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The Academic Success of East Asian American Youth: The Role of Shadow Education

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Abstract

Using data from the Education Longitudinal Study, this study assessed the relevance of shadow education to the high academic performance of East Asian American students by examining how East Asian American students differed from other racial/ethnic students in the prevalence, purpose, and effects of using the two forms – commercial test preparation service and private one-to-one tutoring – of SAT coaching, defined as the American style of shadow education. East Asian American students were most likely to take a commercial SAT test preparation course for the enrichment purpose, and benefited most from taking this particular form of SAT coaching. However, this was not the case for private SAT one-to-one tutoring. While black students were most likely to utilize private tutoring for the remedial purpose, the impact of private tutoring was trivial for all racial/ethnic groups including East Asian American students. The authors discussed broader implications of the findings on racial/ethnic inequalities in educational achievement beyond the relevance of shadow education for the academic success of East Asian American students.

Keywords

Shadow education; East Asian American students; SAT coaching; Race and ethnicity

The academic success of Asian American youth, often labeled as a ‘model minority,’ has been well documented in the United States (Kao and Thompson 2003). For example, among college-bound seniors in 2008-09, average SAT math scores for Asian American students were 587, while the corresponding average SAT scores for white and black students were 536 and 426, respectively (Snyder and Dillow 2010, Table 143). Furthermore, among a cohort of 2002 high school sophomores, about 29% of Asian American students were enrolled in a highly selective 4-year college as of 2006, while only 17%, 4%, and 5% of white, black, and Hispanic students, respectively, were enrolled (Bozick and Lauff 2007, Table 4).

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Various factors have been suggested to explain the academic performance of Asian American children, including the relatively high socioeconomic standing of their families (Kao 1995), cultural arrangements in which their families place a high value on education (Schneider and Lee 1990), high educational expectations of both parents (Goyette and Xie 1999; Kao 2002) and children (Kao and Tienda 1998), and specific parental styles and involvement (Hao and Bonstread-Bruns 1998; Kao 1995, 2004a; Pong, Hao, and Gardner 2005; Sun 1998). However, empirical research shows that these varying factors explain only some of the relatively high achievement of Asian American youth, but not all (Kao and Thompson 2003). In fact, some researchers (e.g., Goyette and Xie 1999) question the relevance of the socioeconomic approach because poverty rates are relatively high among some Asian immigrants (e.g., Lao or Cambodian Americans; see Table 2 in Lee 2004). Other researchers (e.g., Kao 2004b; Kao and Rutherford 2007) cast doubts on the validity of cultural explanations as Asian American youth are more disadvantaged in some forms of parental involvement (Ho and Willms 1996; Kao 1995, 2004a; Kao and Rutherford 2007).¹ While identifying shortcomings of the socioeconomic and cultural arguments, this line of research calls for alternative views and investigations of mechanisms responsible for the high educational achievement of children of Asian immigrants.

In searching for alternative factors affecting Asian American students' education, some researchers (Kao 2004b; Kao and Thompson 2003; Zhou 2008; Zhou and Kim 2006) and mainstream media such as the *New York Times* (Dune 1995; Hernandez, 2009; Luo 2003) have drawn attention to the high level of participation of Asian American students in various forms of private supplementary education occurring outside of the formal schools, including private tutoring, private learning centers, private test preparation services or cram schools. Often conceptualized as *shadow education*, these out-of-school activities aim to help students master academic subjects of school curriculum and improve academic performance in school (Stevenson and Baker 1992; Bray 1999).² However, little is known about motivation and consequences of participation in various forms of shadow education activities among Asian American students, in comparison to other racial/ethnic groups of students.

In this study, we aim to reduce this research gap by investigating the extent to which shadow education contributes to the high performance of children of Asian immigrants, especially focusing on East Asian American students. As will be described in more detail below, our rationale of focusing on East Asian American students as a distinctive group is that various shadow education activities such as attending cram schools³ — *hagwon* in Korea, *juku* in Japan, and *buxiban* in Taiwan — and receiving private tutoring have long been practiced in a large scale in East Asian immigrants' home societies such as Hong Kong (Bray and Kwok 2003), Taiwan (Kuan 2008), Korea (Byun 2009; Park, Byun, and Kim 2011), and Japan (Cummings 1997; Mori and Baker 2010; Stevenson and Baker 1992; Yamamoto and Brinton 2010). Moreover, the number of various shadow education institutions such as cram

¹For example, using data from NELS:88, Kao (1995) found that Chinese and Korean parents do not interact with their children as much as white parents. Using the same data, Sun (1998) further found that parents of East Asian origins are least likely to help children's home work, know other parents, and contact with schools, all of which negatively influence academic achievement.

²Bray (1999:20) highlighted the three dimensions of shadow education: (a) supplementation, (b) privateness, and (c) academic subjects. Shadow education should address subjects already covered in school (*supplementation*), while it should be provided in exchange for a fee, as opposed to unpaid tutoring provided by families or community members, or extra tutoring provided by school teachers as part of their professional commitments and responsibilities (*privateness*). Shadow education should also cover *academic subjects* including languages, mathematics, and other examinable subjects, but excluding musical, artistic or sporting skills which are learned primarily for pleasure and/or for a more rounded form of personal development.

³Despite variation in the scale and quality across East Asian societies (Bray 2009), cram schooling is one of the most dominant forms of shadow education in addition to individual private tutoring in East Asia. A cram school is a for-profit private institution which offers supplementary instructions and practice exams in classroom-like settings and often provides its own curriculum and assessment tools as well as its own original publications and textbooks like a mainstream school.

schools has dramatically increased in the communities especially of East Asian immigrants such as Chinese and Koreans in the United States (Shrake 2010; Zhou 2008; Zhou and Kim 2006). Additionally, East Asian immigrant students (e.g., Chinese, Japanese, and Koreans) as a group have drawn special attention due to their relatively high educational achievement compared to other Asian and non-Asian immigrant students (Hao and Bonstread-Bruns 1998; Schneider and Lee 1990; Sun 1998).

