Shadow Education, American Style: Test Preparation, the SAT and College Enrollment

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Cross-national research finds that "shadow education" – educational activities outside of formal schooling – tends to confer advantages on already privileged students. Shadow education in the United States, such as test prep for college entrance exams, has received considerably less attention. Drawing on the National Education Longitudinal Study, we analyze the likelihood of participation in, and the implications of, SAT preparation. Social class inequalities in test preparation, particularly costly SAT courses and private tutoring, are notable and have at least moderate consequences for SAT scores and selective college enrollment. We also find racial/ethnic variations in the use of test preparation. We consider the implications of these findings for understanding shadow education, stratification and educational mobility in the United States.

The SAT is arguably the single most important test for American high school students. Every year, more than 2 million young people take this standardized multiple-choice test and most four-year colleges and universities use the results to evaluate applicants from more than 20,000 disparate U.S. high schools (College Board 2007; Grodsky, Warren and Felts 2008).[1] In light of the growing importance of test scores for college admission over the past several decades (see Alon and Tienda 2007), it should not be surprising that SAT preparation services have developed into a lucrative multi-million dollar industry. The Princeton Review, one of the largest companies in this market, earned $110.4 million in revenue for its test preparation services in 2009 (Princeton Review 2010a). Such preparation includes expensive private courses and coaching as well as more moderately priced test prep manuals and computer software programs.

A vociferous debate has emerged regarding the "fairness" of the SAT and the extent to which it should be used in the college admission process (Thernstrom and Glazer 1999; Lemann 1999). Indeed, over-reliance on SAT scores in college admissions has broad and clear-cut implications for issues of merit and diversity in the educational sorting and credentialing process (Alon and Tienda 2007). No less profound, especially for the question of merit, is the likelihood that access to and use of test preparation vary by the family background of students (Briggs

2001; Powers and Rock 1998). Are children from well-resourced families more likely to participate in test preparation than poorer children? Does test preparation pay off in terms of higher examination scores and likelihood of admission to college, especially selective colleges? These questions resonate with prior work on educational stratification and its roots in family inequalities, but they also speak to the relevance of "shadow education" in the United States.

Shadow education – a theoretical construct most often used in comparative education research – refers to educational activities, such as tutoring and extra classes, occurring outside of the formal channels of an educational system that are "designed to improve a student's chance of successfully moving through the allocation process."(Stevenson and Baker 1992:1640; see also Bray 1999; Baker and LeTendre 2005) The prevalence of shadow education and its goals vary across nations, but its global spread is so striking that the United Nations Educational, Scientific and Cultural Organization has expressed concern that the rapid expansion of privatized shadow education could negatively influence formal educational systems in terms of both equity and quality (UNESCO 2006). Baker and LeTendre (2005) similarly suggest that institutionalized shadow education (i.e., private tutoring and learning centers) can magnify inequality and confound a nation's ability to provide equitable and high-quality education to the general population.

In this article, we build on cross-national (Bray 1999; Baker et al. 2001; Baker and LeTendre 2005; Southgate 2009) and country-specific research (Stevenson and Baker 1992; Buchmann 2002; Bray and Kwok 2003; Yamamoto and Brinton 2010) on shadow education and extend its conceptual utility to the U.S. case by analyzing SAT preparation, its relation to important status inequalities surrounding social class and race/ethnicity and its consequences for one of the most important distinctions between educational haves and have-nots: enrollment in four-year, and particularly selective four-year, colleges. Specifically, we draw on the National Education Longitudinal Study to examine social class disparities in test preparation activities and the consequences of test preparation for both SAT performance and college enrollment for a national sample of young adults in the United States.

Family Background and the Transition to College

When discussing the transition between high school and postsecondary education, it is important to recognize that, relative to most other industrialized societies, certain features of the American educational system increase the influence of social origins. Most notably, control over primary and secondary schools is decentralized and locally-based (as opposed to centralized and nationally-based in many other industrialized countries) and coexists with a highly stratified and varied system of higher education. These features result in greater "client power" in the U.S. system (Kerckhoff 1995) and ensure that high-socioeconomic parents have more opportunities to influence the trajectories of their own children (Bidwell and Quiroz 1991; Karen 2002). But how?

One possibility is that socio-economic advantages translate into school-level inequalities in, for example, classroom resources, teacher experience, and segregation (Kozol 1992). At the same time, family-based, non-school inequalities – which are wide and growing – are central for educational outcomes given their well-established implications for both concrete and less tangible educational investments parents can make for their children (Downey, von Hippel and Broh 2004; Lareau 2002; Teachman 1987). Advantaged youth consequently enjoy rates of college enrollment and completion that far exceed those of their lower-SES counterparts (Baker and Velez 1996; Charles, Roscigno and Torres 2007). Moreover, while college enrollment in the United States has been expanding over the past century (Clotfelter 1993), not all socio-economic groups have benefited equally. Each year from 1972 to 2005 a higher percentage of high school graduates from high-income families went to college compared to those from low-income families. By 2005, 81 percent of high school graduates from families in the top 20 percent of the income distribution enrolled in college immediately after graduating from high school; only 54 percent of high school graduates in the bottom 20 percent did so (NCES 2007).

Beyond enrollment and non-enrollment distinctions, family background also can affect the *type* of higher educational institution one attends (Soares 2007; Karabel 2005). Davies and Guppy (1997) find that high school graduates from historically excluded groups are less likely to attend highly selective colleges and universities. Extending this analysis to more recent cohorts, Karen (2002) demonstrates growing effects of familial background on the prestige of the higher education institution one attends (see also Soares 2007). Given the importance of college selectivity for general mobility processes and a wide range of socio-economic and occupational outcomes (Bowen and Bok 1998; Karabel 2005; Alon and Tienda 2005; Stevens 2007), further attention to post-secondary inequalities and the mechanisms through which they are created is warranted.

One key mechanism involves the cultural and social capital that families pass to their children. Cultural capital is most often conceptualized and measured either as high-status cultural knowledge and preferences (Bourdieu 1977; DiMaggio 1982) or as a broader skill set including cognitive, linguistic and social/behavioral skills (Condron 2007; Farkas 1996). Social capital reflects positive and rewarding relationships between children, their parents, the community and schools/teachers (Coleman 1988). Derived from both the tangible resources of higher family income and the knowledge associated with high parental education, social and cultural capital are often garnered outside of school, where parents structure children's out-of-school activities in educationally meaningful ways (see Lareau 2002). Such capital may be beneficial directly, by helping to secure access to quality higher education (Sandefur, Meier and Campbell 2006), or indirectly, by influencing teacher expectations and children's curricular placement and educational progress (Condron 2007; Roscigno, Tomaskovic-Devey and Crowley 2006).

