 %	1.79 %	10.21 %
Algebra II & Geometry	7.74 %	14.64 %	6.24 %	23.68 %
Algebra II or Geometry but not both	32.66	40.60 %	31.33 %	44.24 %
Algebra I	28.64 %	22.90 %	30.36 %	14.67 %
Less than Algebra I	28.55 %	16.34 %	30.28 %	7.19 %

Comparing model two with model one, it is clear that much of the individual level effects are mediated by scholastic achievement. Over half of the effect of social class is due to differences in achievement, but a large unexplained social class advantage still remains. Substantively, how large is this effect? To answer this question, predicted probabilities of math sequence placement can be generated from the logit coefficients in the model2. Independent of test scores, students who have a parent with a college degree have a .116 higher probability of being in one of the upper three math sequences than do their counterparts with parents who are high school graduates. This amounts to roughly a 19.2 % increase in the chances of being in the higher track.

The black and Hispanic coefficients are now positive, and gender is no longer relevant. Interestingly, the positive effect of being Asian on track placement persists, and almost half of the intact family effect disappears. Model 2.5 is identical to model 2 from an estimation procedure, but uses dummy variables for the parental education variable. These variables are coded so that the coefficients and the significance tests refer to differences between levels. Less than high school is the omitted category. This model tells us something about which differences in parental education are most significant in affecting track placement. The distinction between college and non-college attendants, and college and non-college graduates is the most salient, though there is also a small effect of having a Phd.

However, this model is somewhat misleading if taken alone, because it does not account for the nesting of individuals within schools. After controlling for achievement, do black and Hispanic students really have an advantage in math sequence placement as the model would indicate? In the data used in this analysis 29.4 % of black students attend a school that is more than 70 % black and 31.8 % of Hispanic students attend a school that is more than 70 % Hispanic (weighted estimates). It makes little sense to think of a racial or ethnic effect in a school with little variance in race and ethnicity. In model 4, school level variables for the percent black and Hispanic are added to the model, as well as interaction effects for the student's race and ethnicity with the percent black and Hispanic. The black coefficient is now significantly negative, and the Hispanic variable has little or no effect. The total effect of being black is only negative however, if the student is in a predominantly white school where the positive effects of the interaction term

2 To do so I specify that all other variables in the model are held at their mean values, with the exception of SES, which I specify is held at the mean value of the groups being compared. Using the model equation I then generate scalar values (in the logit metric) on the latent variable for math sequence placement for different values of parental education. Then the logit metric is transformed into a probability metric for the categories of interest using the cut-points generated by the model. See Long, (1997) for a discussion of how to interpret ordered logistic regression coefficients.

do not apply. According to model 4, with the other variables held constant at their means, a black student in a school that is 10.5 % black has a .058 lower probability (9.6 % less chance) of being in one of the top three math sequences than a white student at the same school. A black student would have to attend a school that was greater than 27.5 % black for the negative effect to disappear. An estimated 33.3 % of the black students in this analysis attend a school where there is a negative effect on math sequence placement.

Model four adds school level controls for sector, inclusiveness and other measures of school academic competitiveness. In the data analyzed, 31 % of the variance in math sequence placement is between schools. Eight percent of the total variance in math sequence placement can be explained by sector alone3. In other words, schools vary widely in the average math sequence placement of the students enrolled. Thus it may be important to consider the characteristics of the schools that students of different social class attend. Looking at the coefficient for parental education and SES, which have decreased some, it appears that part of the individual effect of social class is due to the schools high social class students attend. Students of higher social class tend to go to schools where the probability of being in the higher math sequences is already higher. Economists have developed formal models to illustrate the fact that some of the social class effect on track placement could be due to the fact that schools compete for high ability students across sectors by manipulating the criteria of admission to the higher tracks (Epple, Newlon, & Romano, 2000). Because mobility across sectors is constrained by financial concerns, based on market theory one would have to *expect* a higher level of track placement for upper income families. I offer the comparison between models three and four as at least possible evidence of this phenomenon at work.

