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Evidence for the Influence of School Context on College Access

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Abstract: Since the release of the Coleman Report in 1966, studies (such as Sirin, 2005; Radford, Berkner, Wheelless, & Shepherd, 2010) have continued to find an association between socioeconomic status and educational attainment. Wyner, Bridgeland, and DiIulio (2007) observe that a progressively lower proportion of low-income, high achieving students remain successful as they advance from elementary school through college. The present study considers college enrollments from a college preparatory charter secondary school serving low-income students. The study finds that alumni enrolled in Preuss, a four-year colleges at a higher rate than did lottery-assigned comparison students. These four-year college enrollment findings held for Hispanic, African American, and Asian American students. At the same time, the overall college enrollment rates, meaning enrollment in two- and four-year colleges in contrast to no college enrollment, were quite similar for the Preuss School and comparison students. These results were achieved, this study suggests, through numerous academic and social supports that increase college eligibility rates and institute four-year college and financial aid applications as part of coursework. The four-year college enrollment findings offer the promise that schools can be arranged to increase academic opportunities for low-income students.

Keywords: equity, college enrollment; charter school; school context; social capital; extended school day; extended school year

El acceso equitativo a la universidad: evidencia de la influencia del contexto escolar

Resumen: Desde la publicación del Informe Coleman en 1966, estudios (como Sirin, 2005; Radford, Berkner, Wheelless, y Shepherd, 2010) han seguido encontrando una asociación entre el estatus socioeconómico y el nivel educativo. Wyner, Bridgeland y DiIulio (2007) observaron que una porción, cada vez menor, de estudiantes de bajos ingresos con alto rendimiento académico se mantienen exitosos a medida que avanzan desde la escuela primaria hasta la universidad. El presente estudio considera los ingresos a la una universidad, de estudiantes de bajos ingresos que atienden la escuela preparatoria Preuss. El estudio revela que egresados de Preuss se inscribieron en universidades a un ritmo superior que los estudiantes del grupo de comparación (asignado por sorteo). Los resultados de esta investigación muestran que las inscripciones universitarias se mantuvieron para estudiantes hispanos, afroamericanos y asiático americanos. Al mismo tiempo, las tasas globales de la matrícula universitaria, es decir, la matrícula a programas universitarios de dos y de cuatro años, en contraste con la matrícula no universitaria fueron muy similares para la Escuela Preuss y el grupo de comparación.. Este estudio sugiere que estos resultados fueron alcanzados a través de numerosos apoyos académicos y sociales se aumentan las tasas de elegibilidad de la universidad y de las universidades de cuatro años (four-year college) y a la ayuda financiera como parte de los programas de estudio. Los resultados de este proyecto sobre la matriculación en programas universitarios de cuatro años (four-year college) ofrecen la promesa para que otras escuelas pueden organizarse para aumentar las oportunidades académicas para estudiantes de bajos ingresos.

Palabras clave: equidad; universidad, escuelas charter; contexto escolar; capital social; jornada escolar prolongada; año escolar extendido.

Acesso equitativo à universidade: evidência da influência do contexto escolar

Resumo: Desde a publicação do Relatório Coleman em 1966, estudos (como por exemplo Sirin, 2005; Radford, Berkner, Wheelless, & Shepherd, 2010) têm continuado a encontrar uma associação entre o estatuto socioeconómico e a realização escolar. Wyner, Bridgeland, and DiIulio (2007) observaram que uma proporção cada vez menor de estudantes com baixos rendimentos e elevados resultados permanece bem-sucedida à medida que progride do ensino básico até à universidade. O presente estudo considera as matrículas em universidade, de estudantes de baixos rendimentos que atendem *The Preuss School* uma escola secundária *Charter*. O estudo constata que os estudantes matricularam-se em *four-year colleges* (universidades com cursos superiores de quatro anos de duração, por vezes denominados de bacharelato) a um ritmo mais elevado do que os estudantes do grupo de comparação (escolhidos por sorteio). Os resultados da análise destas matrículas em *four-year college* mantêm-se para estudantes Hispânicos, Afro-Americanos, e Asiático-Americanos. Ao mesmo tempo, a taxa total de matrículas, ou seja as matrículas em universidades com cursos de dois ou quatro anos em contraste com nenhuma matrícula na universidade, foram bastante similares para *The Preuss School* e para os estudantes do grupo de comparação. O estudo sugere que estes resultados foram alcançados através de numerosos apoios académicos e sociais que aumentam as taxas de elegibilidade da universidade e instituto universitário de quatro anos e pedidos de ajuda financeira como parte do programa de estudos. Os resultados da análise das matrículas em *four-years college* oferecem a promessa de que as escolas se podem organizar para aumentar as oportunidades académicas de estudantes com baixos rendimentos.

Palavras-chave: equidade; matrícula em universidade; escola *charter*; contexto escolar; capital social; prolongamento do dia escolar; prolongamento do ano escolar.

Evidence for the Influence of School Context on College Access¹

Recent studies find that family income, level of parent education, and race/ethnicity have continuing significance in determining the educational attainment of students (Radford, Berkner, Wheelless, & Shepherd, 2010; Wyner, Bridgeland, & DiIulio, 2007). The present study examines lottery-based data on college enrollment from a college preparatory charter secondary school serving students from low-income families and considers whether attendance is associated with higher college enrollment, and whether the results apply to students without respect to race or ethnicity. The school's lottery allows for a strong test of the school's effect on educational attainment. This is especially important because lottery-based research on the educational outcomes associated with charter schools has been rare (Betts & Atkinson, 2012; Betts & Hill, 2006).

I suggest that the association between income and educational attainment is multi-causal and involves the influence of social and economic capital on opportunity and perceived risk, and the way diverse social histories and patterns of discrimination affect the presence of community support for education and access to academic institutions. In response to these multiple challenges, the charter school employs a variety of academic and social supports to increase college eligibility and momentum.