In a study of Kenya's highly competitive educational system, Buchmann (2002) argued that the use of shadow education constitutes a form of cultural capital. She found that Kenyan children from wealthy families were far more likely than other children to participate in shadow education activities such as tutoring and examination preparation courses outside of school. These students had higher academic performance and were less likely to repeat a grade than students who reported no experience with shadow education. We suggest that shadow education activities pertaining to college test preparation in the United States may similarly constitute a form of cultural capital borne of both family income and parental educational resources.

Research often disentangles family resources from the investment of those resources in order to avoid confounding potential social class effects into a single indicator and thus conflating the meaningful processes therein (see Charles et al. 2007; Powell and Steelman 1990; Teachman 1987). We likewise conceive of shadow educational investments and college test preparation in such a manner; they emanate from the overlapping and reinforcing character of tangible resources (i.e., income) and knowledge and efficacy (i.e., parental education). By examining such relationships and their implications for test preparation, test performance and eventual college enrollment, we contribute to the broader sociological aim of explicating pertinent *processes* of social class stratification (Reskin 2003). Moreover, we extend the utility of shadow education as a useful sociological construct to the case of the United States.

SAT Test Preparation as Shadow Education

Given the expense of college application and admission processes, disparities in family background likely matter. Admissions officers at selective colleges typically consider a range of factors in deciding whom to admit. Prior academic achievement, measured as high school grade point average or class rank, extra-curricular activities, written essays and SAT scores are usually the most central factors considered (Karabel 2005; Alon and Tienda 2007). It makes sense that in such a competitive environment, students and parents will take action to enhance the chances of admission. Achieving a high SAT score is very much a part of that equation. Although high scores by no means guarantee admission to selective schools, low scores very often disqualify students from admission.

Shadow education – a construct derived from comparative and international education research – is commensurate with previous efforts among U.S. scholars to delineate how family background disparities are meaningful both inside (Lucas 1999; Oakes 1985) and outside (Downey et al. 2004; Lareau 2002) of school. Shadow education encompasses behavior occurring outside of the formal school day for the purposes of "mastering curriculum, examinations, and earning grades for learning and skills used by schools to grant students further educational opportunities."(Baker and LeTendre 2005:56) It can be remedial, when it is used

to help struggling students improve their performance in school, or enriching, when it provides supplementary learning and advantage beyond what is taught in school. Like a shadow, it generally goes unnoticed and takes the shape of formal schooling in both purpose and curricula (Southgate 2009). Prior research on shadow education of the enrichment variety finds that it flourishes in educational systems where high-stakes testing serves as a gatekeeper to future educational opportunities (Stevenson and Baker 1992; Buchmann 2002; Bray and Kwok 2003; Yamamoto and Brinton 2010).[2]

Given the high-stakes nature of the SAT for American high school students planning to attend selective colleges and universities, SAT preparation courses, tutoring and other related activities constitute a clear example of shadow education in our view. The reality, however, is a far cry from what the designers of the SAT intended. When the test was introduced in 1926, proponents maintained that requiring the exam would level the playing field and reduce the importance of social origins for access to college. Its creators saw it as a tool for elite colleges such as Harvard to use in selecting deserving students, regardless of ascribed characteristics and family background. Without the SAT, admission to Harvard would continue to be reserved for the children of elite families (Lemann 1999).

Harvard began requiring the SAT of all applicants in 1935. Most colleges and universities followed Harvard's lead. By 1957 more than half a million American high school students were taking the SAT annually (Lemann 1999). Although initially viewed as a type of IQ test, the College Board, the non-profit organization that administers the SAT, now correctly recognizes that the SAT predicts grades in the first college year, albeit not very strongly. On this point, Rothstein (2004) finds that SAT scores explain only about 3 percent of the variation in students' grades after controlling for family background. Its weakness as a predictor notwithstanding, by the 1990s, the SAT had become the closest thing to a national exam in the United States, similar to the kinds of national examinations that are standard in other nations with centralized educational systems.

Students utilize several strategies in order to improve their SAT scores (Powers 1993). Roughly half take the exam multiple times and 15 percent take the test three or more times (Mehta and Gordon 2008). This strategy pays off, as students' scores usually improve upon re-examination (Vigdor and Clotfelter 2003). Students may have an even greater incentive to take the test more than once since the College Board implemented its "Score Choice" policy in 2009 that allows students to choose how many and which scores to send to colleges; previously all scores were submitted. The fee for taking the SAT is currently $45, with additional fees for services such as changing the test date or accessing scores via telephone (College Board 2010a). The College Board waives the fee for low-income students, but they can only take the test twice for free. Students who can afford to pay can take the test an unlimited number of times (Mehta and Gordon 2008). Even prior to the new College Board policy that allows students to choose which scores

to report, Vigdor and Clotfelter (2003) found that students from more affluent backgrounds are more likely to take the SAT multiple times, net of other factors. Those whose parents earned more than $60,000 had a 1.5 percent higher probability of retaking the test than those whose family incomes were below $40,000; black students were less likely to take the test multiple times compared to whites.

A second common strategy – the focus and contribution of this article – is test preparation. Many students planning to attend college utilize some form of SAT preparation (Powers 1998; Powers and Rock 1998). Given the high costs of some types of preparation, however, advantaged students may have a greater repertoire of strategies. Costs for test preparation vary, but can be expensive. The Princeton Review and Kaplan Incorporated, the best known national companies offering SAT preparation, offer products ranging from online SAT courses to one-on-one tutoring. In 2007, Princeton Review's classroom courses cost $1,000 to $1,200, and private tutoring ranged from $1,500 to $6,900.[3] In either case, the company *guarantees* a score increase or customers can get course fees refunded (Princeton Review 2010b). Even the College Board (2010b) now sells test prep products, including test prep books and online courses, on its website.

The expenses associated with test preparation can be absorbed more easily by higher income families. Moreover, those with highly educated parents may be better informed regarding the SAT's importance for college admission as well as various types of preparation. If students from disadvantaged backgrounds are unaware of preparation options, or are financially constrained from taking advantage of them, they will be less likely to use test preparation. To the extent test preparation holds implications for SAT performance, then one plausible mechanism in the reproduction of educational disadvantage along the lines of social class will be revealed. If we find evidence of social class differences in the use of test preparation, a second question emerges as to why such differences exist. Might more advantaged families use test preparation as a means of enrichment? Or might test preparation, when a family can afford it, actually reflect efforts toward remediation for low-performing students?

If we find effects of test preparation on SAT scores, evidence of the size of these effects will also be informative. In light of the multi-million dollar revenues earned by the test preparation industry and the growing public perception about the necessity of test preparation, debate over the size of the pay off for SAT scores continues (Bollinger 2002; Zwick 2004). Test prep companies frequently tout score increases of 100 points or more, while the College Board has long maintained that the SAT is not "coachable," and that test preparation is largely ineffective. Our analysis of nationally-representative data can provide insights into the effectiveness of test preparation programs.