3 Lee & Bryk (1988) conducted an analysis of the catholic school sector effect on track placement in the HS&B data. They found a substantial positive Catholic sector effect on the amount of academic course-taking as well as on the probability of being in a higher overall track.

Before turning to the role of parental involvement, it is desirable to refine our understanding of track placement with separate logit models for each math sequence transition, and by sub-classification on achievement. To examine each transition, a logit regression is run on the subset of students "eligible" for that transition. Eligibility is defined as being in one of the two categories defined by the transition. For example, Model 4a allows us to answer the question, is there a significant residual parental education effect in placement between algebra I and less than algebra I? I drop the SES variable to increase parsimony4.

Table 5: Separate logistic regression estimates for each transition from model 4 (but without SES variable), selected coefficients.

	Model 4a Less than Algebra I → Algebra I N= 5257	**Model 4b** Algebra I → Algebra II or Geometry N=8406	**Model 4c** Algebra II or Geometry → Both N=7432	**Model 4d** Both Alg II & Geometry → > Alg II or Geom. N=2877
Parental Education	.28(.048)***	.13(.032)***	.035(.035)	.21(.054)***
Black	-.40(.21)	-.27(.20)	.13(.35)	-.036(.51)

*** P > l.001l ** P > l .01l * P > l.05 l

Table four illustrates that the ordered logit model is in general adequate for describing the effects of social class. There are social class effects in both the upper and lower math sequence placement processes, and within the limits of statistical significance they are all in the same direction. The separate estimates for *black* tell a slightly different story. Most of the negative effect of being black on the probability of higher math sequence placements comes from the lower probability of making the transition from less than algebra I to algebra I. This improves the interpretation of the ordered logit findings by showing that the effect does not operate across every transition.

From the models investigated already, it is clear that the specific transition under consideration is important in understanding social class effects. It is also clear that student

4 This is a somewhat different coding than a continuation odds model using separate logit estimates, since those individuals who "made the transition" are only included if they are in the adjacent math sequence.

achievement is a powerful predictor. How might our understanding of math sequence placement by augmented by considering the interaction between social class and achievement? To do this I ran logit models for the transition into the top two math sequences as a function of the student achievement variables alone. I then outputted predicted probabilities of being in the top two tracks for each student based on the student achievement coefficients. Students were put into three groups based on their predicted probabilities. I then ran ordered logit models on each subset of students.

Table 6: Separate ordered logit regressions (model 4, without SES). Students are sub-classified based on predicted probabilities from grade and test data.

Probability of being in top two math seqs:	Bottom 25th percentile, $P \leq 2.9$ %	Middle 50th percentile, P: 2.9 % ⇔ 31 %	Top 25th percentile, $P \geq 31$ %
Parental education	.22(.044)***	.22(.031)***	.13(.039)***

*** P > |.001| ** P > | .01| * P > |.05 |

Regardless of the prior probability of being in a given math sequence based on achievement data, social class plays an important role in placement. This is true at least based on the categorical breakdown above. The top 25th percentile does include some students with a prior probability less than .5. It may be the case that among very high achievers, say the top 10%, that social class does not play much of a role because there isn't "room" for many non-achievement effects. What is important is to consider the analyses in tables four and five together. Taken together they indicate that the residual social class effects are pervasive throughout the strata of opportunity to learn mathematics.

The role of direct parental involvement and expectations

The parental involvement and expectation variables were added to model four. Table 6 compares the effects of involvement and expectations on math sequence placement.

Table 7: Ordered logit models of math sequence placement; the effects of direct parental involvement and expectations (model four variables included).