The Social Context

Radford et al. (2010) find that dependent students from high income families, families with incomes of \$92,000 or more, were more than twice as likely as students from low-income families, those earning less than \$32,000 a year, to have completed a Bachelor's degree within six years – a difference of 58.6 percent versus 25.5 percent. Students whose parent had a bachelor's degree or higher were more than three times as likely (49.4 percent versus 15.4 percent) to receive a bachelor's degree in six years than those with a high school degree or less. Race/ethnicity was also associated with different rates of receipt of bachelor's degrees within six years (Asian Americans 45.5 percent, White 36.4 percent, Hispanic 16.9 percent, African American 16.7 percent, other or two or more races 27.3 percent). A similar pattern of college graduation outcomes based on family income, education, and race/ethnicity held for students who began in four-year colleges in 2003-04, although in much less extreme form than among students who began at all (two and four year) colleges.

Findings are similar regarding college enrollment. Bozick and Lauff (2007:3) found that 70 percent of spring 2002 high school sophomores in their study enrolled in college within two years of high school graduation (60 percent enrolled within the first year), but this varied substantially by family income, race/ethnicity, and level of parent education. Moreover, family income, race, and parent education made an even greater difference in the rates of enrollment at four-year colleges within two years of high school graduation (Bozick & Lauff, 2007, p.16, Table 6).² That is not surprising because there is a higher bar for enrollment in four-year colleges. Thus 73.4 percent of those with family incomes of \$100,001 or more, 51.7 percent with family incomes of \$50,001 to 100,000, 33.2 percent for incomes of \$20,001 to \$50,000 and only 23.1 percent with incomes of zero to \$20,000 enrolled in four-year colleges within two years of high school graduation. With respect to race, 57.5 percent of Asian Americans, 49.3 percent of Whites, 35.2 percent of African Americans, 27.8 percent of American Indians or Alaskan Natives, and 24.3 percent of Hispanics enrolled in four-year colleges. The highest parent education level, graduate/professional degree, was associated

¹ I am grateful to the *Spencer Foundation* for the grant supporting this research. My thanks to Hugh Mehan, Peter Bell, Claudia Der-Martirosian, Carolyn Huie Hofstetter, and anonymous reviewers for their valuable comments, and to Tongshan Chang and Ravinder Singh for the data. The views expressed here are mine.

² Note that this differs from my analysis, which includes only students who enrolled within a year of high school graduation. I expect their results to be high relative to mine.

with four-year college enrollment more than three times as high as the lowest levels of parental education (70.5 percent versus 23.1 percent) (Bozick & Lauff, 2007, p.16). The Bozick and Lauff and Radford, et al. (2010) results echo the findings of the “Coleman Report” which argued that socioeconomic status and race had a greater influence on educational achievement than did school quality (1966).

A recent meta analysis (Sirin, 2005, p. 440) of research published between 1990 and 2000 on students in grades K-12 finds a correlation, averaging .299 across the studies, between socioeconomic status and educational achievement. Citing findings from a meta analysis conducted by White (1982), Sirin suggests that there has been improvement across decades and that, nonetheless, SES has a continuing influence on achievement.³ Similarly, a report focusing on high-achieving students (Wyner et al, 2007) concludes that low family income outweighs prior achievement in contributing to students’ continued academic success, and argues that “there are far fewer lower-income students achieving at the highest levels than there should be, they disproportionately fall out of the high-achieving group during elementary and high school, they rarely rise into the ranks of high achievers during those periods and, perhaps most disturbingly, far too few ever graduate from college or go on to graduate school” (Wyner et al., 2007, p. 6).

Theoretical Orientation

Researchers have sought explanations for the tenacity of this pattern of educational outcomes. Given the persistence of the phenomenon, it seems likely that it cannot be fully explained by any single theory or dimension of society but, rather, that the outcome is fed by multiple sources which contribute in different degrees to given cases. Bourdieu (1985) and his colleagues suggest a link between high socioeconomic status, the forms of cultural capital associated with class status, and academic success. Bourdieu (1985) argues that differences in academic success are accounted for by the transfer of “cultural capital” from one generation to the next in wealthier families, and the value placed on this cultural capital in school practices. Elaborating on theories of social capital, Lareau (1987) and Lareau and Cox (2010) observe that social and cultural capital provides parents with the resources and social influence to optimize the school experiences of their children. Oakes (2003) suggests that even the high achieving students from schools in low-income neighborhoods are not exposed to the wide range of academic, social, and cultural resources available to students in schools in well-to-do neighborhoods.

More directly economic studies have noted the significance of family income and/or family wealth, or neighborhood income (Sastry & Pebley, 2010) as a correlate of differential educational outcomes. As suggested by theoretical arguments in this vein, economic factors such as income and family wealth may affect current opportunity, such as the ability to take on college costs and postpone work, the costs of failure, and the perception of future opportunity that may affect the value of preparing for college and willingness to take on the risks and burdens associated with accumulating loans.

Considering the interaction of economic and racial or ethnic factors, researchers have focused on the distinctive histories of racial and ethnic groups in the US, and the ways the diverse social histories and current and past experiences of discrimination configure the presence of community supports for education and access to academic institutions (Hardaway & McLoyd, 2009; Zhou & Kim 2006) and differences between immigrant and non-immigrant experiences in schooling (Bennett & Lutz, 2009; Rumbaut, 1999). The importance of neighborhood income has led to further

³ White (1982) found a correlation of .343. However, White argued that medians rather than means should be used in the analysis, and that the effect of SES on achievement was minor.

attempts to understand the nature of those influences. In an experiment designed to change educational outcomes in low-income families by giving housing vouchers which allowed families to move to higher SES neighborhoods, Sanbonmatsu, Kling, Duncan, and Brooks-Gunn (2006) found no significant effect, and concluded that the schools in the new neighborhoods were not markedly better than those in areas the families had left.

In response to these challenges, educational activists and researchers have sought to eliminate the association between income and academic achievement through the creation of school or community environments that are in some instances paired with efficacy research. In public education, this has generally been implemented through charter schools. Studies of the Harlem Children's Zone (Dobbie & Fryer 2009) and the Knowledge Is Power Program (KIPP) schools (Woodworth, David, Guba, Wang, & Lopez Toros, 2008) find significant gains in student achievement tests associated with attendance at these schools. In the private school domain, Catholic schools have acquired a reputation for success in helping low-income students achieve at high levels (see, for example, Bryk, Lee, & Holland, 1993). An effort to increase the educational opportunities of students from low-income backgrounds was undertaken in the late 1990's at the University of California, San Diego (UCSD). The Preuss School at UCSD is the site of the present study.