Racial/ethnic variations in SAT preparation are less straightforward. One might expect to find racial disparities in the use of test preparation due to associations between race/ethnicity and social class. At the same time, the history of racial/ethnic disadvantage on the SAT and public attention to the topic in recent decades

have heightened consciousness about the need to counter bias and test-related in-equalities. University affirmative action policies also may have created what Brown and Hirschman (2006:108) call "a symbolic beacon of a welcoming environment" for minorities. These policies include outreach efforts such as providing personal contacts, information about the admissions process and encouraging minority students to consider test preparation at an early age. Indeed, one recent study finds that black students are *more* likely than whites to report using a host of test preparation activities (Devine-Eller 2005). In contrast to predictions regarding social class inequalities, we suspect that racial/ethnic minorities will be as likely as, or even more likely than, whites to utilize test preparation.

Data

Data are drawn from the National Education Longitudinal Study, a large, nationally-representative dataset. In 1988, the National Center for Education Statistics drew random samples of approximately 25 8th graders in each of about 1,000 randomly selected middle schools. NELS followed the students through high school in 1990 and 1992, and beyond in 1994 and 2000, with high follow-up response rates (see NCES 1994). All of our measures come from the 1994 restricted-use data (base year through third follow-up) with the exception of college enrollment/selectivity and SAT scores, which we extracted from the 2000 wave and merged with the 1988-94 data.

These data are well suited for addressing our research questions. First, their longitudinal nature and detailed student and parent components allow us to control for family background, educational achievement and other factors prior to and during high school, and to follow youth in their subsequent postsecondary trajectories. The longitudinal data also enable us to analyze potential processes related to background, SAT preparation and college enrollment in a logical and causally consistent manner.

Like any data source or analysis, there are admittedly limits to what we can capture. For example, we are unable to distinguish students who took the SAT once from those who took the exam multiple times; nor does the dataset provide multiple SAT scores for students in this latter category. The optimal design to evaluate the effect of test preparation would involve the random assignment of students into different preparatory conditions, yet to date no such study has been conducted on a large scale. A few small-scale studies with data on students' SAT scores prior to and after coaching (e.g., Powers and Rock 1998) model causality more appropriately, but are not generalizable. We compare our results to those derived from these smaller-scale studies and are cautious about inferring causal relationships. Despite such limitations, we are afforded confidence by both the nationally representative nature of the data and the extensive information they provide regarding students, their families and long-term educational experiences.

From the entire sample we selected 8,820 respondents who, in their senior year of high school, reported that they already took or were planning to take the SAT

Table 1: Variable Descriptions and Summary Statistics

Variable	Description	Mean	SD
College enrollment	Type and selectivity of first postsecondary institution in which student enrolled after high school; NELS determined selectivity based on ratio of acceptances to applicants and average composite SAT score of students in entering class:		
	0: No college enrollment	.16	
	1: Less than 4-year college	.29	
	2: Non-selective 4-year college	.38	
	3: Selective 4-year college	.13	
	4: Highly-selective 4-year college	.04	
SAT score	SAT score, or ACT score converted to SAT scale, ranging from 400-1600 (used in Table 3), also converted to standardized z-score (used in Table 4)	876.40 .00	229.02 1.00
Highest-Level Test Preparation			
Ordinal coding	Single measure ranging from 0-4 indicating the highest level of test preparation the student used, also converted to the following categorical coding:	1.29	1.18
	0: No preparation: Student did not prepare for SAT.	.27	
	1: Books/ video/ software: Student used books and/ or videos and/ or computer software but no other type of test preparation.	.40	
	2: High-school course: Student took a high-school test-preparation course either alone or with some combination of books/ video/ software.	.15	
	3: Private course: Student took a private test-preparation course either alone or with some combination of books/ video/ software or high-school course.	.11	
	4: Private tutor: Student had a private test preparation tutor either alone or with any other type of test preparation.	.07	
Family income	Total family income prior to NELS base year (1987), mid-point coded from original dollar-amount categories (used in Figure 1) and converted to standardized z-score for regressions (Tables 2-4).	49,173.27 .00	46,306.82 1.00
Parent had high-school diploma or less	Highest level of education completed by either parent was a high-school diploma or less.	.22	
Parent had some college	Highest level of education completed by either parent was greater than high school but less than 4-year degree.	.40	
Parent had college degree	Highest level of education completed by either parent was college degree.	.19	
Parent had Master's/ Ph.D./ professional degree	Highest level of education completed by either parent was M.A. or equivalent, Ph.D., M.D., or other professional degree.	.19	

Variable	Description		
White	Student-reported race/ethnicity is white, non-Hispanic.	.68	
Asian	Student-reported race/ethnicity is Asian or Pacific Islander.	.09	
Black	Student-reported race/ethnicity is black, non-Hispanic.	.11	
Hispanic	Student-reported race/ethnicity is Hispanic.	.11	
Native	Student-reported race/ethnicity is American Indian or Alaskan Native.	.01	
Controls			
Female	Sex of student; 0 = male, 1 = female	.54	
Prior achievement	Standardized z-score of student's 8th-grade math/reading composite	.00	1.00
Student's educational expectations	Standardized z-score of how far in school student thought he/she would get in 10th grade; less than high-school graduation to Ph.D./M.D.	.00	1.00
Student planned to take SAT	Student planned to take ACT or SAT during 10th grade; 0 = no, 1 = yes.	.81	
Frequency student discussed preparation with parents	Standardized z-score of how often student discussed preparing for ACT/SAT with parents during first half of 10th grade; never to often.	.00	1.00
Frequency student discussed going to college with parents	Standardized z-score of how often student discussed going to college with parents during first half of 10th grade; never to often.	.00	1.00
Student had tutor to help with homework	Student had paid tutor help with homework between grades 10 and 12; 0 = no, 1 = yes.	.08	
Parent encouraged student to prepare for SAT	Parent reported encouraging student to prepare for ACT or SAT; 0 = no, 1 = yes.	.87	
Parent's expectations for student's education	Standardized z-score of how far in school parent expected student to go in 8th grade; less than high-school diploma to Ph.D./M.D.	.00	1.00
Money parents saved for college	Standardized z-score of how much money parents had set aside for student's future educational needs in 12th grade; none to $30,000+.	.00	1.00
Northeast	Student attended high school in the Northeast; 0 = no, 1 = yes.	.21	
South	Student attended high school in the South; 0 = no, 1 = yes.	.35	
Midwest	Student attended high school in the North Central/Midwest; 0 = no, 1 = yes.	.26	
West	Student attended high school in the West; 0 = no, 1 = yes.	.18	
Rural	Student attended high school in a rural area (outside MSA); 0 = no, 1 = yes.	.29	
Urban	Student attended high school in an urban area; 0 = no, 1 = yes.	.31	
Suburban	Student attended high school in a suburban area; 0 = no, 1 = yes.	.40	

or ACT. This group – SAT/ACT takers – is the population of interest to which our results apply. We use multiple imputation of missing data for all measures in the analyses (von Hippel 2007). In the multivariate models, we account for the initial sample clustering of students within schools using the NELS school identifier and utilize the longitudinal base-year to third follow-up panel weight. We lose several hundred cases due to missing school identifiers or weights, leaving us with a final sample of 8,150 individuals across all multivariate analyses reported. Table 1 reports descriptions and unweighted summary statistics for all indicators.