Dependent var:	**Math Sequence** (*Mseq*) N=13,548	
Independent vars:	**Model 5**	**Model 6**
Parental education	.079(.036)*	.064(.023)
SES	.24(.069)***	.17(.068)*
Skipped a grade	.30(.29)	.29(.27)
Held back a grade	-.32(.096)***	-.33(.096)***
Parent decides which courses student takes	.010(.050)	.011(.050)
Parent requested current math course	.37(.17)*	.41(.17)*
Number of times parent contacted school about academic program of student	-.038(.039)	-.042(.039)
Neutral contact with school	-.17(.056)**	-.18(.055)***
Involvement in Parent-Teacher organization activities	.10(.053)	.099(.054)
Discussion about school (parent indicator)	.029(.046)	.023(.047)
Talking about school (student indicator)	.056(.038)	-.038(.038)
Parent knows parents of students friends (Parental Networks)	-.0047(.017)	-.010(.018)
How far in school do you think you will go		.23(.031)***
How likely you will go further than high school		-.04(.049)
Expect to enroll in college track		.26(.064)***
Expect to enroll in vocational track		-.15(.069)*

*** P > |.001| ** P > | .01| * P > |.05 |

The social class coefficients did not decrease in model 5 from their value in model 4. In fact, the effect of parental education actually increased. Of the involvement measures investigated only one has a significant positive effect; the indicator of a parent having requested the student take their current math class. This variable is almost positively related to math sequence placement by definition though. The interesting finding is not the value or significance of the coefficient, but that it occurs only rarely (1.2 % of the cases) and is only loosely related to social class, thus it cannot be expected to mediate the effect of social class by much, if any. The effects of both measures of contact, as well as the indicator of parental networks are actually negative.

So while parents of higher social class are certainly more directly involved, it does not appear to contribute to the advantage their children have in being placed into higher math sequences. Perhaps the effects of direct involvement on math sequence placement only operate if the parent is also of high social class? I tested this hypothesis by adding interaction terms, and by running models on subsets of parent education levels, but found little that would support this conclusion. In fact, if one considered only parents with a college degree or higher, there were no significantly positive effects of involvement. A different conclusion can be reached about the effect of expectations on math sequence placement. When the four measures of expectations were added to the model 32 % of the residual SES effect and 16 % of the parental education effect was accounted for. General expectations about educational attainment had a strong positive effect, as did specific expectations about placement in the college and vocational tracks.

Discussion & Conclusions

This research supports and extends much of the prior research on track placement and social class. At the baseline level, students of higher social class have a huge advantage in attaining placement in elite mathematics sequences. Even after controlling for middle school grades and standardized test scores in four different subject areas, a substantial effect persists. Unlike prior research using very similar data and measure of course-taking (Stevenson, Schiller, & Schneider, 1994), I find that social class has an effect across all of the math sequence transitions, though it is strongest in the lower sequences. Prior research has also noted that there may be an interaction between social class and achievement, such that the social class effect operates only among the lower achieving students (Gamoran, 1992a). This is really very similar to the previous question, since the transition of interest is largely determined by prior achievement. Again, I find that social class operates regardless of the level of student achievement, though the effects on math sequence placement are strongest between low achieving students. These are important findings because they have implications for investigating the relationship between direct involvement and track placement. They suggest that an ordered categorical model is appropriate.

How do the results presented on race differ from prior findings? Prior research concludes almost unanimously that for black students compared to white students, there is a large negative baseline effect that disappears or becomes positive after achievement controls are introduced (Garet & Delany 1988; Gamoran & Mare, 1989; Lucas & Gamoran, 1991; Lucas, 1999 chapters 3 & 6). Since different measures of track placement are used in these studies they are not strictly comparable to the results presented here. For example, Lucas presents two sets of analyses on race and track placement, a multinomial analysis of joint track placement in math and English in more than one year (Chap. 3), and a stratified ordered probit model of twelfth grade mathematics and English track *mobility* (Chap. 6). More importantly, in these studies the researchers did not take into account the fact that students were nested within schools, so they offer little information on the role of race. For example, Lucas & Gamoran (1991) find that adding school level controls to an ordered probit regression of track placement on race negates the positive effects of being black. While this controls somewhat for the between school component of track placement, it does not address the fact that the effect of being black is contingent on the racial composition of the school. It is necessary to consider the interaction between the racial composition of the school, and the race of the student. Contrary to prior research, I find a significant negative effect of being black on math sequence placement in predominantly white schools. In particular, black students have a lower probability of making the transition out of the lower math sequences. I also find that Asian students have a persistent advantage in math sequence placement, and that there is little effect of being Hispanic.