Research Setting

The Preuss School is a charter school serving grades six to twelve and located on the UCSD campus. Preuss was formed in 1999 in response to the rejection of affirmative action in California public education (see Lytle, 2008; Mehan, 2012; Rosen & Mehan, 2003). In the school's first year, students entered in grades six, seven and eight, and a grade-level was added each year thereafter. In 2003 through 2005, 88 percent of teachers, on average were credentialed and teaching in their subject area, and virtually all classes had less than 30 students (San Diego Unified School District, 2006).

Preuss has a college-going mission and admits motivated students from low-income families (see Appendix A for eligibility criteria). Students learn among peers who have a shared ethos regarding school and college, peers whose behavior and past performance reflect those perspectives (McClure, Strick, Jacob-Almeida, & Reicher, 2005). The school offers an exclusively college-preparatory curriculum and "supplements instruction with a comprehensive system of academic and social supports, including a longer school day and longer school year with 18 more days of school a year than most other District schools), tutoring by UCSD undergraduates, 'Saturday Academies' for students who continue to struggle, psychological counseling, mentoring by community members, and parental involvement and education" and ongoing teacher professional development (Alvarez & Mehan, 2006, p. 82-83, 86). The academic counseling support is focused on college-going, and virtually all seniors take the Scholastic Aptitude Test (SAT) or American College Testing (ACT) and are required to complete four-year college applications and financial aid packages as part of their schoolwork (McClure et al., 2005). These supports or "scaffolds" (Wood, Bruner, & Ross, 1976; see also Vygotsky, 1978) are part of school policy. In addition, Preuss supporters have provided Preuss-targeted scholarships to some alumni in addition to the competitive awards students may receive from elsewhere, and in 2010 this included the award of eight graduate school scholarships.⁴ In short, Preuss is a single (college) track school for academically engaged students from low-income backgrounds.

⁴ Personal communication from Patricia Weil.

Since the school's inception, the academic progress of its students has been followed in annual reports, occasional research studies, and media coverage. The reports follow the subset of "lottery-winners" who remain at Preuss through graduation, and the subset of "lottery-losers" who remain in the San Diego Unified School District (SDUSD) through graduation, referred to here as Preuss and comparison groups. The reports and subsequent studies have found that standardized test results of Preuss and comparison students are not statistically different on upon entry to the school (on the Stanford-9 test, SAT-9) or in 11th grade testing using the California Standards Test (CST) which replaced the SAT-9 in California (Betts, Tang, & Zau, 2010; McClure & Reicher, 2007; McClure et al., 2005). Yet a report based on qualitative data (McClure et al., 2005) indicates that college enrollments are higher for Preuss than comparison students in the 2005 graduating class. This paper extends the analysis of Preuss students' academic performance into college using a national database and expands the analysis to all lottery-assigned treatment and control students in three graduating classes.

Methods

Study Design

This study investigates the school's impact on college enrollment with two distinct comparisons. One comparison is made between treatment and waitlist groups, and a second comparison is drawn between Preuss and comparison groups. The "treatment group" includes all lottery "winners," including students who remained at the school along with those who later left Preuss, while the "waitlist group" includes those waitlisted students who later entered Preuss or moved to other districts or states, all lottery "losers." In other words, students are included in the first analysis according to their original lottery assignments whether or not they remained in those assigned groups. This kind of analysis diminishes the possibility that the decisions students later made to remain at or leave the school, or extrinsic factors such as family mobility, led to a more self selected groups or to unbalanced samples. This "intent-to-treat" approach provides a strong test of the impact of Preuss on college outcomes (Hollis & Campbell, 1999; Shavelson & Towne, 2002).

A second analysis compares Preuss and comparison groups. The Preuss group is the subset of treatment students who were assigned by lottery to Preuss and remained at the school through graduation. The "comparison group" consists of students who were assigned to the waitlist and had continuous attendance and graduation in the San Diego Unified School District. Preuss and comparison groups are subsets of the treatment and waitlist groups respectively. This Preuss/comparison analysis considers more closely the association between continuous Preuss school attendance and academic outcomes.

This is a lottery-based study of the 2005, 2006, and 2008 cohorts. There are no comparison groups for the 2004 and 2007 cohorts because there were places at The Preuss School for all eligible applicants in those years. Therefore, these cohorts are not included in this study. The lottery and eligibility criteria are briefly reviewed here, and are detailed in Appendix A. Appendix B contains assignment results. The mean Stanford-9 (SAT-9) scores for treatment and waitlist groups were not significantly different in the year before the lottery; similarly, there were no significant differences in mean SAT-9 scores for Preuss and comparison groups before the lottery.

This study expands the number of cohorts from a prior study (McClure et al., 2005) but uses a national data set rather than student self-report. The analysis is important because Preuss is developing a model explicitly committed to preparing low-income students for college, and

lottery-based studies of such efforts are rare. There are few randomized studies of the academic outcomes of students who attend charter schools (Betts & Atkinson, 2012; Betts & Hill, 2006) and few studies follow charter school outcomes beyond high school (Betts, 2010). Some of the students who were not selected for Preuss attended other charter schools, and so this paper does not compare charter and non-charter schooling as such: It does compare students who received a particular form of schooling with equally eligible and capable students who took advantage of a range of other educational options.

In the first years of operation, a public information campaign was directed at schools and community organizations in low-income areas to recruit applicants.⁵ Students, often with the help of teachers or other adults, completed an application available on the school's website. Eligibility consists of low family income, parents or guardians who have not graduated a four-year college, and the demonstrated motivation to attend university as evidenced in grades, standardized tests, and teacher recommendations. Everyone placed into the lottery for a given grade had their names entered into an Excel spreadsheet, and there were no preferences. A random number generator was used to assign a number to each name and students were selected for the school in that order. Lottery winners who declined admission were replaced by the next name on the list and were then counted in the control group. There was very little fluidity of assignment after the first semester. The result is a student body that is racially, ethnically, and linguistically diverse, but is homogeneous in terms of family income, neighborhood income, parent education, and high academic motivation.