Test Preparation

Test preparation is our initial outcome of interest. We then treat it as an independent variable in later models predicting SAT scores and college enrollment. When the students were high school seniors (1992), NELS asked whether they did any of the following to prepare for the SAT/ACT: took a course at their high school, took a course offered by a commercial test preparation service, received private one-on-one tutoring, studied from test preparation books, used a test preparation computer program, or used a test preparation videotape. Students may combine these test preparation strategies. More than half (53 percent) of the sample reports using test prep books. Use of other types of prep is less common, with response rates ranging from 7 to 18 percent.[4]

From the original indicators just noted, we constructed an indicator of *highest-level test preparation*, with recognition that some types of test prep may be more effective and also more costly than others. It is coded as follows: (0) used no preparation of any kind; (1) used test preparation books and/or computer software and/or videos, but no other type of test preparation; (2) took a high school course either alone or in combination with test prep in category 1, but no other type of test prep; (3) took a private course either alone or in combination with test prep in categories 1 and 2, but had no private tutoring; (4) used a private tutor either alone or with any other type of test prep. This strategy was guided by the fact that books, videos, and computer software are the most affordable and accessible types of test preparation, followed by high school courses, private/commercial courses and private tutoring, respectively.

In addition to the ordinal indicator, we created a set of four mutually exclusive and exhaustive dichotomous variables indicating students' highest level of test preparation (relative to no test preparation). As Table 1 indicates, 27 percent of the sample of SAT-takers used no test prep and 40 percent used nothing beyond books/video/software. A high school course was the highest level of prep for 15 percent of the sample, a private course was the highest level for 11 percent, and a private tutor was the highest level for 7 percent.

SAT Performance and College Enrollment

Some students took the SAT and others took the ACT. Fortunately, NELS has a measure that incorporates ACT scores converted to the SAT scale, thus reporting

all scores on the SAT scale. *SAT score* is a dependent variable when estimating how background attributes and college exam preparation shape test performance. For ease of interpretation, we use the original coding of *SAT score* in these models. SAT score then becomes an independent variable in the analyses of college enrollment, where we use a standardized z-score version in order to help gauge the strength of the effect relative to other continuous independent variables (all of which are standardized for the same reason).

The final outcome of interest is *college enrollment*. Our measure distinguishes four types of enrollment from non-enrollment. Each value indicates the type and the selectivity of the first postsecondary educational institution attended after high school: no enrollment, less than four-year institution, non-selective four-year institution, selective four-year institution or highly-selective four-year institution.[5] Although college admission might be considered more appropriate, we use data on college enrollment because they are more complete and of better quality than college admissions data. Indeed, admissions data in national surveys are often of questionable quality with substantial amounts of missing information (Kane 1998). Alon and Tienda (2007) found that admissions data are suspect or missing for about half of all NELS respondents who attended postsecondary institutions. Enrollment is a reasonable proxy for admission; as Alon and Tienda (2007 online supplement:4) explain, "attendance patterns by selectivity tiers reveal a great deal about admission decisions because the difference between admission and tier-specific enrollment is not large."

Family Background, Race/Ethnicity and Controls

We include indicators of family income and parental education measured prior to high school entry and modeled causally prior to our outcomes of interest. *Family income* is derived from the NELS parent survey, and reflects total income in real dollars from all sources (converted to a standardized z-score for the multivariate analyses). Parental education is a set of dichotomous indicators tapping into the highest level of education of either parent (*high school diploma or less*, *some college*, *college degree*, or *master's/Ph.D./other professional degree*).[6] Models also include measures of students' self-reported race (*white*, *Asian*, *black*, *Hispanic* or American Indian/Alaskan *native*).

Students who engage in test prep likely differ in important ways from students who do not engage in test prep. Thus, we include controls to account for potential selection into test preparation – that is, to account for factors besides family income and parental education that likely shape students' use of test prep (see Briggs 2004). These controls include a wide range of student attributes and behaviors: prior academic achievement, educational expectations, plans to take the SAT, discussions with parents about SAT prep and plans for college, and having a tutor to help with homework. We also include parental encouragement to prepare for the SAT, their expectations for the child's educational attainment, and the amount of money they have saved for their child's college education. Then, in the analyses

of SAT scores and college enrollment, we retain controls that significantly predict test prep, such that the impact of test prep can be distinguished from the impact of selection into test prep. This approach seeks to rule out selection effects and assess the models' ability to determine whether students' SAT scores improve as a result of test preparation.
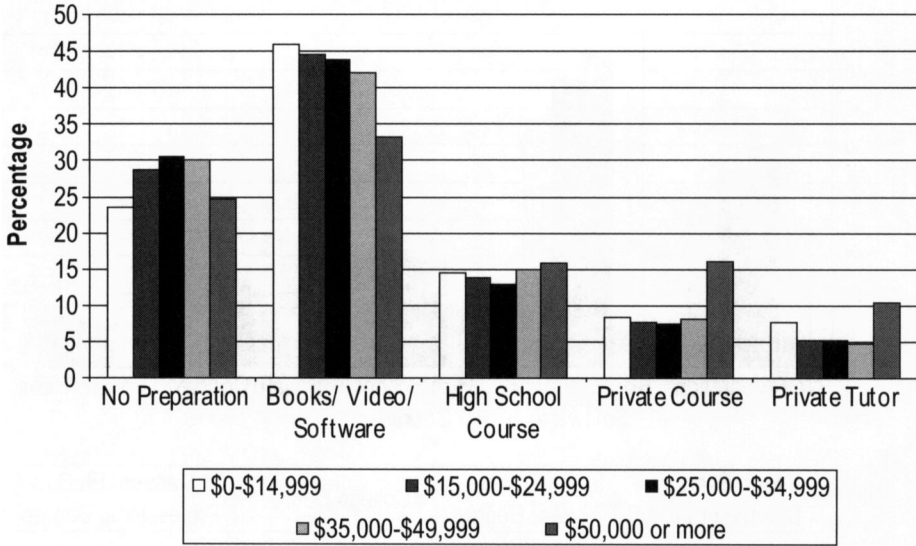
Analytic Strategy and Results

The analyses proceed in three steps. First, using multinomial logistic regression, we analyze the likelihood of utilizing each of the four types of highest-level test preparation vs. no test preparation and report these results in Table 2. These models include family income, parental education, race/ethnicity and controls. The aim is to determine whether and how family income and parental education shape students' use of test preparation. If family income and parental education promote test preparation – more expensive forms of it in particular – net of other factors, this would suggest that SAT preparation constitutes an influential mechanism in the link between familial advantage and educational mobility, and a form of shadow education that warrants more sociological attention. Supplemental analyses, referred to in the text, delineate whether the patterns reflect use for enrichment or remediation.

