A Longitudinal Analysis of Contextual Exposure to Peers with College Educated Parents and Students' College Enrollment

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Abstract

Students with college educated parents are more likely to attain higher levels of education than students of parents with lower levels of education. Past research has explained this favorable outcome as the result of advantageous placement and greater availability of educational resources. Using data from Add Health and AHAA, we find evidence that exposure to students of college educated parents at the school level and within courses increase the likelihood of four year college enrollment even after controlling for family background, achievement, and placement. We also found that exposure to students of college educated parents has especially strong positive effects on college enrollment for students whose own parents do not have a college degree. These findings suggest that greater exposure to students of highly educated parents at the school level and within courses partially explains the favorable educational attainment of students with college educated parents.

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Extended Abstract

Introduction

High schools serve as gatekeepers to college entrance through academic placement and assignment of grades. Thus, in an era where college graduation has become a primary marker that distinguishes the middle class from the working class, academic success in high school has major consequences for an adolescent's well-being in adulthood (Muller et al. 2004). Cognizant of this fact, highly educated and affluent parents attempt to ensure their children's academic success by enrolling them in schools with rigorous academic programs and securing advantageous placement within schools (Powell 1985; Jones et al. 1995). These efforts often result in the intergenerational transmission of social advantage for individuals of high SES.

Due to its role in the intergenerational transmission of stratification, the relationship between family background and educational attainment has historically been a salient subject for sociology of education, in particular, research on status attainment (Gamoran 2001; Hauser, Tsai, & Sewell 1983). Researchers have repeatedly found that parent education and family SES are crucial in patterning student achievement and educational attainment (Roscigno & Ainsworth-Darnell 1999). Furthermore, parents of school mates' have independent positive effects on student outcomes (Coleman et al. 1966). That is, the composition of the social context as defined by the parent community appears to promote achievement for all students in the school, and in particular students whose parents have lower levels of education. This work was extended by the finding that Catholic schools function in some of the same ways, and that in particular they provide a rigorous curriculum to students. Others observed that students of different SES experience unequal educational opportunities and this partially explains the differentials in achievement by SES, identifying tracking as a possible mechanism through which social inequality is reproduced in some schools (Oakes 1985; Gamoran 1987). Unlike racial inequality that has substantially diminished throughout the 20th century, socioeconomic inequality in education has persisted and is expected to persist throughout the 21st century (Gamoran 2001). Thus, the relevance of these findings and future findings on this subject are also expected to persist.

Research has shown that the practice of tracking has changed significantly in the last two decades (Lucas and Berends 2002), and that particular courses may be especially important gatekeepers for postsecondary preparation. It is unclear if exposure to college educated parents in courses and at the school level affects educational attainment. That is, do students of college educated parents experience favorable educational attainment outcomes because they experience higher levels of exposure in their academic courses to other students of college educated parents?

Using data from the National Longitudinal Survey of Adolescent Health (Add Health) and transcript data from the Adolescent Health and Academic Achievement (AHAA) study, we will attempt to address this question by (1) examining if school level exposure to students of college educated parents affect four year college enrollment; (2) investigating if exposure to students of college educated parents within courses affect for year college enrollment; and (3) evaluating whether exposure to students of college educated parents has especially strong positive effects on college enrollment for students whose own parents do not have a college degree.

We expect that exposure to students of college educated parents within courses will increase the likelihood of college enrollment even after controlling for family background, achievement, and placement. In addition, exposure to students of college educated parents at the school level will also increase the likelihood of college enrollment even after controlling for family background, achievement, and placement. Exposure to students with college educated parents will particularly have strong positive effects on college enrollment for students whose own parents do not have a college degree. If the reverse is true, that exposure to college educated parents has a larger impact for students whose parents have higher levels of education, then this suggests that there exists an unmeasured dimension (e.g., much higher quality curriculum or teaching) within the courses that contributes to the higher achievement of those who are already advantaged.

Background

Family background influences an individual's educational attainment (Roscigno & Ainsworth-Darnell 1999). A particularly important aspect of family background is parent education (Sewell & Shah 1967, Lareau 2000). Although parent's education is only one dimension of Socioeconomic Status, this factor might play an especially important role in children's college enrollment. In part, this strong influence can be explained by differentials in educational resources and cultural capital available to students with different levels of parental education (Roscigno & Ainswoth-Darnell 1999). Equally, if not more important, is the influence of parent education and family SES in shaping educational access within and across schools (Roscigno & Ainswoth-Darnell 1999). That is, highly educated parents take steps to ensure that their

children get placed in high ability groups geared towards college entrance and select schools that offer rigorous programs of study (Gamoran 1987; Jones 1995). By securing advantageous placement for their children, they attempt to create the necessary ambience for high education attainment.