We draw on recent research by Buchmann, Condron, and Roscigno (2010) defining various forms of SAT test preparation such as receiving private tutoring or taking a course offered by a commercial test preparation service as *American style of shadow education*. Using data from National Education Longitudinal Study (NELS), Buchmann and her colleagues addressed how participation in various forms of SAT test preparation mediates educational inequality associated with family socioeconomic background in the context of US education. Their study highlighted the role of shadow education, which has been overlooked in the US literature, and extended our understanding of specific ways in which educational inequality is reproduced through shadow education in the US context. In this study, while following Buchmann et al., we are interested in the two forms of SAT test preparation – (a) taking a commercial SAT test preparation course and (b) receiving private SAT one-to-one tutoring. Amongst various forms of SAT test preparation these two particular forms are closest to the two most common forms of shadow education in East Asian societies: (a) cram schooling and (b) individual private tutoring.

We extend Buchmann et al.'s (2010) work in several important ways. First, we analyze data from Education Longitudinal Study (ELS) that has followed a more recent cohort of US high school students. Buchmann et al. examined high school seniors in 1994 from NELS, a decade earlier than high school seniors in 2004 from ELS. As Buchmann et al. acknowledged, the importance of the SAT for college admission has increased over the last decade. Accordingly, demand for SAT preparation services has likely grown during the past decade. Drawing on the more recent data of ELS, we can better address a recent trend in the prevalence, purpose, and effect of SAT coaching among students of diverse racial/ethnic background.

Second, we investigate differences in the *prevalence* of utilizing the two particular forms of SAT coaching between East Asian American students and other racial/ethnic students (including other Asian American students). Buchmann et al. primarily focused on socioeconomic differences in SAT coaching, but did not fully examine racial/ethnic variation. Furthermore, they considered Asian Americans as a homogenous group with a single category of “Asian American.” However, as many studies have documented, Asian Americans consist of various heterogeneous groups in their learning opportunities and educational outcomes (Goyette and Xie 1999; Hao and Bonstread-Bruns 1998; Kao 1995; Sun 1998). This may also be true for shadow education, given that it has been a major feature of education in East Asian societies such as Japan (Cummings 1997; Mori and Baker 2010; Stevenson and Baker 1992; Yamamoto and Brinton 2010), Korea (Byun 2009; Park et al. 2011), and Hong Kong (Bray and Kwok 2003), even though it is increasingly becoming a worldwide phenomenon (Baker and LeTendre 2005; Bray 2009; Lee, Park, and Lee 2009). By distinguishing East Asian American students from other Asian American students, we can better address variation in the prevalence of SAT coaching among students of diverse racial/ethnic background.

Third, we address a potential difference in the *purpose* of taking SAT coaching between East Asian American students and other racial/ethnic students by examining the relationship between prior achievement and SAT coaching. Some racial/ethnic groups may take SAT coaching to keep up with their peers (*remedial purposes*), while other racial/ethnic groups

may do so to stay ahead of their peers (*enrichment purposes*). By examining potential variation among racial/ethnic groups in the relationships between prior achievement and SAT coaching, we can better address the nature of SAT coaching for each racial/ethnic group.

Finally, we examine potential racial/ethnic variation in the *effect* of using the two forms of SAT coaching on SAT performance. Depending on various factors that affect SAT coaching as well as characteristics of students who take it, taking a commercial SAT test preparation course or receiving private tutoring can be particularly beneficial for certain racial/ethnic groups than others. In this study, we elaborate on several factors that may yield SAT coaching to be particularly effective among East Asian American students and empirically test the extent to which SAT coaching is more beneficial among East Asian American students than other racial/ethnic students. In short, our nuanced investigation of (a) prevalence, (b) purpose, and (c) effects of taking a commercial SAT test preparation course and receiving private one-to-one tutoring among East Asian American students in comparison to other racial/ethnic groups of students should highlight the relevance of shadow education activities for understanding academic success of East Asian American students. Beyond the relevance for East Asian American students, we discuss broader implications of racial/ethnic variation in shadow education activities for racial/ethnic inequalities in American education.

BACKGROUND

Shadow Education in the US Context

East Asian societies are well known for their long practice of shadow education which “is deeply embedded in the culture” (Bray 2009:24). A considerable proportion of East Asian students today participate in various forms of shadow education including attendance at a cram school. For example, in 2008, 8 out of 10 primary and secondary Korean students received at least one or more forms of shadow education among which attending a cram school was most common: about half of all Korean students attended a cram school, *hagwon* (Korea National Statistical Office 2009). In Japan, more than 65% of 9th grade students attended a cram school, *juku* in 2007 (Bray 2009, Table 1). While there is a debate on what leads to the extensive shadow education system in this region (as well as other societies) (Bray 1999; Lee et al., 2009), one popular explanation highlights intense competition for advancing upper levels of education and prestigious colleges in these societies (Baker and LeTendre 2005; Bray 1999; Lee et al. 2009; Stevenson and Baker 1992). In East Asian societies such as Korea (Park et al. 2011) and Japan (Stevenson and Baker 1992), high-stakes tests play a vital role in assessing school performance and gaining access to selective colleges and prestigious jobs, and thus both pressure and competition among students is high to succeed in a series of the high-stakes tests. In contrast, in the United States, non-cognitive criteria such as extracurricular activities and recommendation letters in addition to cognitive test scores (e.g., SAT) play an important role in selective college admissions.⁴