Data Sources

Data comes from the National Student Clearinghouse, an independent non-profit organization that collects information from participating post-secondary educational institutions. The National Student Clearinghouse is the best source for centralized records of college enrollment and degree completion, and it collects data from over 3,200 colleges and universities. The Clearinghouse relies on colleges to provide the data on a regular basis. However, some students opt out of reporting, and data requests to the Clearinghouse are most easily fulfilled when there is sufficient identifying information to locate the students and when colleges provide prompt and thorough reporting to the Clearinghouse. A student name change can prevent identification of college records; we did not have access to social security numbers, which offer more certain results. For these reasons some students in this study who were otherwise known to be attending college were not located in Clearinghouse databases; we can think of these as “false negatives” and they represent missing data. In contrast, when a student is identified in the databases, it is virtually certain that they are attending college.

Currently it is not possible to distinguish between students who are not attending college and the false negatives. There is no reason to believe that the Clearinghouse has greater accuracy in locating graduates of Preuss or the District since these names are provided by the District and are equally recent. However, the names of students who left the District before graduation are less recent and may allow less accurate follow-up. In this respect, the analysis of Preuss and comparison graduates is more reliable than the comparison of treatment and waitlist students. In a previous study (Strick, 2009:7), I compared Clearinghouse results with all sources of information about Preuss graduates and concluded that the results must be treated with caution. Taking a conservative approach, I examine results for the Preuss and comparison groups from two perspectives, first assuming Clearinghouse results are complete as given and, second, as if all students with no Clearinghouse record actually enrolled in four-year colleges.

⁵ Personal communication, Hugh Mehan, February 2012.

Data Analysis

Clearinghouse data included college enrollment begin-end dates for each student, college names and states, and a college's status as a private/public and two- or four-year institution. A student's full or part-time status and withdrawal from college was inconsistently available and is not used; instead, any level of enrollment for any amount of time is credited in the analysis. Enrollment was counted at any point during the first year after high school graduation. I emphasize rates of enrollment in four-year colleges in the first year after high school graduation because this path shows the greatest promise for college graduation within six years (Complete College America, 2011; Skomsvold, Radford, & Berkner, 2011). A hierarchy was applied such that attendance at a community and a four-year college during a single year is counted as attendance at the four-year college.

For the two-versus-four year college enrollment contrast, for-profit colleges were excluded from analysis (only three students entered for-profit colleges); for the any-college-versus-no college contrast, for-profit college attendance was included. Fisher's Exact Test is used because it can test for statistical independence in a binary comparison of small samples of categorical data. The statistical analyses considers the relative proportions in a 2x2 table, for example considering two-year versus four-year college attendance among those Preuss and comparison student attending college, or college versus no record of college attendance in two groups. Excel files for each graduating class were coded with dummy variables for students' college enrollment during the first year after high school graduation and imported to Statistical Package for Social Sciences (SPSS Inc.) for Windows, Version 11, for analysis. Figures provide estimates of the minimum and maximum rates of college-going if those students with no Clearinghouse record are actually in college.

College Enrollment Findings

Treatment and Waitlist Students: Original Lottery Assignments

The question of interest here is the relative college enrollment records of treatment and waitlist students. These students were eligible for Preuss, participated in the Preuss lottery in 1999 or 2001, and were randomly assigned to one group or the other. Some of these randomly assigned students remained with their grade-cohort either at Preuss or at schools in the San Diego Unified School District from 6th grade (7th grade for the Class of 2005) through graduation in 2005, 2006, or 2008. Since the students were randomly assigned to the treatment or waitlist groups, differences in college enrollments should be largely associated with the factor that consistently divides them, namely their secondary school attendance.

Table 1 compares the college enrollment of students originally assigned by lottery to the treatment and waitlist groups. This analysis includes in the treatment group students who later left The Preuss School, and includes in the waitlist group those waitlist students who later entered Preuss or left the district schools. In short, students are included in the analysis according to their original lottery assignments, whether or not they left or switched schools. This approach helps ensure that factors such as student self-selection do not produce unbalanced samples. A higher proportion of randomly assigned treatment than randomly assigned waitlist students enrolled in four-year colleges, and the Clearinghouse figures for two-year college versus four-year college enrollment among enrollees are significantly different. There is virtually no difference in the proportion of randomly assigned treatment and waitlist students enrolled in all college types combined, i.e. two-year, four-year, and for profit college enrollment versus those with no identified record of college.

Table 1

College Enrollment of All Lottery-Assigned Students in the Combined Classes of 2005, 2006, 2008

Enrollment Record	Treatment		Waitlist	
	n	%	n	%
No record ^b	79	32.9	53	36.6
Two-year college	38	15.8	43	29.7
Four-year college ^a	122	50.8	47	32.4
Private for-profit	1	0.4	2	1.4
Total	240	100	145	100.0

(a) Fisher's Exact Test for the difference in two-year versus four-year college enrollment among those attending college, $p=.001$. (b) Fisher's Exact test for the difference in any college (two-year, four-year, and for profit) versus no record of college, $p=.268$

Preuss and Comparison: Continuous Attendance

College enrollment is much higher for students who had continuous attendance at The Preuss School through middle and high school, that is, for the randomly assigned students who remained through graduation. These Preuss students had higher four-year college enrollment rates (73.4 percent) than the treatment group (50.8 percent), and higher rates than the comparison group (40.3 percent) or waitlist group (32.4 percent). There is a statistically significant difference between Preuss and comparison graduates in their enrollment rates at four-year versus two-year colleges.

In Figure 1, the light section represents those with 'no record of enrollment.' It shows that even if all comparison students with 'no record' were attending four-year colleges in addition to confirmed enrollments (for a total of 63.7 percent), the comparison enrollment rate would still be less than confirmed enrollments for the continuous Preuss students (73.4 percent).