In this analysis, I find almost no support for the hypothesis that students of social class have an advantage in math sequence placement because their parents are directly involved in the placement process. Parents do sometimes directly intervene, which is indicated for example by the variable measuring whether or not the parent requested the student take their current math course. At the national level, this happens rarely though, and cannot account for the widespread social class effect. Really though, it is highly unlikely that direct parental involvement could mediate most or all of the social class effect as in the Baker & Stevenson (1986) analysis, because most schools probably do not allow the parents to completely determine the student's placement (Kelly, 1998).

The question of how to account for the social class effect is really a question of which social relationship is most important; the parent-student relationship, the school-student relationship, or the parent-school relationship. I am not suggesting that parental alignments to school *in general* are unimportant, but I would like to suggest that the third relationship is the least relevant in terms of *direct* involvement. Perhaps the social class effect can be explained by considering that even after controlling for student achievement, the students themselves are still not comparable. How might they lack comparability?

Model six demonstrates that roughly a third of the residual social class effect can be explained by the student's educational expectations. These findings bring to mind anthropological research on immigrant minorities, which suggests that direct parental involvement with the school may be irrelevant to the child's success in school (Gibson, 1987). It has been asserted that parents of all social class backgrounds value educational success (Connell et al., 1983). However, as Lareau suggests, this does not necessarily entail equal expectations on an objective scale (Lareau, 1987). I find that internalized expectations are partly responsible for social class effects in schooling. While educational expectations are certainly a function of the parent-student relationship, it is crucial to realize that this relationship need not be determinate. These findings are optimistic because expectations can be affected by the school-student relationship as well. Do school programs that specifically attempt to raise the educational aspirations of lower class students actually do so? If so, what are the effects, both cumulative and immediate of these interventions? These are important policy questions.

Finally, I would like to reiterate the distinction between direct and indirect involvement I have made here. I have analyzed the effects of direct parental involvement after controlling for student achievement. Yet by the time students reach the eighth grade, there is already a vast difference in student achievement by social class. To the extent that parental involvement is an important factor in generating this achievement difference, it obviously has an important role in predicting track placement indirectly, and on many other outcomes of sociological interest.

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[1] All data are modeled using Stata's Svy commands, which control for the sampling design of the NELS 88 survey. The analysis was conducted with the student individual level data. The data is stratified by school type, and clustered within schools. There are an average of 12.5 cases per school in the *Math Sequence* analysis. Further, minorities were over-sampled within schools. Preliminary analysis showed that models run without taking account of the sampling design had deflated standard errors. For example, in the full model the four standardized test controls in the unadjusted model had standard errors that were approximately 40 % smaller than in the adjusted models. Thus all models employed in the analysis utilize the more conservative techniques that control for the sample design.

Table 8: parameter estimates for three of the standardized test controls in model four† Svylogit vs ologit	English test score	Math test score	Science test score
Ordered logit regression	.015 (.0033)	.094 (.0026)***	.0045 (.0058)***
Svy ordered logit regression	.023 (.0045)	.093 (.0040)***	.0008 (.0083)***

*** P > |.001| † see Table 3 for a list of the independent variables.

Appendix 1

Coding procedures for Transcript File

Using the *Classification of secondary school courses* (NCES 1982) I assigned the following codes (1-5) to each of the courses, with the exception of "Pure Mathematics, Other"(270400) where the content and level of the course was ambiguous. For this course I looked at individual cases and assigned a code based on which other classes they have taken. For example, if they took algebra II and Geometry by freshman year and a (270400) course sophomore year, I assigned this course to group one. There were 103 instances of this code, only 21 of which occurred in the ninth and tenth grade years, which will be the ones that I code by hand.