In recent years, however, there has been growing emphasis on standardized testing in American education for various purposes of evaluating students and educators associated with educational reform for accountability (Dworkin 2005; Grodsky, Warren, and Felts 2008). In addition, as a growing number of universities use SAT or ACT scores for college admissions, the number of students taking SAT or ACT has considerably increased (Alon

⁴For example, Harvard’s Admissions Committee uses many other criteria including community involvement, leadership, distinction in extracurricular activities, community involvement, and work experience, in addition to academic accomplishment in high school and standardized test scores (for more information, see the website of Office of Admissions at Harvard College at <http://www.admissions.college.harvard.edu/index.html>).

and Tienda 2007; Buchmann et al. 2010). The growing reliance on standardized testing for important educational decisions likely increases pressure and competition among students to do better in high-stake tests and may in turn lead to growing demand for shadow education to enhance students' standardized test scores in the United States (Buchmann et al. 2010). Indeed, a recent documentary "*Race to Nowhere*" depicts how stress, pressure, and competition to get *better* grades and test scores have dramatically increased among American students across the nation (for a review on this documentary, see George 2010). Furthermore, commercial SAT test preparation companies such as the *Princeton Review* and *Kaplan* have been considerably expanded in recent years in the United States (Buchmann et al. 2010; see Davies and Aurini 2006 for a similar development in Canada).

These commercial SAT test preparation services offered in the United States share key features of cram schools in East Asia (Buchmann et al. 2010; Kuan 2008). For example, students take commercial SAT preparation courses outside of formal schooling to master the test contents and improve test scores (Becker 1990). Further, the SAT has the high-stakes nature for American high school students as it plays an important role in determining admission to selective colleges (Alon and Tienda 2007). As such, commercial SAT test preparation services and private SAT one-to-one tutoring provide an interesting parallel to shadow education in East Asian societies. It is no surprise that Buchmann et al. (2010) called a variety of SAT test preparation activities as the *American style of shadow education*.

The Relevance of Shadow Education to the Academic Success of East Asian American Youth

East Asian American students can take SAT coaching not only from traditional options such as *Princeton Review* and *Kaplan* but also (perhaps more) from a variety of SAT preparation institutions and cram schools in ethnic communities being run by East Asian immigrant entrepreneurs (Shrake 2010; Zhou 2008; Zhou and Kim 2006). Although little has been documented about the extent to which East Asian American students participate in shadow education, recent research has documented the dramatic expansion of various forms of shadow education institutions including cram schools in the communities of East Asian immigrants such as Chinese and Koreans in the United States (Shrake 2010; Zhou 2008; Zhou and Kim 2006). Given the long history and high prevalence of shadow education in their origin societies, East Asian immigrant parents may be inclined to rely on these shadow education institutions as a way to help their children's academic performance.

However, as some scholars indicate, the possible reliance of East Asian immigrant parents on shadow education may not be simply a spillover effect of East Asian culture, but also a reflection of the context where East Asian culture and the mainstream American education system interact for East Asian American immigrants (Shrake 2010; Zhou and Kim 2006). Although many East Asian immigrant parents perceive education as the most effective or only means of achieving mobility in American society (Zhou and Kim 2006), they are often frustrated by the mainstream American education system due to their limited English skills and lack of confidence in interaction with teachers and schools (Kao 1995, 2004a; Sun 1998). In this situation, shadow education may be particularly appealing to these East Asian immigrant parents because unlike the mainstream American education system they can easily communicate with instructors in their ethnic shadow education institutions, which should facilitate parents to work with the instructors for customized learning for their child.

Yet little research has empirically investigated the relevance of shadow education to the academic success of East Asian American students. As a result, little is known about the extent to which East Asian American students participate in various shadow education activities and the extent to which they benefit from their shadow education activities in

terms of improved academic achievement, compared to other racial/ethnic groups. Using data from ELS, we address the need of empirical evidence on the prevalence and effect of shadow education among East Asian American students as well as other racial/ethnic students.

HYPOTHESES

Prevalence

Unfortunately, as will be described below in more detail, the ELS data do not allow us to identify where (e.g., ethnic-cram schools or traditional options such as *Kaplan*) and how (e.g., off-line course or on-line course) students took a commercial SAT test preparation course. Nonetheless, given the high prevalence of shadow education in their origin societies (Baker and LeTendre 2005; Baker et al. 2001) and the wide availability of and accessibility to cram schools in East Asian immigrant communities (Shrake 2010; Zhou 2008; Zhou and Kim 2006), it would be reasonable to assume that taking a commercial SAT test preparation course should be much more frequent among children of East Asian immigrants than among children of other racial/ethnic groups.

Hypothesis 1 (*Prevalence*): East Asian American students will be more likely to take a commercial SAT test preparation course than any other racial/ethnic students.

Purpose

As noted, the motivation for utilizing SAT coaching may vary among racial/ethnic groups. Studies in the United States suggest that after-school tutoring programs are usually used for remedial purposes to help students meet the requirements of what is taught in school (Farkas 1996; Lee 2007; U.S. Department of Education 1993). In other words, tutoring programs mostly serve academically struggling or low-achieving students. With respect to SAT coaching, Buchmann et al. (2010) found that low-achieving students are more likely to utilize a variety of coaching strategies for SAT. For East Asian American students, however, SAT coaching may serve already high-achieving students to further enhance their academic achievement. Kao (2004b:174) notes:

“Chinese American and Korean American communities sometimes offer...after-school “cram” classes that reinforce and add to the regular schools the children attend. *These institutions are not remedial in nature — in fact, they often serve high-aspiring youths and their families and can give youths an edge over their peers.*” [Emphasis added]

Some research shows that shadow education usually serves high-achieving students in many East Asian societies, most notably Korea (Baker et al. 2001). Thus, it is quite possible that many East Asian American students may participate in shadow education not only to keep with their peers, but to do *better* than their peers in the high-stakes exams (i.e., enrichment purposes). If this were the case, we should be able to find a different pattern with respect to the relationship between prior achievement and taking a commercial SAT test preparation course for East Asian American students, compared to other racial/ethnic groups.