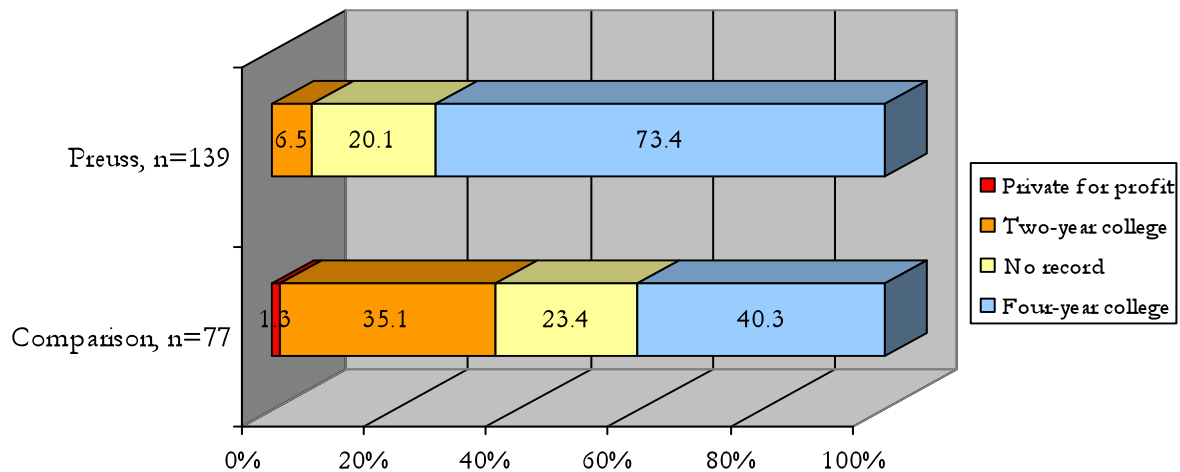


Figure 1. College Enrollment of Preuss and Comparison Students: 2005, 2006, and 2008 Cohorts Combined: Percentages

Note: Fisher's Exact Test for the difference in two-year versus four-year college enrollment among those attending college, $p<.001$. Fisher's Exact Test for the difference in any college versus no record of college enrollment of continuously attending Preuss students and students who remained in the school district, $p=.348$.

The pattern observed in the combined sample also holds in the individual cohorts. High school graduates with continuous attendance at Preuss have a higher rate of four-year college enrollment than do comparison students. If Clearinghouse figures are accurate as given, the differences in two-year college versus four-year college enrollment rates are statistically significant.

Table 2

College Enrollment of Continuously Attending Students in the 2005, 2006, 2008 Cohorts

Enrollment Record	Preuss Group		Comparison Group	
	n	%	n	%
2005				
No record	6	19.4	3	15.0
Two-year college	2	6.5	9	45.0
Four-year college ^a	23	74.2	8	40.0
Private for profit	0	0	0	0
Total	31	100	20	100
2006				
No record	3	12.5	10	31.3
Two-year college	3	12.5	11	34.4
Four-year college ^a	18	75.0	11	34.4
Private for profit	0	0	0	0
Total	24	100	32	100
2008				
No record	19	22.6	5	20.0
Two-year college	4	4.8	7	28.0
Four-year college ^a	61	72.6	12	48.0
Private for profit	0	0	1	4.0
Total	84	100	25	100
Total				
Enrollment Record	Preuss Group		Comparison Group	
	n	%	n	%
No record	28	20.1	18	23.4
Two-year college	9	6.5	27	35.1
Four-year college ^a	102	73.4	31	40.3
Private for profit	0	0	1	1.3
Total	139	100	77	100

(a) Fisher's Exact Test for two-year versus four-year college enrollment among those attending college: 2005 cohort $p=.002$; 2006 cohort $p=.014$; 2008 cohort $p=.002$; total $p<.001$

Race, Ethnicity, and College Enrollment

Treatment and waitlist groups. Do the benefits associated with Preuss reach all students attending the school? Here again, I first consider all students assigned to the treatment and waitlist, whether or not they remained at Preuss or in the school district. To consider the impacts on subsets of students, the 2005, 2006, and 2008 cohorts were combined to increase sample size. As seen in Table 3 below, the treatment Hispanic students attended four-year colleges at higher rates than waitlist students but the maximum possible waitlist group attendance (that is, four year plus no record) was higher the minimum treatment group attendance, and thus there is some uncertainty about relative outcomes, given that some of the non-attendance may simply reflect missing data. Assuming that the minimum (that is, confirmed) enrollment figures are accurate, the treatment

group Hispanic students in the combined 2005, 2006, and 2008 cohorts enrolled in four-year rather than two-year colleges at rates significantly different than Hispanic students in the waitlist group. The groups were not significantly different in their enrollment at any college versus no college. There is no clear trend across cohorts.

Table 3

College Enrollment and Ethnicity in the Lottery-Assigned Treatment and Waitlist Groups Combined 2005, 2006, and 2008 Cohorts

	Treatment		Waitlist	
	n	%	n	%
African American ^a				
No record	12	27.3	14	36.8
Two-year college	12	27.3	11	28.9
Four-year college	20	45.4	12	31.6
Private for profit	0	0	1	2.6
Total	44	100	38	100
Asian American ^b				
No record	9	21.9	2	9.5
Two-year college	1	2.4	5	23.8
Four-year college	31	75.6	14	66.6
Private for profit	0	0	0	0
Total	41	100	21	100
Hispanic ^c				
No record	51	37.5	30	42.2
Two-year college	21	15.4	21	29.6
Four-year college	63	46.3	19	26.7
Private for profit	1	0.7	1	1.4
Total	136	100	71	100

(a) For two-year versus four-year college enrollment among college-enrolled African American students, Fisher's Exact Test, $p=.312$. Any college versus no college, Fisher's Exact Test, $p=.245$.

(b) For two-year versus four-year college enrollment among college-enrolled Asian American students, Fisher's Exact Test, $p=.022$. Any college versus no college, Fisher's Exact Test, $p=.197$.

(c) For two-year versus four-year college enrollment among college-enrolled Hispanic students, Fisher's Exact Test, $p=.003$. Any college versus no college, Fisher's Exact Test, $p=.302$.