In Table 3, we turn to whether test preparation promotes higher SAT scores. The first model includes family background and all controls that significantly predict test preparation (in Table 2). Subsequent models incorporate the test preparation indicators. These additions assess (1. whether and how test preparation matters for actual test performance, and (2. the potentially mediating role of test preparation in the family background-SAT score relationship, as denoted by declines in family income and parental education coefficients once test preparation is introduced.

Finally, in Table 4, we consider the implications of these patterns for college enrollment. Using multinomial logistic regression, we examine the determinants of enrolling in colleges of varying selectivity. Following the causal logic of our initial discussion and prior analyses, our interest is in whether background disadvantages and test preparation effects, captured in the first equation, are mediated to some extent by SAT performance.

Family Background and Variations in College Exam Preparation

How does SAT preparation vary by family background attributes? Figures 1 and 2 report bivariate relationships between highest-level test preparation and both family income (Figure 1) and parental education (Figure 2). The results paint an interesting picture of how test takers from varying backgrounds utilize test preparation. Recall that students are coded according to their *highest level* of test prep, not simply whether they utilized each type (as such, the bars for each income/education category total 100%). Students from the higher parental income and education categories are less likely to use no preparation or only the most affordable types of prep (books/video/software) compared to their

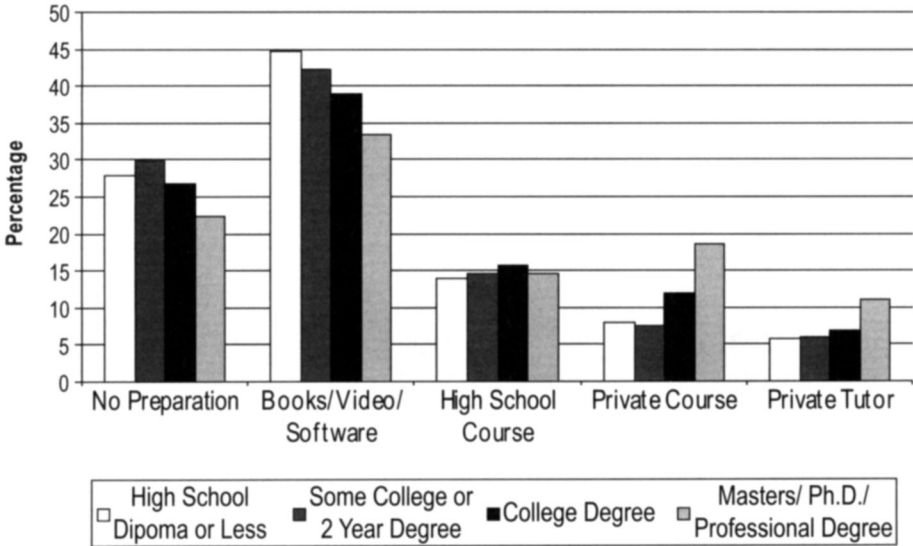**Figure 1. Highest-Level Test Preparation by Family Income**

Note: Students are coded according to their highest level of test preparation, not simply whether they used each type of prep.

counterparts from more disadvantaged socio-economic backgrounds, and they are more likely to use more expensive types of preparation.

Does the relationship between family status and test preparation prove robust when we control for a host of other factors that may shape students' likelihood of prepping? Table 2 addresses this question. We estimate the likelihood of participating in each of the four types of highest-level test preparation vs. no preparation, the reference category. For ease of interpretation, we present odds ratios. A ratio of 1 represents equal odds that the student falls into the comparison category or the reference category. A ratio greater than 1 represents increased odds, while a ratio less than 1 represents decreased odds of falling into the comparison category rather than the reference category.

The results in Table 2 reveal distinct patterns for the impacts of parental income and education. First, parental education does not exhibit a significant effect on highest-level test preparation after other potential predictors are taken into account. This suggests that the parental education advantages illustrated in Figure 2 matter indirectly through other aspects of family background now accounted for in the model. Second, net of all the controls, family income significantly boosts the odds of using the two most expensive types of test preparation – private courses and private tutors – compared to using no prep. These robust and persistent income effects, net of numerous controls, offer convincing evidence that family income advantage increases the likelihood of test preparation.

Figure 2. Highest-Level Test Preparation by Parental Education

Note: Students are coded according to their highest level of test preparation, not simply whether they used each type of prep.

Blacks are much more likely than whites to utilize three of the four test prepara-tion strategies. This means that blacks from comparable backgrounds to whites, in terms of parental income and education, take advantage of test preparation. This finding accords with recent research on the race implications of the SAT and group-specific approaches to combating real or perceived biases (Devine-Eller 2005). It is also consistent with the view that black adolescents and their families are well aware of the history/visibility of the SAT as a gate-keeping tool in the production of racial/ethnic educational stratification and respond accordingly by engaging in test preparation activities. Females are more likely than males to engage in all forms of test preparation. Several factors included to account for potential selection into prep matter as well (e.g., parents and students discussing prep, students having a homework tutor during high school, parents encouraging students to use prep, etc.). Regional differences are also apparent, as students from the Midwest and West are less likely to prep than students from the Northeast.