Hypothesis 2 (*Purpose*): Unlike other racial/ethnic students, high-achieving students will be more likely than low-achieving students to take a commercial SAT test preparation course among East Asian American students.

Effects

Some unique features of cram schools in East Asian immigrant communities lead us to expect the greater effectiveness of cram schools for East Asian immigrant students. For

example, many Chinese and Korean cram schools mimic those of home countries in their structures and features by offering challenging work and homework after school, on weekends or over the summer (Han 2010; Zhou 2008), which may differ from traditional American test preparation institutions in terms of intensity of instruction and the rigor of curriculum. In a newspaper interview, managers of Korean-run cram schools (*hagwons*) in the United States emphasize the systematic and rigorous curriculum and tight schedule as key features of their cram schools (Han 2010).

Furthermore, cram schools in East Asian ethnic communities may offer additional advantages through social capital among East Asian American students, in addition to supplementary education (Zhou and Kim 2006). While cram schools in East Asian ethnic communities generally serve highly motivated East Asian American students (Kao 2004b), these students may bring in, share, and reinforce a set of values, beliefs, behaviors, and strategies that facilitate academic success and the mobility goals in the United States, which may combine to create a positive social setting conducive to academic achievement (Zhou and Kim 2006). The following statement by an African-American mother who sent her son to a Korean cram school in New York indicates such a positive social environment (Maxwell 2003).

“Up here in Harlem, they don’t have a lot of role models their own age. A lot of these kids don’t open a book after they get off the subway. My kids just don’t fit in because they love to study. That makes me feel bad. The cram school is different. Those Korean kids study very hard. My boys are the only blacks in the school, but they fit in. I mean, it’s normal to work hard. Nobody says they’re acting white. When they see all these other kids studying, my kids don’t feel weird. The peer pressure is positive. Studying has become a habit- second nature.”

As pointed out above, we assume that East Asian American students who reported taking a commercial SAT test preparation course in the ELS data likely did so through cram schools in their ethnic communities. Moreover, considering the unique features of those cram schools in ethnic communities of East Asian immigrants described so far, we expect that taking a commercial SAT test preparation course should be particularly beneficial among children of East Asian immigrants.

Hypothesis 3 (*Effects*): East Asian American students will benefit more from taking a commercial SAT test preparation course for SAT performance than any other racial/ethnic students.

In addition to the commercial SAT test preparation course, we additionally examine another prevailing form of shadow education – private one-to-one tutoring. Despite variation across East Asian societies, much private one-to-one tutoring is provided through informal channels in the students’ or tutors’ homes (Bray 2010:5). This outside-school private tutoring also has been increasingly available in the United States (Helfand 1999). However, compared to cram schools, less is known about the extent to which East Asian and other immigrant families in the United States utilize private tutors outside school to help their children prepare SAT tests. In fact, similar to their reluctance to interacting with teachers in schools due to their lack of English skills and confidence (Kao 1995, 2004a), immigrant parents may find it uncomfortable to have a tutor of different race/ethnicity visit their home and coach their child. Moreover, compared to cram schools, East Asian immigrant families may have more difficulties in finding private tutors who are of the same ethnic group. In that regard, we expect a less clear pattern in the prevalence, purpose, and effect of utilizing this form of shadow education among East Asian American students, compared to taking a commercial SAT test preparation course through cram schools.

DATA AND METHODS

Sample

To test these hypotheses, we drew on data from the Educational Longitudinal Study of 2002-2006 (ELS:02-06) conducted by the National Center for Education Statistics (NCES). The survey followed a nationally representative sample of U.S. high school sophomores in 2002 through their senior years (2004) and beyond (2006). All of our measures came from the 2006 restricted-use data (base year through second follow-up). From the data, we selected students who had taken or planned to take the SAT or ACT in 12th grade for the analysis of the determinants of SAT coaching ($n = 9,800$).⁵ The questions of whether students took or planned to take a course offered by a commercial test preparation service or received or planned to receive individual tutoring were only asked to those who indicated that they had taken or planned to take the SAT or ACT. For the analysis of the effects of SAT coaching, we further restricted the sample to those students who had a valid SAT or ACT score.⁶ Obviously, not all US high school seniors would take or plan to take the SAT or ACT. Therefore, it should be kept in mind that our study deals with only a portion of US high school seniors who have taken or planned to take the SAT or ACT. We excluded Native Americans for all analyses due to the small sample size. The missing data especially for the SAT tests scores resulted in the varying sample size with 9,760 for the analysis of the determinants of SAT coaching and 7,030 for the analysis of the effects of SAT coaching on SAT scores.

Variables

This study aims to examine racial/ethnic variation in the prevalence, purpose, and effect of using the two forms of SAT coaching. Accordingly, variables of interest are (a) race/ethnicity, (b) the two forms of SAT coaching, (c) and SAT scores.

Race/ethnicity—Race/ethnicity was measured by students' self-reported race/ethnicity (Asian, black, Hispanic, and white). ELS asked an additional question about specific ethnic origins to those who marked "Asian." Utilizing this information, we grouped Asian American students into East Asian⁷ (i.e., Chinese, Japanese, and Koreans) and other Asian (e.g., Filipinos, Southeast, South, and other Asian) American students. East Asian American students served as the reference group.