NCES code	Title	Course code	NCES code	Title	Course code
270100	Mathematics, Other General	5	270409	Geometry, Informal	5
270101	Mathematics 7	5	270410	Algebra 3	1
270102	Mathematics 7, Accelerated	5	270411	Trigonometry	1
270103	Mathematics 8	5	270412	Analytic Geometry	1
270104	Mathematics 8, Accelerated	5	270413	Trigonometry and Solid Geometry	1
270105	Unused Code		270414	Algebra and Trigonometry	1
270106	Mathematics 1, General	5	270415	Algebra and Analytic Geometry	1
270107	Mathematics 2, General	5	270416	Analysis, Introductory	1
270108	Science Mathematics	5	270417	Linear Algebra	1
270109	Mathematics in the Arts	5	270418	Calculus and Analytic Geometry	1
270110	Mathematics, Vocational	5	270419	Calculus	1
270111	Technical Mathematics	2	270420	Calculus, Advanced Placement	1
270112	Mathematics Review	5	270421	Mathematics 1 Unified	3
270113	Mathematics Tutoring	5	270422	Mathematics 2 Unified	2
270114	Consumer Mathematics	5	270423	Mathematics 3 Unified	1
270200	Actuarial Sciences, Other*		270424	Mathematics, Independent Study	5
270300	Applied Mathematics, Other	5	270500	Statistics, other	5
270400	Pure Mathematics, Other		270511	Statistics	5
270401	Pre-ALgebra	5	270521	Probability	5
270402	Algebra 1, Part 1	5	270531	Probability and statistics	5
270403	Algebra 1, Part 2	4	270601	Basic Math 1	5
270404	Algebra 1	4	270602	Basic Math 2	5
270405	Algebra 2	2	270603	Basic Math 3	5
270406	Geometry Plane	3	270604	Basic Math 4	5
270407	Geometry Solid	3	279900	Mathematics, Other	5
270408	Geometry Plane & Solid	3			

* this course was not taken by any ninth or tenth grade students.

Individual course codes:

1 Greater than Algebra II or Geometry
2 Algebra II
3 Geometry
4 Algebra I
5 Less Than Algebra I OR Math Elective

Student track codes sophomore year:

5: Higher than Algebra II or Geometry
4: Algebra II & Geometry
3: Algebra II or Geometry but not both
2: Neither Algebra II or Geometry, or higher but Algebra I
1: Only Less than Algebra I or math electives

References

Baker, David P. and David L. Stevenson. (1986). "Mother's Strategies for Children's School Achievement: Managing the Transition to High School." *Sociology of Education*, 59: 156-166.

Balli, Sandra J., Demo, David H., and John F. Wedman. (1998). "Family Involvement with Children's Homework: An Intervention in the Middle Grades." *Family Relations*, 47: 149-157.

Connell, R. W. et al. (1983). *Making the Difference: Schools, Families, and Social Division.* George Allen, Boston

Epple, D., Newlon, E., and R. Romano. (2000). "Ability tracking, school competition, and the distribution of educational benefits." NBER Working Paper No.7854

Gamoran, Adam. (1992a). "Access to Excellence: Assignment to Honors English Classes in the Transition from Middle to High School." *Educational Evaluation and Policy Analysis*, 14: 185-204

____________. (1992b). "The Variable Effects of High School Tracking." *American Sociological Review*, 57: 812-828.

Gamoran, Adam, & Mare, R.D. (1989). "Secondary school tracking and educational equality: Compensation, reinforcement, or neutrality." *American Journal of Sociology*, 94: 1146-1183