Prior achievement has a negative effect for the most part, indicating that high-er-achieving students are less likely to prep than lower-achieving students net of all else. In supplemental analyses we found that prior achievement interacts with parental education (but not income). Here, the effect of prior achievement becomes less negative as we move up the parental education scale and even be-comes positive at the highest level of parental education. For most students, then,

Table 2: Odds Ratios from Multinomial Logistic Regression Predicting Highest-Level Test Preparation

	Books/ Video/ Software	High School Course	Private Course	Private Tutor
Family income	.888	1.129	1.278**	1.552***
Parent had some college (vs. high school diploma or less)	.942	.875	.821	1.197
Parent had college degree (vs. high school diploma or less)	1.090	.994	1.107	1.107
Parent had Master's/ Ph.D./ professional degree (vs. high school diploma or less)	1.117	.917	1.348	1.451
Asian (vs. white)	1.446	1.360	2.172***	1.694
Black (vs. white)	1.320	2.128**	2.302***	3.328***
Hispanic (vs. white)	1.009	1.334	1.358	1.911**
Native (vs. white)	.636	.671	2.636	3.205*
Female (vs. male)	1.842***	1.773***	1.782***	1.323*
Prior achievement	.903	.778**	.799**	.640***
Student's educational expectations	.934	1.026	1.023	.908
Student planned to take SAT (vs. did not)	1.148	1.467*	1.099	1.186
Frequency student discussed test prep with parents	1.058	1.268***	1.407***	1.380***
Frequency student discussed going to college with parents	1.171**	1.106	1.108	1.148
Student had tutor to help w/ homework (vs. did not)	.718	.963	1.659*	3.090***
Parent encouraged student to prep for SAT (vs. did not)	1.562**	2.028**	2.784***	2.033*
Parent's expectations for student's education	.969	1.142*	1.052	.941
Money parents saved for college	1.036	1.032	1.167	1.096
South (vs. Northeast)	1.218	.950	.778	.659
Midwest (vs. Northeast)	1.073	.506***	.516***	.326***
West (vs. Northeast)	1.221	.733	.664*	.396***
Urban (vs. rural)	1.154	1.258	1.106	1.280
Suburban (vs. rural)	.907	1.093	.948	1.206
Intercept	.551	.168	.093	.071

N = 8,150
Note: No test preparation is reference category.
*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

lower achievement prompts test preparation, but for those of advantaged socio-economic backgrounds, higher achievement prompts test preparation. This lends more evidence to an enrichment, rather than a remedial, interpretation.

Implications of Family Background and SAT Preparation for Test Scores

Next we turn to the question of whether exam preparation activities influence SAT scores. The analyses presented in Table 3 use generalized least squares regression to generate estimates and standard errors that account for the clustered NELS sample

design. The first model includes family income and parental education, race/ethnicity, and all controls that had a significant effect on the odds of test prep in earlier analyses.

Model 1 reveals large and significant disparities in SAT scores by family income and parental education. Asians score about 35 points higher than whites, while blacks score about 40 points lower than whites. Scores of other minority groups do not differ significantly from those of whites. Females score about 37 points lower than their male counterparts. These findings pertaining to social class, race and gender are generally consistent with those of past research (Grodsky et al. 2008; Kobrin, Sathy and Shaw 2007; Jencks and Phillips 1998). Not surprisingly, prior achievement has a strong positive impact on SAT scores. Few of the other controls for selection into test prep matter, although the regional disparities are large, with test-takers from all other regions scoring significantly lower than those from the Northeast.

Models 2 and 3 introduce highest-level test preparation, in order to assess its direct impact on SAT scores as well as the extent to which it may mediate family income and parental education effects already established in Model 1. As the coefficient in Model 2 indicates, test-takers gain about 10 points on the SAT by utilizing the next-highest level of test preparation. To delineate more precisely how different types of test prep are related to SAT scores, Model 3 replaces the ordinal measure with the more interpretable categorical coding. Using books, videos or computer software with no other type of prep does not significantly boost SAT scores (although the effect is positive). The other three forms of test preparation bolster SAT scores. Compared to using no prep, taking a high-school course produces a gain of about 26 points. Taking a private/commercial course boosts scores by about 30 points and a private tutor increases scores by about 37 points. By estimating both measures of highest-level test preparation, we can see that the apparent overall boost of 10 points per unit on the scale actually stems from disproportionate gains from the higher levels of prep and no real gain from the use of books, videos or software. These estimates are much smaller than the gains of 100 points or more that test prep companies advertise. They are also more in line with results of studies that similarly account for potentially confounding factors (Briggs 2001, 2009) and smaller scale studies using data on pre- and post-test preparation SAT scores that find score gains in the range of 20-30 points (Powers 1998; Powers and Rock 1998; College Board 1999).

Whether such small gains in SAT scores increase students' admission prospects depends on how colleges and universities use and evaluate SAT scores. A 2009 survey commissioned by the National Association of College Admission Counseling found that, of the 130 institutions responding, more than a third agreed that a 20-point improvement on the SAT-Math test would "significantly improve students' likelihood of admission."(Briggs 2009:18) Thus, even modest SAT score gains may have practical significance for improving a student's chances of being admitted to the college of his or her choice.

Note that the magnitude of family income and parental education effects diminish somewhat after test preparation is included. This is most evident in the

Table 3: Unstandardized Coefficients from Generalized Least Squares Regressions Predicting SAT Score

	Model 1	Model 2	Model 3
Family income	15.709***	13.696***	13.738***
Parent had some college (vs. high school diploma or less)	10.809*	10.839*	10.864*
Parent had college degree (vs. high school diploma or less)	40.639***	40.357***	40.307***
Parent had Master's/ Ph.D./ professional degree (vs. high school diploma or less)	53.851***	52.860***	52.922***
Asian (vs. white)	34.650**	32.284**	32.349**
Black (vs. white)	-39.899***	-44.093***	-44.287***
Hispanic (vs. white)	-14.810	-16.747	-16.838
Native (vs. white)	-35.068	-39.704	-39.315
Highest-Level Test Preparation			
Ordinal coding		10.162***	
Categorical coding			
Books/ Video/ Software (vs. no preparation)			8.759
High school course (vs. no preparation)			25.679**
Private course (vs. no preparation)			30.214***
Private tutor (vs. no preparation)			37.133***
Female (vs. male)	-37.375***	-38.729***	-38.758***
Prior achievement	168.096***	169.275***	169.262***
Student planned to take SAT (vs. did not)	29.524*	28.904*	28.674*
Frequency student discussed test preparation with parents	4.712	3.449	3.360
Frequency student discussed going to college with parents	1.284	.947	.965
Student had tutor to help w/ homework (vs. did not)	-10.463	-15.018	-14.623
Parent encouraged student to preparation for SAT (vs. did not)	2.276	-.459	-.585
South (vs. Northeast)	-30.686***	-29.087***	-29.077***
Midwest (vs. Northeast)	-40.909***	-37.321***	-37.053***
West (vs. Northeast)	-41.576***	-38.728***	-38.613***
Intercept	878.681	868.907	869.139
R-squared	.737	.740	.740

N = 8,150

*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

case of family income, the coefficients for which decline in magnitude by approximately 13 percent from Model 1 to both Model 2 and Model 3. This makes sense in light of the larger effects of family income vs. parental education in Table 2 and offers further evidence that family income inequality is more salient to SAT preparation and its consequences than are inequalities in parental education.