There are similar patterns for other subgroups. There were differences in four-year college enrollment rates for African American students, but differences were not significant in two-year versus four-year college enrollment or in their college versus no college enrollment.

Enrollment in four-year colleges was also higher for treatment group Asian American students than for the waitlist group students, and the difference was statistically significant. There was little difference in college versus no college in enrollment; the small differences favored the waitlist group rather than the treatment group and did not reach statistical significance. The number of students classified as White or as Other ethnicity are much too small to allow analysis.

Enrollment rates in four-year colleges for both treatment and, most markedly, waitlist group African American high school graduates increased across the 2005, 2006, and 2008 cohorts (see Figures 2 and 3). College enrollment rates increased in the treatment group (40 percent, 38.5 percent, and 56 percent in 2005, 2006, and 2008 cohorts respectively) and the waitlist group (11.1 percent, 31.6 percent, 50 percent) samples. However, based on 2004 rates, this may be the artifact of

a dip in enrollments in the 2005 and 2006 cohorts rather than a general increase over time, and data from more cohorts will be needed to determine if the upward trend continues.

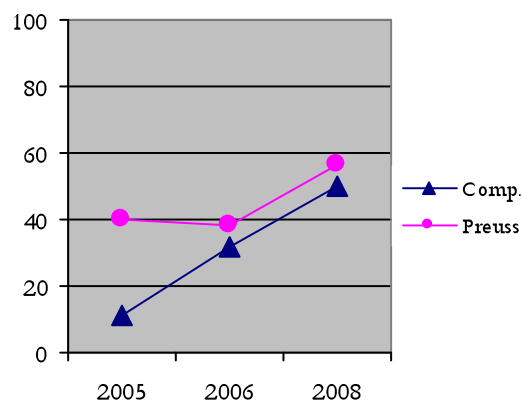


Figure 2. Rates of Four-year College Enrollment, Change across Cohorts, African American Students

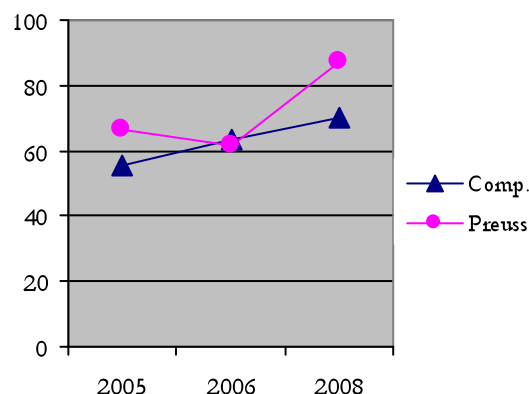


Figure 3. Rates of Enrollment in Any College, Change across Cohorts, African American Students.

Preuss and comparison groups. In all three subgroups, enrollment in four-year colleges was stronger for the students who remained at Preuss than for treatment group students or for waitlist or comparison students. As previously noted, Preuss and comparison group students come from the pool of lottery-assigned treatment and waitlist students, respectively, and they remained at Preuss (or, in the case of comparison students, in the school district) through graduation.⁶

The African-American, Asian American, and Hispanic Preuss students enrolled in college at substantially higher rates than the comparison students. As can be seen in Figure 4, the minimum Preuss college enrollment exceeds the maximum possible comparison enrollment: Even if all comparison students with “no record” are actually attending four-year colleges, their enrollment rates would still be lower than the known rates for Preuss graduates. This applies to all three subgroups, although results for African American students should be treated with caution given the high attrition rates for African American students from Preuss. Using the minimum figures, the differences in two-year versus four year college enrollment are statistically significant, while the differences in college versus no college are not significantly different. We can be confident of the direction if not the degree of difference associated with these findings.

⁶ In some cases families moved or other circumstances made it difficult for the students to remain in their schools. Thus “self selection” is not the only reason for staying or leaving.

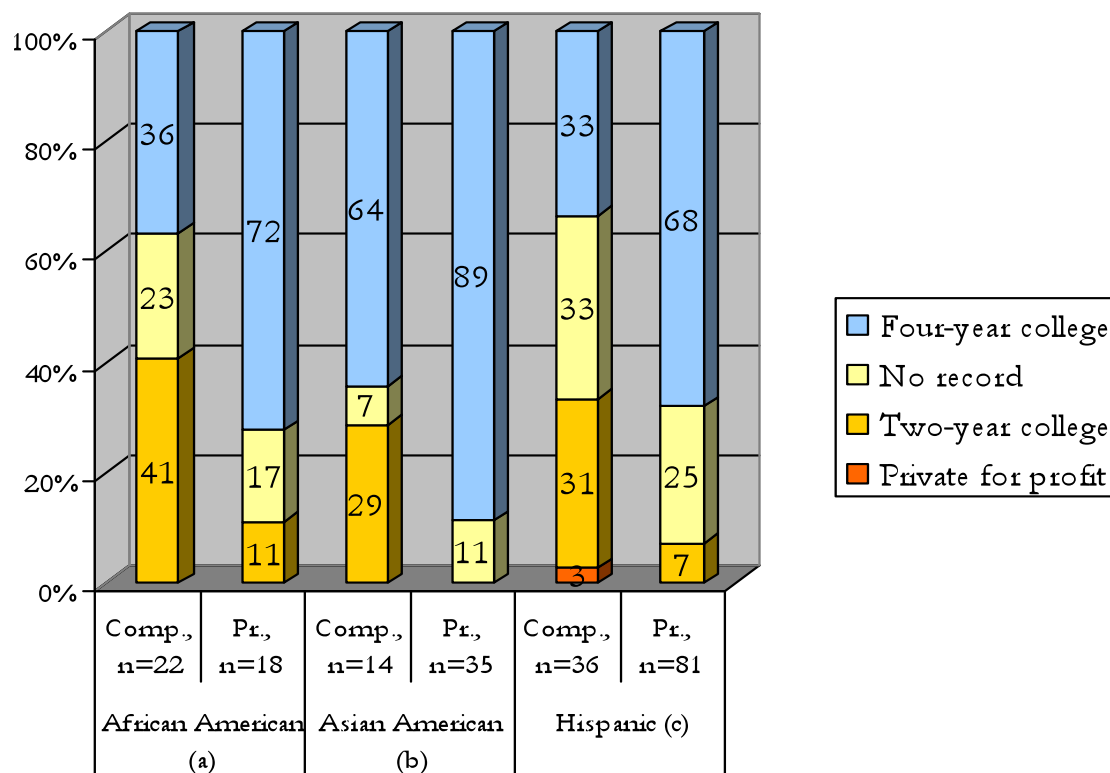


Figure 4. Rates of College Enrollment by Ethnicity: Preuss and Comparison Students, 2005, 2006 2008 Cohorts Combined.