Garet, M. S., & Delany, B. (1988). "Students, courses, and stratification." *Sociology of Education*, 61: 67-77

Gibson, Margaret A. (1987). "The School Performance of Immigrant Minorities: A Comparative View." *Anthropology & Education Quarterly*, 18: 262-275

Hallinan, Maureen T. (1992). "The Organization of students for instruction in middle school." *Sociology of Education*, 65: 114-127

Heyns, Barbara. (1974). "Social Selection and Stratification within Schools." *American Journal of Sociology* 79: 1434-51

Ho, Esther Sui-Chu, and J. Douglas Willms. (1996). "Effects of Parental Involvement on Eighth-Grade Achievement." *Sociology of Education*, 69: 126-141

Jones, James D., Beth E. Vanfossen, and Margaret E. Ensminger. (1995). "Individual and Organizational Predictors of High School Track Placement." *Sociology of Education*, 68: 287-300

Lee, Valerie E. and Anthony S. Bryk. (1988). " Curriculum tracking as mediating the social distribution of high school achievement." *Sociology of Education*, 61: 78-94

Lareau, Annette. (1987). "Social Class Differences in Family-School Relationships: The Importance of Cultural Capital." *Sociology of Education*, 60:73-85

____________. (1989). *Home Advantage: Social class and parental intervention in elementary education.* New York: Falmer Press.

Long, Scott J. (1997). *Regression Models for Categorical and Limited Dependent Variables.* Thousand Oaks: Sage Publications

Lucas, Samuel R. (1999). *Tracking Inequality.* New York: Teacher's College Press.

Lucas, S. R., & Gamoran, A. (1991). "Race And track assignment: A reconsideration with course-based indicators of track locations." Paper presented at the meeting of the American Sociological Association, Cinncinnati, OH.

Kelly, Sean. (1998). "Structure and Opportunity in North Carolina High Schools." Unpublished honors thesis. The University of North Carolina at Chapel Hill

Moore, Don, and Suzanne Davenport. (1988). *The New Improved Sorting Machine.* Madison, WI: National Center on Effective Secondary Schools.

NCES. (1982). *A Classification of secondary school courses*, Evaluation Technologies Incorporated.

Oswald, Hans, David P. Baker, and David L. Stevenson. (1988) "School Charter and Parental Management in West Germany." *Sociology of Education*, 61: 255-265

Rosenbaum, James E. (1976). *Making Inequality.* New York: Wiley.

Rosenbaum, P. and D. Rubin. (1984). "Reducing Bias in Observational Studies using Subclassification on the Propensity Score.", *Journal of the American Statistical Association*, 79: 516-524

Sørenson, Aage B. (1970). "Organizational Differentiation of Student and Educational Opportunity." *Sociology of Education*, 43: 355-56

Spade, J. Z., Columba, L., & Vanfossen, B. E., (1997). "Tracking in Mathematics and Science: Courses and Course-Selection Procedures." *Sociology of Education*, 70: 108-127

Stevenson, David L. and David P. Baker. (1987) "The Family-School Relation and the Child's School Performance." *Child Development*, 58: 1348-1357

Stevenson, D.L., Schiller, K.S., & Schneider, B. (1994). "Sequences of Opportunities for Learning." *Sociology of Education*, 67: 184-198.

Useem, Elizabeth L. (1991) "Student Selection Into Course Sequences in Mathematics: The Impact of Parental Involvement and School Policies." *Journal of Research on Adolescence*, 1(3): 231-250

_____________. (1992a) "Getting on the Fast Track in Mathematics: School Organizational Influences on Math Track Assignment." *American Journal of Education*, may 92: 325-352

_____________. (1992b) "Middle School's and Math Groups: Parents' Involvement in Children's Placement." *Sociology of Education* 65: 263-279

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