Although these models reveal some lingering racial disadvantages, particularly for blacks, it is interesting that the gap between black and white students' SAT scores increases when we account for test preparation. This makes sense given that blacks

engage in test preparation more often than whites net of other factors (Table 2). When black students prepare for the SAT more than white students, as is the case in the unadjusted Model 1 of Table 3, their SAT scores trail those of white students by about 40 points. But in models 2 and 3, where test preparation is held constant and thus blacks and whites prepare equally, the black/white SAT score gap increases to about 44 points. This suggests that engaging in SAT preparation helps black students narrow the gap with white students, at least by a few points. The same is true for females compared to males, although to a lesser extent. In supplementary analyses, we find no significant interactions between forms of exam preparation and either parental income/education or student race, indicating that returns to SAT preparation are relatively uniform across groups. Moreover, the effects of family income on the most expensive types of test prep (see Table 2) and the positive impact of these types of prep on SAT scores (Table 3) provide confidence that we have operationalized test prep in a meaningful and appropriate way

Consequences for College Enrollment and Selectivity

Does family background and its linkages to SAT test preparation and scores have consequences for college enrollment? Results reported in Table 4 address this question relative to four specific types of enrollment: less than four-year, non-selective four-year, selective four-year and highly-selective four-year college (vs. no college enrollment). We first analyze the impact of family background, test preparation and controls on enrollment. We then introduce SAT scores in a second model. Given that test preparation likely shapes college enrollment mainly through its impact on SAT scores, we expect that test preparation either will exhibit no direct effect on college enrollment or, if it does shape college enrollment, this effect will be mediated by SAT scores. We used a generalized logit model to estimate the likelihood of enrolling in each of the four types of institutions compared to no college enrollment, the reference category. As in Table 2, Table 4 reports odds ratios for ease of interpretation.

First, as expected, family income and parental education are consequential for college enrollment, increasingly so at more selective levels. Indeed, for both family income and most of the parental education measures, the coefficients in Model 1 increase in magnitude moving from less to more selective college enrollment. In Model 1, Asians are more likely than whites to enroll in selective and highly-selective institutions, and Hispanics are more likely to enroll in highly selective institutions. Test preparation has no significant impact on enrollment in less than four-year and non-selective four-year institutions, yet has a positive effect on enrollment in selective and highly-selective institutions. Females are more likely than males to enroll in less selective institutions. Notably, the impact of prior achievement grows larger with greater institutional selectivity. Region also stands out. Students from the South in particular, but also students from the West and Midwest, are less likely to enroll in more selective institutions compared to students from the Northeast.

Table 4: Odds Ratios from Multinomial Logistic Regressions Predicting College Enrollment

	Less Than 4-Year College		Non-Selective 4-Year College		Selective 4-Year College		Highly-Selective 4-Year College	
	1	2	1	2	1	2	1	2
Family income	1.492**	1.403**	1.662***	1.511**	2.017***	1.800***	2.417***	2.100***
Parent had some college (vs. high school diploma or less)	1.178	1.151	1.481**	1.426**	1.228	1.170	2.298	2.012
Parent had college degree (vs. high school diploma or less)	1.766**	1.645*	3.413***	2.936***	3.989***	3.086***	10.007***	6.699***
Parent had Master's/Ph.D./professional degree (vs. high school diploma or less)	2.641***	2.423**	5.074***	4.170***	6.147***	4.435***	22.636***	12.576***
Asian (vs. white)	1.364	1.347	1.516	1.454	3.284**	2.906*	8.770***	6.134***
Black (vs. white)	.782	.899	1.094	1.486*	1.369	2.261*	4.229	11.102*
Hispanic (vs. white)	.901	.957	1.095	1.275	1.469	1.836*	4.320***	5.767***
Native (vs. white)	.612	.690	.507	.640	.916	1.305	.001	.003
Highest-level test preparation (ordinal coding)	.932	.918	1.033	.987	1.236**	1.146*	1.510***	1.349*
SAT score (standardized)		1.889**		4.287***		11.310***		53.152***
Female (vs. male)	1.306*	1.438***	1.479***	1.875***	1.116	1.719***	.946	1.820*
Prior achievement	1.246**	.815	2.252***	.854	4.363***	.863	18.766***	1.304
Student planned to take SAT (vs. did not)	1.352*	1.266	2.049***	1.807***	3.609***	2.986***	7.627**	5.058*
Frequency student discussed test preparation with parents	1.019	1.030	1.125	1.136	1.325***	1.313**	1.315	1.229
Frequency student discussed going to college with parents	1.119	1.104	1.184**	1.175**	1.151	1.168	1.234	1.331
Student had tutor to help w/ homework (vs. did not)	1.338	1.383	1.174	1.267	1.170	1.362	.561	.826
Parent encouraged student to prepare for SAT (vs. did not)	1.220	1.238	1.960***	2.040***	1.713*	1.892*	2.589*	3.252**
South (vs. Northeast)	1.149	1.201	.687*	.760	.461***	.556**	.251***	.347**
Midwest (vs. Northeast)	1.223	1.329	1.097	1.331	.989	1.417	.365**	.674
West (vs. Northeast)	1.142	1.209	.478***	.551**	.500*	.688	.476*	.905
Intercept	1.090	1.198	.595	.636	.079	.062	.000	.000

N = 8,150

Note: No college enrollment is reference category.

*p < .05 **p < .01 ***p < .001 (two-tailed tests)

Model 2 introduces SAT scores in order to assess whether test performance mediates the family background and test preparation effects observed in Model 1. SAT scores have strong positive effects on college enrollment, and these effects grow larger at each level of institutional selectivity. The introduction of SAT scores partially mediates the effects of family income, parental education and highest-level test preparation, but to a smaller degree than we expected. Roughly 10 percent of the effect of test preparation on selective and highly selective college enrollment appears to be operating through SAT scores. This suggests that a substantial part of the association between test preparation and selective college enrollment is independent of SAT scores. Clearly, the controls we incorporated to account for selection into test prep do not capture all of the ways in which students who engage in test preparation differ from those who take no test prep. Perhaps the indicators of test preparation distinguish students in terms of future aspirations and plans for college to a greater degree than do the control variables. Students who do not engage in test prep may be less likely to enroll in a selective college, regardless of their SAT scores, for reasons that we cannot capture with the data at hand. Another possibility is that those who use SAT prep constitute individuals who are striving in specific ways to enroll in selective colleges. They may engage in other strategies (e.g., crafting their college admission essays or building their repertoire of extra-curricular and volunteer activities) that boost the odds of getting in to a selective college. At any rate, the continuing effect of test prep on selective and highly selective college enrollment net of SAT scores indicates that the story, while partially captured by our modeling, is more complex. Although those of more advantaged backgrounds have a greater likelihood of SAT test preparation (especially expensive forms of test prep) and this preparation yields test score gains with implications for selective college enrollment, the causal pathways are not as clearly marked as expected.