SAT coaching—As noted, this study focused on the two particular forms of shadow education activities: (a) taking a commercial SAT test preparation course and (b) receiving private SAT one-to-one tutoring. When the students were high school seniors (2004), ELS asked whether they took or planned to participate in each of the two types of SAT coaching.⁸ Both taking a commercial SAT test preparation course and receiving private tutoring were measured by dichotomous variables. These two types of SAT coaching first served as outcomes of interest and then became independent variables in the model predicting SAT performance.

⁵Following the Institute of Education Sciences' restricted use data security procedures, we rounded the unweighted N s to nearest 10.

⁶The proportion of students who had a valid SAT or ACT score among ELS students was highest among East Asian students (69%), followed by white (67%), other Asian American (58%), black (51%), and Hispanic (40%) students.

⁷Of East Asian American students in the analytic sample, approximately 48% were Chinese, approximately 18% Japanese, and approximately 34% Koreans.

⁸Although the original questionnaire item asked whether students "took or planned to take" the two types of SAT coaching, the ELS data do not allow us to identify exactly when students took SAT coaching as well as whether those students, who had planned to take the SAT coaching, eventually took SAT coaching. This limitation should be kept in mind in interpreting the relationships between prior achievement and SAT coaching and between SAT coaching and SAT performance in our results. Meanwhile, we use the term of "take" instead of "plan to take" for simplicity.

SAT score—The ELS:02-06 data provide the highest composite SAT scores achieved as of 2006. If students took the ACT, the ELS data provide their converted SAT scores, ranging from 400-1600.

Controls—Building on prior studies (e.g., Briggs 2001; Buchmann et al. 2010), we controlled for several variables that might be correlated with race/ethnicity and SAT coaching/SAT performance: (a) socioeconomic status (SES), (b) immigrant generation, (c) family structure, (d) the number of siblings, and (e) parental educational expectations, (f) gender, (g) prior achievement, (h) region, and (i) urbanicity. All measures of the background control variables came from the base year (2002) data. SES is a standardized composite score derived from the five variables: (a) father/guardian's education, (b) mother/guardian's education, (c) family income, (d) father/guardian's occupation, and (e) mother/guardian's occupation (measured in the base year). This index was constructed and provided by ELS. Following Goyette and Xie (1999), the immigrant generation was constructed by using the students' and parents' birthplaces. First generation (reference category) indicates that both the child and at least one of the child's parents were born outside the United States; second generation the child was born in the United States but at least one parent was not; and third generation the child and both parents were born in the United States. Family composition denotes whether students live in two-parent families (= 1) or in other forms of families (= 0). Parents reported the number of siblings that a student had. Parental educational expectations were based on the question of how far in school parents expected their child to go (some college or less [reference category] vs. bachelor's degree vs. advanced degree). Gender was measured by the student's sex (female = 1 vs. male = 0). Prior achievement was measured by the math/reading composite score from the standardized test administered by ELS during the 10th grade. Region was based on the location where the student attended high school with four categories (Northeast vs. Midwest vs. West vs. South [reference category]). Finally, urbanicity refers to the place in which the student attended high school with three categories (urban vs. suburban vs. rural [reference category]).

Analytic Strategies

We implemented three analytic strategies corresponding with three hypotheses. First, to test the Hypothesis 1 about prevalence, we analyzed the likelihood of taking a commercial SAT test preparation course by using logistic regression. For this logistic regression analysis, we used the *pooled sample* with all racial/ethnic groups of students combined and estimated two models predicting the likelihood of taking a commercial SAT test preparation course. The first model included only a set of race/ethnicity variables to examine unadjusted racial/ethnic differences in the likelihood of taking a commercial SAT test preparation course. The second model added all control variables to Model 1 to examine whether racial/ethnic differences in the likelihood of taking a commercial SAT test preparation course (if any) existed after controlling for the background variables. We replicated these logistic regression analyses for private SAT one-to-one tutoring.

Second, to test the Hypothesis 2 about purpose of using shadow education, we conducted logistic regression analysis predicting the likelihood of taking a commercial SAT test preparation course by prior achievement. Compared to the analysis that assessed prevalence of shadow education by race/ethnicity using the pooled sample with all racial/ethnic groups of students combined, we examined the relationships between prior achievement and taking a commercial SAT test preparation course separately for each racial/ethnic group to straightforwardly present the relationship for each group and its varying pattern by race/ethnicity. Again, we replicated these logistic regression analyses for private tutoring.

Finally, to test the Hypothesis 3 about the effect of shadow education, we conducted ordinary-least square (OLS) regression analysis predicting students' SAT scores by their use of a commercial SAT test preparation service and private tutoring. To clearly show how the relationships between the two forms of SAT coaching and SAT scores vary by race/ethnicity, we conducted analysis for each racial/ethnic group of students, separately.

Missing data—As noted, we restricted our sample to those students who reported whether they used SAT coaching. For the analysis of SAT coaching effect on SAT scores, we further limited our sample to those who had valid SAT (or ACT) scores. In examining the extent of missing data of those selected cases for the control variables, we found that most of the cases had few missing data except for immigrant generation and the number of siblings (see Table 1). For the immigrant generation, following Goyette and Xie (1999), we created the dichotomous variable denoting missing cases on this variable to retain those students whose parents did not report either the child or/and parents' birthplaces. Likewise, for the number of sibling, while substituting the average number of siblings for the missing data, we created the dichotomous variable denoting the missing cases on this variable. Our supplementary analysis with those who had no missing information on the immigrant generation and the number of siblings being excluded (i.e., listwise) showed very similar results reported in the current study.