This unequal access to educational opportunities leads to differentials in educational attainment and is the mechanism through which intergenerational stratification is replicated. Rosenbaum (1976) found that students in lower ability groups are discriminated against in grading practices. Furthermore, Powell and colleagues (1985) found evidence that schools place a priority in resource allocation for students in high tracks; ensure that highly motivated teachers are assigned to them; and experience superior academic curriculum. Because grades and the quality of education are extremely important to college entrance, assignment to high "ability groups" places students at an advantage for high education attainment.

Differentials in educational access also lead to a differentiation in peers for students of distinct SES groups and studies have shown that peer groups heavily contribute in the decision making process to attend college. Hallinan & Williams (1990) found that most high school students lack adequate information and consequently are highly vulnerable to the influence of others. In particular, peers, who share similar school experiences, have a strong hold in the decision making processes because their information is considered more trustworthy (Hallinan & Williams 1990). Furthermore, peers often serve as a normative reference group that sets standards of behavior (Hallinan & Williams 1990). Thus, individuals whose peers view college enrollment as the norm are more likely to have aspirations for college enrollment, which leads to higher incidence of actual college enrollment. In sum, sharing courses with students of college educated parents will increase the likelihood for college enrollment because students of college educated parents will be more likely to set college enrollment as a normative standard and may have greater access to information on college entrance which they can disseminate.

Data

We examine data from the National Longitudinal Study of Adolescent Health (Add Health) and transcript data from the Adolescent Health and Academic Achievement (AHAA) study. The complex longitudinal design of the Add Health consists of a 1994-95 in-school interview, a 1995 Wave I in-home interview, a 1996 Wave II in-home interview, and a Wave III in-home interview collected between 2001 and 2002 (Harris et al. 2003). Our analysis primarily employs data from the Wave I in-home interview, which was completed by 20,745 students, to determine parent education level, race, income, family type and their score on an abbreviated Peabody Vocabulary Test. Transcript data in the AHAA study 12,250 respondents were utilized to construct measures of course placement (math placement in 9th and 11th grade), early achievement (average GPA in 9th and 10th grade), exposure (proportion of overlap in classes with students of college educated parents and proportion of students with college educated parents at the school level), and educational attainment (four year college enrollment).

Our sample consisted of the cohort of 11th graders in the academic years: 1994-1995 and 1995-1996. To be included in the sample, individuals must have responded to the in-home survey during Wave I and given researchers access to high school transcripts. We also excluded cases that failed to report college enrollment status. Subsequently, our sample was limited to 3,677 cases of students.

Variables

Dependent Variables

The dependent variable in this analysis is four year college enrollment. Four year college enrollment is coded 1 and all other forms of post secondary education including none is coded 0. We chose college enrollment over college graduation as our measure for educational attainment due to the relative young age of our cohort.

Explanatory Variables

The explanatory variables for the analysis include parent education, income, proportion of students with college educated students in school, and proportion of courses shared with students of college educated parents. Past research has argued that family socioeconomic status and parent education are particularly important aspects of the family background that patterns students' achievement and educational attainment outcome (Roscigno & Ainsworth-Darnell 1999). Thus, our measures of parent education and household income will capture a student's family background. **Parent education** is the measure of maximum highest education attainment of the parents. 5 dummy variables are constructed to represent each category of parent education level. The categories are less than high school, high school graduate, post- secondary education, college graduate, and graduate degree. **Household income** is a continuous variable ranging from 0-999 where the units are thousands of dollars. When asked to estimate their household income,

about a quarter of the interviewed parents either didn't answer or refused to answer this question. In our analytical sample, the missing values are present in 962 (26%) cases. Because so many parents failed to respond to this question and income is a crucial component in the determination of one's SES, we imputed the household income for the missing values. We did this with the IMPUTE command in STATA, using household race, education of primary caregiver, family type, employment status of each parent, full-time or part-time status of each caregiver, disability status of primary parent, disability status of secondary parent, public assistance recipient in household, median income for their household race in their census tract and proportion of those earning less than 15,000 of their household race in their census tract as predictors.

Previous work on peer influence has found that students are highly influenced by their peers when making decisions to attend college (Hallinan & Williams 1990). The following two variables will capture the influence that coursemates have on educational attainment. **Proportion of students with college educated parents in school** measures the level of exposure to students with college educated parents at the school level. This variable was calculated by dividing the number of students with college educated parents by the total number of students in a school. **Proportion of courses shared with students of college educated parents** is attained by dividing the number of the courses a student shares with students of college educated parents from all shared courses. This measures the level of exposure within courses.