Beyond core results surrounding general familial advantages, noteworthy racial patterns also emerge in these final models. First, in supplemental unadjusted/bivariate analyses (not shown), non-Asian minorities are far less likely than whites to enroll in institutions at all levels of selectivity. Second, as Model 1 in Table 4 reveals, once we account for factors such as family income, parental education and prior achievement, blacks and Hispanics often have greater odds of enrolling in college than do whites (see also Charles et al. 2007). Finally, Model 2 of Table 4 – which adjusts the equation for students' SAT scores – reveals even more college enrollment advantages for blacks and Hispanics. In contrast, Asians' odds of college enrollment tend to decline from Model 1 to Model 2. These patterns make sense because Asians have higher SAT scores than whites, so adjusting the model for SAT scores (i.e., making Asians' and whites' SAT scores equal) reduces Asians' advantage. In contrast, blacks and Hispanics have lower SAT scores than whites on average, so making their test scores equal to those of whites boosts their chances of college enrollment. University diversity policies at selective and highly selective institutions also may play a role.

Discussion

The results of our analyses indicate that family background inequalities – and inequalities in family income in particular – shape the likelihood that students will engage in SAT preparation, and that these shadow education activities have important implications for test performance and selective college enrollment. Students from the most advantaged families are significantly more likely to enroll in private courses, such as those offered by Princeton Review and Kaplan – a strategy that, as our analyses indicate, corresponds to SAT score gains of about 30-40 points. Higher SAT scores, in turn, increase the chances of getting into the nation's most selective colleges and universities, although the causal pathways in this process are not as clearly delineated as expected. SAT preparation, while one pathway, is not the only route by which familial advantage translates into post-secondary opportunities (as indicated by the strong effects of family income and parental education in Table 4). It is, nevertheless, an influential form of shadow education worthy of further consideration by stratification and education scholars.

In the 15 years since the youth in NELS responded to questions regarding their test preparation activities, the importance of the SAT for college enrollment and the prevalence of SAT test preparation activities have only grown (College Board 1999). Thus, our results likely provide conservative estimates of the relationships between social class, SAT preparation activities and college enrollment today. While more students of all backgrounds may be using some form of test preparation now, it is also likely that students from advantaged families are engaging in ever more rigorous, longer-term, and more expensive forms of test preparation in the hope of staying ahead in the competition for admission to selective colleges and universities.

Interesting is the fact that racial/ethnic minorities are more likely than whites to utilize some types of test preparation net of family income, parental education and other factors. While it is hard to gauge public awareness about long-standing racial achievement gaps (Jencks and Phillips 1998), we suspect that knowledge of these gaps has served to ensure that college-oriented minority students are generally more motivated to use test preparation aids than their white counterparts. Given the racial/ethnic patterns in test preparation, along with the racial/ethnic minority advantages in college enrollment shown in Table 4, it is clear that social class and racial/ethnic stratification play out differently when it comes to test preparation, the SAT and college enrollment. Indeed, non-Asian minorities tend to have lower academic achievement during the K-12 years than whites (Kao and Thompson 2003) and similarly have lower SAT scores at the time of high school completion (see Table 3). In this sense, the production of racial/ethnic educational stratification has occurred prior to college enrollment. In contrast to the ways in which general background disadvantages in family income and parental education are exacerbated through test preparation and SAT scores, minorities appear to prepare for the SAT more than whites and also may receive a boost in college enrollment odds from diversity-sensitive enrollment policies.

richment tutoring as well as supplemental education services. Sylvan Learning Company, with more than 900 franchises in North America, is the largest of these private learning companies (Sylvan Learning 2010). Aurini and Davies (2004) predict that this form of market-based shadow education is the wave of the future (see also Davies 2004). If they are correct, salient questions will emerge for stratification researchers.

In light of the growing debate over the value and fairness of SAT scores in the college admission process, key actors are making policy decisions that may give rise to different relationships between social class background and college enroll-ment. For example, the National Association for College Admission Counseling recently suggested that colleges and universities reconsider how they use scores on college entrance exams: "While the exams used by a large majority of four-year colleges and universities to make admission decisions provide useful information, colleges and universities may be better served by admission exams more closely linked to high school curriculum."(NACAC 2008:7) The Commission also noted the problem of "uneven preparation for tests," a central focus of our study. Some colleges and universities are indeed changing how they use SAT scores in their admission processes. In just the past few years, many liberal arts colleges have stopped requiring applicants to report SAT scores. In May 2008, Wake Forest University became the first selective university to make SAT scores optional for ap-plicants, thus challenging conventional wisdom that more selective universities are too big and have too many applicants to do away with SAT scores (Jaschik 2008). Wake Forest University administrators made this change based on their desire to recruit a more socioeconomically and racially diverse student body. Whether other selective universities follow Wake Forest's lead remains to be seen.

As the "rules of the game" for getting into college change, scholars of education and stratification should be cognizant of how various forms of shadow education serve to exacerbate or ameliorate inequalities in the college admissions process and in the American educational system more generally. Explicating key mechanisms is vital, as is recognizing changes occurring within the sorting and selection process itself. Doing so will move us beyond basic analyses of individual/familial attributes and toward a more sociologically informed focus on the dynamics of structural opportunity and the interplay of stratification and institutional processes.

Notes

1. In 1993 the College Board changed the name of the SAT from Scholastic Aptitude Test to SAT I: Reasoning Test. At the same time, the former Achievement Tests were renamed the SAT II: Subject Tests. In 2004, the numerals "I" and "II" were dropped and the tests are now named the SAT Reasoning Test (or just SAT) and SAT Subject Tests (College Board 2007). Like the SAT, the ACT, formerly known as the American College Testing Program Assessment, is a standardized multiple-choice test meant to predict first-year college grades. It is less common than the SAT. We refer to both tests under the general term SAT.

2. But see Baker and LeTendre (2005) for a discussion on the remedial type of shadow education which, they argue, is more prevalent worldwide than enrichment based shadow education.

3. For private tutoring, there is an administrative fee of $210 and tutoring costs $79 per hour with a minimum charge of 10 hours of math tutoring and 10 hours of verbal tutoring. Private tutoring costs also vary considerably depending on the credentials of the tutor and whether the tutoring will cover one component of the SAT or the entire exam.

4. Most high school SAT preparation classes are voluntary and take place at the end of the normal school day and thus fall outside of the realm of standard high school curriculum. As such, we include this indicator among others pertaining to shadow education.

5. NELS assigned institutions a selectivity category based on a number of factors including the ratio of acceptances to applicants and the average composite SAT score of students in the entering class.

6. In other analyses not shown, family structure and number of siblings were included as additional predictors. Their effects were virtually non-existent after accounting for income, parental education and prior achievement.

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