Correction for design effects—ELS employed a two-stage sampling approach where a representative sample of schools was first drawn, and then students were randomly selected within those sampled schools. Given the structure of ELS's data in which students are nested within schools, it is important to adjust for clustering when calculating the standard errors for our multivariate regression coefficients. In our analyses, we used the *cluster* option in Stata, which generates robust standard errors by downwardly adjusting for the inflated standard errors resulting from the violation of the independent errors assumption (Rogers 1993)

Correction for selection bias—Selection bias is a major concern when estimating the causal effect of SAT coaching on SAT scores, as students who receive SAT coaching are likely different from students who do not in terms of their background (Briggs 2001; Domingue and Briggs 2009; Hansen 2004; Powers and Rock 1999). Considering that preexisting differences between students who receive SAT coaching and students who do not may confound the effects of SAT coaching, more rigorous methods which can better deal with selection bias would be more appropriate to estimate the overall effects of SAT coaching (Domingue and Briggs 2009; Hansen 2004). Using the linear regression approach, we acknowledge the limitation of our study to address the causal effect of SAT coaching.

However, recent studies comparing the effects of SAT coaching using linear regression with those using more sophisticated methods (e.g., propensity score matching) show a similar result between these two different methods, as long as proper adjustments are made by including important control variables (Hansen 2004; Domingue and Briggs 2009). As described above, we included a stringent set of controls in our regression models including prior achievement with which we hope to somewhat deal with the selection issue. Nonetheless, estimating the causal effects of SAT coaching is difficult and always involves

some degree of unknown selection factors⁹ that may confound the effect of SAT coaching; our study is no exception.

RESULTS

Descriptive Findings

Table 1 presents weighted descriptive statistics for the variables used in the analysis by race/ethnicity. Of 9,760 analytic samples (for the determinants of SAT coaching), 5.7% were East Asian American students, while 6.7% were other Asian American students. White students accounted for 63.4%, while Black and Hispanic students represented 11.8% and 12.4%, respectively. The first row of the table indicates the unadjusted mean of the SAT scores among those students who had valid SAT scores ($n = 7,020$). Results clearly showed that the East Asian American students (1138) outperformed other racial/ethnic groups of students including whites (1045) and other Asian students (998). Black students showed the lowest achievement (833), followed by Hispanics (896).

In the second and third rows, overall 12% and 9% of students took (or planned to take) a commercial SAT test preparation course and received (or planned to receive) private tutoring, respectively. Yet there was substantial variation in the participation rates by race/ethnicity. East Asian American students showed the highest prevalence of taking a commercial SAT test preparation course (30%), followed by black students (16%). On the other hand, regarding the use of private tutoring, black students showed the highest rates (17%), followed by East Asian American students (11%).

With respect to background characteristics, results showed some racial/ethnic differences favoring East Asian American students. For example, East Asian American students showed the highest prior achievement score and SES index. In addition, the proportion of students who lived with two parents was relatively high among East Asian American students (84%), compared to African American students (52%). East Asian American students also tended to have had a relatively small number of siblings (1.82), compared to other racial/ethnic groups of students (e.g., the whites: 2.06, the blacks: 2.70). In sum, consistent with previous findings (Goyette and Xie 1999; Hao and Bonstread-Bruns 1998; Sun 1998), descriptive statistics in Table 1 show somewhat favorable family environments of East Asian American students.

Racial/Ethnic Differentials in the Prevalence of Shadow Education

The first set of analyses examined racial/ethnic differences in the prevalence of using the two forms of shadow education for the SAT preparation with the pooled sample of all racial/ethnic groups of students. Recall that we expected that East Asian American students would be more likely to take a commercial SAT test preparation course than any other racial/ethnic groups (Hypothesis 1), while this pattern would be less clear for private SAT one-to-one tutoring. Because we focus on the racial/ethnic differences in SAT coaching, we present only the estimated coefficients of a set of dummy variables denoting the different racial/ethnic groups with the East Asian American group being the reference category. We show the full results including coefficients of other control variables in the supplementary tables available on the journal website, Tables A and B.

⁹One of possible unobserved characteristics that may confound the effects of SAT coaching may be taking the exam multiple times. Taking the exam multiple times is one of the common strategies that students utilize to improve their SAT performance, and this likely pays off in terms of improved test scores (Vigdor and Coltfelter 2003). Unfortunately, the ELS data did not allow us to identify those who had taken SAT or ACT multiple times. In that regard, we acknowledge our inability to capture the possible effect of re-taking SAT tests as another limitation of our study.

Commercial SAT test preparation course—The first model in Table 2 with only a set of race/ethnicity dummy variables clearly showed that East Asian American students were much more likely to take a commercial SAT test preparation course than any other racial/ethnic groups of students including other Asian American students. In Model 2 in which all background controls were taken into account, the higher likelihood of taking a commercial SAT test preparation course among East Asian American students remained mostly significant. Exceptionally, the difference between East Asian American students and black students became insignificant after the background variables were controlled.

Private SAT one-to-one tutoring—The first model in Table 3 with only a set of dummy variables representing different racial/ethnic groups showed that black students were significantly more likely than East Asian American students to use private SAT one-to-one tutoring. However, East Asian American students were more likely than white and Hispanic students to receive private tutoring. In Model 2 that included the background controls, the observed differences in the use of private tutoring between black and East Asian American became insignificant. On the other hand, once the background controls were taken into account, differences between East Asian American students and other Asian students became significant at the 90% confidence level. In both Model 1 and 2, the difference between East Asian American students and Hispanic students was significant at the 90% confidence level.