Control Variables

Past research has argued that being from a parent-step family or single family is associated with poorer educational attainment outcomes (McLanahan and Sandefur 1994). Other studies document racial disparities in academic achievement and educational attainment (Roscigno 1998). In efforts to accurately determine the relationship between SES and educational attainment, we control for race and family type. **Race** is based on the self-report of comprised of 6 dummy variables; White, Black, Asian, Other, Mexican, and non-Mexican Hispanic. **Family type** is comprised of 4 dummy variables: Two parent, step, single, and other families. They were reported during Wave I.

Peabody Vocabulary (PVT) scores, average GPA in early years, math placement in 9th grade, and math placement in 11th grade are the other set of control variables. We control for these variables for two reasons. First, we are interested in how high school processes contribute to different educational outcomes for students of college educated parents and the students with lower levels of parent education. Thus, it is important that we control for early achievement patterns. **Add Health Picture Vocabulary Test (AH_PVT)** is a continuous variable that ranges from 1-181 measuring academic dexterity. **Average GPA in 9th and 10th grade** is an indicator of early educational achievement. **Math placement in 9th grade** measures the preparation in math at the time of entry. Students are placed in three ability groups, coded as no math, remedial, or pre-algebra=1; algebra 1 or geometry=2; algebra2, advanced math, pre-calculus or calculus=3. Second, we wanted to examine how exposure alone affects educational attainment outcomes without looking at the implications that distinct placement has on educational attainment outcomes. **Math placement in 11th grade** is a measure of current ability group placement. Students are placed in four ability groups, coded as no math, remedial, pre-algebra, algebra1=1; geometry=2; algebra2 or advanced math=3, pre-calculus or calculus=3. Because learning by nature involves the use of previously accumulated knowledge that results from early achievement and placement, which in turn is often shaped by family background, these are very strong controls. Consequently our analyses might understate the influence of our key explanatory variables, proportion of schoolmates and proportion of coursemates with college educated parents.

In the case of AH_PVT and contextual variables at the census tract level, missing scores were replaced by means scores while dummy variables were created for missing values for all other variables.

Method of Analysis

Our study incorporates both descriptive and inferential analyses. In the descriptive analysis, the percentage distributions illustrate the proportion of courses that students of each parent education level share with students of college educated parents. A second column of percentage distributions lists the proportion of students whose parents are college educated in their school by parent education level.

The inferential analysis relies on logistic regression models to investigate the determinants of educational attainment. Six models were estimated. The first model examines the relationship between family background and four year college enrollment. The second model examines how academic ability influences the relationship between family background and four year enrollment. The third and fourth model each adds 9th grade and 11th grade math placement to the existing models to determine the effects that current and prior placement have on the relationship between family

background and educational attainment. The fifth model examines what additional effect exposure to students with college educated parents at the school level have on the relationship between family background and educational attainment. Lastly, the sixth model examines what is the additional effect that exposure to students with college educated parents within courses have in the relationship between family background and educational attainment.

Preliminary results

Table 1 presents differences in the amount of exposure to coursemates with college educated parents by parent education. It shows that a student's propensity to share courses with students of college educated parents is greater if their parents are highly educated. On the other hand, Table 2 illustrates the likelihood of exposure to students of college educated parents at the school level is greater if a student's parents are highly educated.

In Table 3, Model 1 reinforces past empirical findings that indicate that children of highly educated students experience greater educational success. Model 2 indicates that academic achievement exerts a strong influence over college enrollment. Controlling for PVT scores and average GPA reduces the positive association between parental education and college enrollment, especially for students whose parents have a graduate degree. Thus, favorable educational outcomes for students of college educated parents can partially be explained by early preparation levels. Model 3 shows the effect that early placement, 9th grade math placement, has on the college enrollment outcome. Adding this variable further reduces the positive effects of parental education. This is probably due to the disproportionate levels academic achievement prior to high school entrance. That is, students with college educated parents enter high schools already with higher levels of academic preparation; and thus, experience advantageous placement. In Model 4, we introduced math placement in 11th grade. The positive effect of this variable suggests that even controlling for academic preparation prior to high school, academic placement influences the likelihood of college enrollment.

If earlier models explored how intergenerational stratification occurs, model 5 and model 6 attempts to examine if exposure to students of college educated parents affect college enrollment. Model 5 shows that exposure to students of college educated parents at the school level has a strong effect on students with high parent education. That is, students of college educated parents experience more favorable education outcomes because they get more exposure to other students whose parents are college educated. Model 6 further reinforces this finding, but at the course level. After this variable into the model, the coefficient predicting the influence of parent education at the "college graduate" level loses significance. We see that course level exposure to other students of college educated parents is the driving force that explains the favorable educational outcomes for this particular group as well as those of highly educated parents.

Interestingly, the coefficient and t-value for 11th grade math placement changes very little when the two variables measuring exposure is added to the models. This lack of change suggests that the effects of math placement are largely independent of the characteristics on the student peers. This is also the case of income. The lack of change in the coefficient and t-value for income also suggests that the effects of income are largely independent of the characteristics of student peers.