(a) Fisher's Exact Test for two-year versus four-year college enrollment for the African American graduates $p=.022$; for college versus no college, $p=.472$.
 (b) Fisher's Exact Test for two-year versus four-year college enrollment, $p=.005$; for college versus no college, $p=.555$.
 (c) Fisher's Exact Test for two-year versus four-year college enrollment among Hispanic graduates, $p<.001$; for college versus no college, $p=.227$.

Discussion

Randomly assigned treatment students have higher four-year college enrollment rates than do randomly assigned waitlist students based on available data. The results are stronger still for the sizeable subset of randomly assigned Preuss students who remained and graduated from the school. There is little difference between treatment and waitlist, or between Preuss and comparison alumni in their two-and-four-year-college (any college versus no college) enrollment, although there are differences among cohorts, with somewhat stronger Preuss performance in the 2006 than the 2005 cohort and more equal performance for Preuss and comparison students in the 2008 cohort, representing continued strength for treatment and Preuss groups and higher performance in this waitlist and comparison cohort than in earlier cohorts.

The treatment Hispanic students had higher four-year college enrollment than the waitlist graduates. The treatment African American students likewise had higher four-year college enrollment than did those in the waitlist group. The same pattern holds for the Asian American students. (There are too few White students to make a valid assessment.) These results were more marked for students remaining at the school, the Preuss group, than for the full set of randomly assigned students in the treatment and waitlist groups. Thus it is likely that Preuss is effective in

preparing students to enroll in college without respect to race or ethnicity. Sub-groups differ in rates of four-year college enrollment, but all Preuss sub-groups show high four-year college enrollment relative to their peers in the comparison group.

In sum, there is little treatment-waitlist or Preuss-comparison difference in overall college enrollment, but Preuss appears to make a substantial difference in increasing the number of under-represented minority and students from low-income backgrounds who enroll in four-year colleges. These findings are important because attendance at four-year colleges, and at selective colleges more specifically, has been associated with higher college graduation rates. A National Center for Education Statistics [NCES] report (Skomsvold et al., 2011) shows difference in the graduation outcomes of students who began at four-year and two-year colleges. Among students who started in 2003-04, 58 percent of those who began at a four-year college and 10.6 percent of those who began at a two-year college had received a bachelor's degree six years later, by spring of 2009 (Skomsvold et al., Table 2.0-A). If that finding holds true for Preuss alumni, that is if there are higher college graduation rates for Preuss students in four-year colleges than for their randomly assigned peers or for Preuss alumni enrolling in two-year colleges, then we can conclude that the school has made a positive impact not only on students' exposure to college, but to the opportunities following from a college degree. However, if this finding does not hold, then the advantage of four-year college enrollment, given higher costs of four-year colleges in California, is not clear-cut.

A significant caveat remains, as we are unable to distinguish between students who are attending college but were not 'found' in data searches (the "false negatives") and students who are, in fact, not attending college. Access to a universal identifier would eliminate much of the uncertainty, although some students (5 percent in recent data on these students) request that colleges not release their information.

Coleman (1966) and his colleagues found to their surprise, that schools mattered less than social class in predicting academic outcomes. The association of educational achievement with SES and race/ethnicity has not vanished in the four decades since the Coleman report was published. Yet this study argues that school context is an important factor in the relationship between SES and attainment.

Recent research (Engberg & Wolniak, 2010; Hill, 2008; Wolniak & Engberg, 2010) has sought to identify the elements of schools, schooling, and student preparation that are associated with greater academic success. The present study does not investigate specific causes within the school context, but two ideas may help explain the higher rates of four-year college enrollment from Preuss. An explicit part of the Preuss theory of action is extending learning time, providing scaffolds and expanding access to social capital regarding the college-going process. These scaffolds are implemented through the school's academic and counseling support, supplemental tutoring, the longer school day and school year. Patall, Cooper, and Allen (2010) suggest there is evidence for the value of an extended school day and year in improving academic outcomes particularly for students at academic risk. These scaffolds allow Preuss students to pass college preparatory courses and complete college testing requirements and thereby increase rates of college eligibility. It is unclear why we do not see a similarly strong effect on students' 11th grade standardized test scores relative to comparison group peers (Betts et al., 2010; McClure & Reicher, 2007; McClure et al., 2005), though different study designs and analyses may account for some of the difference. Yet the present study suggests that increases in college eligibility and standardized test results do not necessarily co-occur. While flowing from the same educational goals they may reflect different emphases in the school missions or distinct scaffolds.

Secondly, Preuss policies provide a type of scaffolding that may offer momentum toward four-year college enrollment. Thaler and Sunstein (2008) note that a high school policy requiring

application to community college increased enrollment by 11 percent⁷ and introduce the idea of “channel factors” (Lewin, 1951) as policies that may create or diminish obstacles. Jabbar (2011) argues that the community college policy configured the requirements so that the default condition of college application made subsequent enrollments more likely. These ideas resonate with Preuss policies that provide important scaffolds for first generation college students, those whose parents have not experienced college (Billson & Terry, 1982; Choy, 2001), and for low-income families with few financial resources. Specifically, in the context of higher Preuss college eligibility rates, the requirement and practical support of four-year college and financial aid applications as part of coursework may contribute to opportunity, direction and momentum towards four-year college enrollments.