Racial/Ethnic Differentials in the Purpose of Shadow Education

The second set of analyses examined racial/ethnic differences in the purpose of using shadow education by investigating the relationship between prior achievement and the use of the two forms of shadow education for each racial/ethnic group of students. Recall that we expected that unlike other racial/ethnic groups high-achieving students would be more likely to take a commercial SAT test preparation course among East Asian American students (Hypothesis 2), while this enrichment purpose of using SAT coaching among East Asian American students would be less clear when it comes to private SAT one-to-one tutoring. In Tables 4 (a commercial SAT test preparation course) and 5 (private tutoring), we present only the estimated coefficients of the prior achievement variable in each group of students (see on-line supplementary tables, Tables C and D, for the full results).

Commercial SAT test preparation course—Results of logistic regression in Table 4 clearly showed the positive relationship between prior achievement and taking a commercial SAT test preparation course among East Asian American students. This was also true for other Asian American students. On the contrary, the relationship between prior achievement and taking a commercial SAT test preparation course was negative among white students. Although it was not statistically significant, prior achievement was also negatively associated with the odds of taking a commercial SAT test preparation course for black and Hispanic students.

Private SAT one-to-one tutoring—Results of logistic regression in Table 5 showed that there was no significant relationship between prior achievement and private SAT one-to-one tutoring among East Asian American students as well as other Asian American students. However, a negative association between prior achievement and private tutoring was found among all non-Asian racial/ethnic groups, including white, black, and Hispanic students.

Racial/Ethnic Differentials in the Effect of Shadow Education

The final set of analyses examined the extent to which East Asian American students benefited from the use of the two forms of SAT coaching for their SAT scores, compared to other racial/ethnic groups of students. Recall that we expected that East Asian American

students would benefit more from their taking a commercial SAT test preparation course than any other racial/ethnic groups (Hypothesis 3), while this pattern would be less clear for the use of private SAT one-to-one tutoring. Again, because our interest is in racial/ethnic variation in the relationships between the use of the two forms of SAT coaching and SAT performance, we present only the coefficients of the two SAT coaching variables across racial/ethnic groups in Table 6 (see the on-line supplementary table, Table E, for the full results).

Results of OLS regression predicting students' SAT scores in Table 6 clearly showed the positive effect of taking a commercial SAT test preparation course on SAT scores among East Asian American students, even after controlling for the background variables. On the other hand, private SAT one-to-one tutoring had no significant effects across different racial/ethnic groups including East Asian American students when course-taking in a commercial test preparation service and the other control variables were taken into account. Taking a commercial SAT test preparation course was associated with SAT scores among white students only at the .10 significance level, but not at all for other Asian, black, and Hispanic groups. The statistical tests of comparisons indicated that the coefficient (.68.8) associated with course-taking in a commercial test preparation service among East Asian American students was significantly larger than the corresponding coefficient of any racial/ethnic group.

As pointed out earlier, we expected greater benefits of taking a commercial SAT test preparation course among East Asian American students because they were likely to take a course through cram schools in their ethnic communities that we reasoned to provide more effective coaching. This reasoning suggests that we expect a stronger relationship between taking a commercial SAT test preparation course and SAT performance among 1st- and 2nd-generation East Asian American students than their 3rd generation counterparts who are presumably much less likely to have access to immigrant communities. Our supplementary analysis (not shown) indeed showed that taking a commercial SAT test preparation course was significantly associated with improved SAT scores among 1st - ($p = .002$) and 2nd - generation ($p = .000$) East Asian American youth but not among 3rd - generation ($p = .931$) after controlling for SES, prior achievement, and all other control variables used for analysis in Table 6.¹⁰ The result is consistent with our assumption that availability of cram schools in ethnic communities likely contributes to the positive relationship between taking a commercial SAT test preparation course and the SAT scores among East Asian American students.

DISCUSSION

The overall goal of this study was to investigate the relevance of shadow education to the academic success of East Asian American students. Despite the extensive use of shadow education in the home countries of East Asian immigrants (Baker and LeTendre 2005; Baker et al. 2001), little research has empirically explored its role in the academic success of their children in the United States. Drawing on literature of shadow education in the home countries of East Asian immigrants (e.g., Bray and Kwok 2003; Park et al. 2011; Stevenson and Baker 1992) as well as research of SAT coaching in the United States (e.g., Buchmann et al. 2010), we hypothesized how East Asian students would differ from other racial/ethnic groups in the prevalence, purpose, and effect of SAT coaching, focusing on course-taking in a commercial SAT test preparation service and private SAT one-to-one tutoring. Specifically, with respect to course-taking in a commercial SAT test preparation service, we expected that East Asian American students would be more likely to take a commercial SAT

¹⁰We thank an anonymous reviewer for pointing out the useful test by generation among East Asian American students.

test preparation course for improving their SAT scores (Hypothesis 1); that they would take a commercial SAT test preparation course for the enrichment purpose (Hypothesis 2); and that they would benefit more from taking a commercial SAT test preparation course for their SAT test scores (Hypothesis 3), compared to other racial/ethnic groups. On the other hand, we expected that the distinctive patterns among East Asian American students would be less straightforward in regard to receiving private SAT one-to-one tutoring.

Our empirical analyses of the ELS data support these expectations. Results showed that East Asian American students were more likely to take a commercial SAT test preparation course than any other racial/ethnic students with black students being exceptional. East Asian American students were distinctive not only in the prevalence of taking a commercial SAT test preparation course but also in the purpose of its use. Our results showed the positive relationship between prior achievement and the likelihood of taking a commercial SAT test preparation course among East Asian American students (as well as other Asian American students), indicating that high-achieving East Asian American students are more likely to use this particular form of shadow education for the enrichment purpose. Most importantly, we found that East Asian students benefited most from their taking a commercial SAT test preparation course in terms of improved SAT test scores.