Discussion and Conclusions

Differentials in levels of exposure to students of college educated parents within courses and at the school level provide a partial explanation to the gap in educational outcomes between students with college educated parents and students with parents with lower levels of education attainment. Preliminary investigations also suggest that the positive effects of the exposure variables are especially strong for those with the least educated parents. The analysis we will present in spring will further explore these variations. Our next step is to investigate the process through which exposure affects college enrollment.

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Table 1. Percentage of classes shared with students of college educated parents, by parent education

	% courses shared	Standard Error	Min	Max
Less than High School	19.39%	12.91%	0.00%	67.08%
High School	23.13%	13.35%	0.00%	73.42%
post secondary school	27.66%	14.75%	0.00%	83.29%
College graduate	58.01%	19.30%	15.00%	100.00%
Graduate Degree	67.36%	21.14%	19.27%	100.00%

Table 2. Percentage of students with college education parent at the school level, by parent education

	% of students with college educated parents	Standard Error	Min	Max
Less than High School	28.88%	11.98%	0.00%	74.42%
High School	31.41%	13.48%	0.00%	86.84%
post secondary school	34.54%	14.40%	0.00%	95.83%
College graduate	41.70%	17.41%	5.88%	100.00%
Graduate Degree	50.39%	21.96%	7.89%	95.83%

Table 3. Logistic Regression predicting the effect of family background, achievement, placement, and exposure on 4 year college enrollment

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	exp(β)	t-value	exp(β)	t-value	exp(β)	t-value	exp(β)	t-value	exp(β)	t-value	exp(β)	t-value
Intercept	0.51	-6.54	0.01	-15.31	0.00	-16.12	0.01	-14.32	0.00	-14.92	0.01	-14.65
Parent's education (High School)												
Less than High School	1.12	0.89	1.40	2.36	1.40	2.33	1.29	1.76	1.36	2.06	1.44	2.42
Some post secondary	1.81	6.01	1.52	3.90	1.48	3.61	1.43	3.22	1.37	2.84	1.35	2.68
Bachelors	2.32	8.35	1.75	5.14	1.66	4.61	1.65	4.47	1.42	3.03	1.07	0.46
Masters+ PhD	6.71	11.78	4.85	9.20	4.39	8.53	4.34	8.38	3.47	6.94	2.60	4.60
Missing	0.61	-2.25	0.89	-0.48	0.89	-0.48	0.89	-0.47	0.89	-0.49	0.87	-0.54
income	1.01	6.85	1.01	5.63	1.01	5.32	1.01	4.93	1.01	4.24	1.01	4.24
Family Structure (Two original parent)												
Single Parent	0.88	-1.25	1.10	0.88	1.09	0.79	1.12	1.01	1.06	0.57	1.07	0.62
Step Parent	0.44	-8.14	0.47	-7.06	0.47	-6.98	0.47	-6.79	0.48	-6.63	0.48	-6.64
Other Family	0.62	-2.56	0.70	-1.78	0.73	-1.58	0.77	-1.27	0.75	-1.36	0.83	-0.90
Race (White)												
Black	1.00	0.04	1.52	3.57	1.49	3.35	1.40	2.82	1.30	2.18	1.31	2.24
Asian	1.72	2.91	1.45	1.82	1.40	1.63	1.27	1.13	1.24	1.03	1.27	1.11
Other	1.54	1.57	1.86	2.04	1.93	2.11	1.98	2.19	1.98	2.19	1.92	2.09
Mexican	0.64	-2.00	0.38	-3.96	0.40	-3.78	0.39	-3.79	0.38	-3.88	0.39	-3.82
Hispanic Not Mexican	1.37	1.88	1.99	3.76	1.97	3.67	2.05	3.84	2.15	4.05	2.14	4.03
Missing Race	4.20	0.26	10.44	0.43	9.65	0.40	9.57	0.40	10.26	0.41	9.80	0.41
Earlier Achievement												
PVT Wave I Score (Raw)			1.03	5.55	1.02	4.32	1.01	3.06	1.01	2.84	1.01	2.95
Average GPA 9th and 10th			2.82	18.36	2.44	15.17	2.00	10.99	2.00	10.95	1.95	10.50
Math Placement 9th					2.00	8.23	1.18	1.60	1.13	1.22	1.11	0.98
Math Placement 11th							1.70	9.08	1.72	9.19	1.71	9.01
School-level % of parents with ba and above									4.69	6.15	2.54	2.78
Proportion of course overlap with ba and above											2.54	2.68

Sample: Cohort of 11th graders in 1994-1995 and 1995-1996; N= 3677

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