The Preuss School is predicated on the assumption that schooling can be designed so that students from low-income backgrounds can succeed at high levels. The school presents a particular model: While racially and ethnically fairly diverse, and while exclusively college preparatory in academic emphasis and counseling support, Preuss students come from similar socioeconomic backgrounds and neighborhoods and they arrive at the school with strong academic goals and above average preparation and motivation. It is unclear how factors such as peer environment and characteristics, parent influence, the consistency of goals, stability of schooling and the school’s ability to focus on these students’ particular needs contributes to the school’s success. Nonetheless, while this is but one school, the results suggest that it is possible for schools to help students achieve beyond the predictions of circumstance and conceivably move social expectations toward greater equity and achievement. Coleman’s (1966) and Bourdieu’s (1985) observations about the significance of socioeconomic status and cultural capital in determining academic outcomes may be true but not inevitable or beyond the reach of change.

Given the differential outcomes described by Radford et al. (2010) and Bozick and Lauff (2007), one might expect that Preuss students, who are low-income and generally minority students, would have poor college enrollment records. Yet the college enrollment results for Preuss graduates hold the promise that this educational model can assist more academically minded low-income students to enter four-year colleges and may put them in reach of achieving their academic goals.

Offering opportunity to those who seek opportunity is not new or unknown. But the academic, counseling, social support and peer milieu to grasp opportunity is not evenly or universally distributed, as Lareau (1987), Lareau and Cox (2011), and Oakes (2003) have observed. There is no doubt that some students succeed in the absence of extra support, or find the resources and social networks to succeed, as Rumbaut (1999) and Zhou and Kim (2006) have found. But this study tells us that the culling process operates differently for Preuss and comparison students, and that some able and talented comparison students may have a harder and longer path to success. This study supports the view that schooling exerts a substantial influence on college enrollment. While the college enrollment results hold the broader promise that schools can diminish the association between socioeconomic status and academic success, more convincing evidence of Preuss accomplishment will wait for comparison of college graduation rates.

Implications for Policy and Further Research

The policy implications from this study include the need for research on college graduation from Preuss, and college outcomes for low-income students who have not evidenced the same promise as Preuss students. Mixed-methods research on high school characteristics

⁷ Thaler and Sustein (2008) state the finding but a study is not cited in this source.

and post-secondary outcomes associated with similar schools could inform us about effective practices for a diverse student population.

Second, in light of the studies of the KIPP schools, the Harlem Children Zone's Promise Academies, and The Preuss School, practices followed at these schools might be implemented at public schools, accompanied by research on implementation and outcomes. Following the Preuss example, a college preparatory curriculum, tutoring supports, academic and counseling support for meeting college requirements, and the inclusion of college and financial aid applications in coursework could lead to similar results at public schools. In some educational policy circles charter schools have been advocated to offer a broader spectrum of educational options and as proving grounds for promising educational policies to address the needs of underserved students. If the second goal is to be met, studies must follow the long-term outcomes of schools designed to expand the educational attainment of low-income students, and these policies must then be reintroduced and tested in the wider educational environment.

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Appendix A

Eligibility Standards and Lottery Process

Eligibility

Criteria prequalifying students for admission to the School include, but are not limited to:

- a) students qualifying as children from low-income families as that term is used in Subchapter 1 for the purposes of Federal school assistance for Disadvantaged Children (20 U.S.C. § 6301 et seq.), which generally includes families whose income does not exceed 200 percent of the federal poverty standard;
- b) students whose parent(s) or guardian has not graduated from any four-year college or university; and
- c) students exhibiting a level of academic ability, performance and motivation as measured by grades or standardized tests, exhibited in personal interviews, or reflected in letters of reference or in other evidence of achievements, to benefit from the Preuss School's approach and mission. (Students who fit the AVID Profile are an example of the kind of students meeting this criterion.)
- d) with respect to "letters of reference" in item (c) above, teacher recommendation forms that are part of the application process will be made available for review by students and parents who wish to do so.

Lottery

When there are more eligible students requesting admission to Preuss than there are spaces available, students are selected by lottery. The following rules and procedures apply:

- a. Open enrollment for the School occurs each year between November 1 and February 28.
- b. Lottery procedures, date, and time are communicated to applicants via the School's newsletter, website (<http://preuss.ucsd.edu/>), and the application itself.
- c. The lottery takes place on the School's campus at 5:00 p.m. on the third Tuesday in May each year.
- d. There are four witnesses to the lottery: a Charter School Consortium roundtable representative, a University student, a University representative, and a member from the community at large. A written confirmation as to the lottery's fair execution is retained in the Preuss School records.
- e. The lottery is administered via computer program designed to randomly select students by grade level. The drawing continues until all names are drawn. After all spaces are filled, students are placed on a waiting list in the order drawn.
- f. The waiting list is valid for one year. Students are promoted off the waiting list as openings become available. Families are contacted by telephone or in writing and are given several days to respond.
- g. All students in the lottery are weighted equally. No preferences are granted.

Appendix B

Table B1

Lottery Assignments of Eligible Applicants in the 2005, 2006, 2008 Cohorts

	2005	2006	2008	Total
Treatment Group: N (% of Treatment Group)				N
Treatment Group (TRT) Original Lottery “Winners”	53 (100)	53 (100)	134 (100)	240
Preuss Group:				
TRT Students Continuously Enrolled, Graduated from Preuss with Cohort	31 (58.5)	24 (45.3)	84 (62)	139
Remained at Preuss but Graduated with a Different Class	1 (1.9)	1 (1.8)	0	2
Left Preuss	21 (40)	28 (52.8)	50 (37)	99
Waitlist Group: N (% of Waitlist Group)				N
Waitlist, Original Lottery “Losers”	33 (100)	72 (100)	40 (100)	145
Comparison Group: Waitlist Students Continuously Enrolled, Graduated from SDUSD with Cohort	20 (60.1)	32 (44.4)	25 (62.5)	77
Left for Preuss	3 (9.1)	11 (15.3)	3 (7.5)	17
Left SDUSD for other districts	8 (24.2)	28 (38.9)	12 (30)	48
Left cohort	2 (6.0)	1 (1.4)		3

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