Our results also showed that it was not East Asian American students, but black students who were most likely to utilize private SAT one-to-one tutoring, consistent with past research findings (Buchmann et al. 2010). In addition, results showed the insignificant relationship between prior achievement and private SAT one-to-one tutoring among East Asian American students (and other Asian American students), but the positive relationship among non-Asian American students, suggesting that private tutoring largely serves low achieving students among non-Asian American students. Yet private tutoring had no significant effects on SAT performance for all racial/ethnic groups including East Asian American students.

Our findings of the high prevalence and the positive effect of course-taking in a commercial test preparation service among East Asian American students offer evidence on the relevance of this particular form of shadow education to the academic success of East Asian American students. Drawing on literature (Shrake 2010; Zhou 2008; Zhou and Kim 2006), we interpreted the high prevalence of this particular form of shadow education among East Asian American students in light of the interplay of East Asian culture and American education. The high expectations of children's education (Goyette and Xie 1999; Kao 2002; Kao and Tienda 1998) but frequent frustrations experienced by the mainstream American education among East Asian immigrant parents due to their limited English skills (Kao 1995, 2004a; Sun 1998) may combine to lead to greater reliance on shadow education among these immigrant parents.

On the other hand, we attributed the positive impact and greater effectiveness of course-taking in a commercial test preparation service for East Asian American students to several unique features of cram schools widely available in East Asian ethnic communities, including intense instruction, rigorous curriculum, and social capital. Indeed, according to recent news articles, a growing number of non-Asian students attend cram schools in East Asian ethnic communities, recognizing the effectiveness and rigorous academic programs of those cram schools (Hernandez 2008; Luo 2003) as well as a positive academic atmosphere (Maxwell 2003). Our finding of the positive effect of using the commercial test preparation service is consistent with some studies showing the positive effect of attending a cram school in Korea (Byun 2009) and Taiwan (Kuan 2008).

However, our findings of the positive role of taking a commercial SAT test preparation course among East Asian American students should not be considered as evidence to support an argument that more shadow education opportunities such as cram schools should be available for other racial/ethnic minorities to enhance their academic achievement. Although we have offered some reasons why cram schools in East Asian ethnic communities may be effective in coaching students, we do not claim the causal effect of cram schooling. More fundamentally, as many cram schools primarily focus on helping students strategically master or memorize as much information as possible necessary for particular tests in a very short period of time, rather than fostering critical thinking (Sharke 2010), it is questionable whether enhancing academic achievement through cram schooling is a desirable educational practice. Rather, we highlight that more attention should be paid to the roles of shadow education activities in explaining the academic success of East Asian American students as scholarships on shadow education in relation to race and ethnicity have been very limited yet in the United States.

We believe our findings also have broader implications for racial/ethnic inequalities in American education beyond the relevance of shadow education to the academic success of East Asian students. Buchmann et al. (2010) suggest that the recent emphasis on standardized testing and school accountability in American education likely increases demand for shadow education and potentially leads to the widening socioeconomic achievement gap in the United States by showing the significant relationship of shadow education with both family background and educational achievement. Our findings additionally suggest that growing demand for shadow education may also lead to an increase in racial/ethnic inequalities in educational achievement. Our analysis showed that East Asian American students were not only most likely to utilize the commercial SAT test preparation service but also most benefited from the participation. As compared to East Asian American students, black students did not differ significantly in their course-taking in a commercial SAT test preparation service and they were even more likely to receive private tutoring; yet black students' participation in the two forms of shadow education did not substantially enhance their SAT scores. Therefore, how growing demand for shadow education will shape racial/ethnic inequalities in educational achievement should be carefully monitored in addition to its relation to the socioeconomic achievement gap.

The present study has several limitations that need to be addressed in the future. First, for the purpose, this study focused on children of immigrants from East Asian societies as a group because shadow education has traditionally played a substantial role in educating children in their origin societies (Bray 1999). In addition, relatively rich information on shadow education in East Asian societies (e.g., Bray and Kwok 2003; Park et al. 2011; Stevenson and Baker 1992) as well as in East Asian American communities in the United States (e.g., Zhou 2008; Zhou 2006) allowed us to derive reasonable hypotheses on children of immigrants from East Asian American. However, we do acknowledge that the category of "East Asian American" can be problematic as Chinese, Koreans, and Japanese differ in background characteristics and educational outcomes (Goyette and Xie 1999; Hao and Bonstread-Bruns 1998; Kao 1995; Sun 199) and may also differ in the prevalence, purpose, and effect of SAT coaching. This may also be true for the category of "other Asian American." We leave for future research the questions of how East, South, Southeast Asian Americans are different from each other in prevalence, purpose, and effect of SAT coaching.

Second, despite numerous other forms of shadow education emerging and considerable variation in intensity, scale, and mode within and between various forms of shadow education (Aurini and Davies 2004; Bray 2009; Ventura and Jang 2010), this study focused on the two particular forms of shadow education (i.e., the commercial test preparation service and private one-to-one tutoring) because of the limitations of the ELS data. As

explicitly noted, the ELS data do not allow us to identify whether students participated in shadow education available in ethnic communities as well as the frequency, intensity, and duration of shadow education students used. The lack of information about shadow education is also the case for earlier data such as NELS. Accordingly, studies using these national data sets are limited by the proximate measures of shadow education (or SAT coaching) that are available within ELS or NELS. Future efforts to collect details of shadow education activities will provide significant opportunities of investigating how shadow education mediates racial/ethnic and socioeconomic inequalities in educational outcomes in the United States.

Finally, we highlighted some constructive features of cram schools in East Asian ethnic communities, which might be responsible for greater effectiveness of the commercial SAT test preparation service among East Asian American students. However, future research should more explicitly assess how cram schools in East Asian ethnic communities are effective in enhancing academic achievement, and identify specific structures and conditions of those cram schools conducive to student learning. Understanding contexts in which cram schools in East Asian ethnic communities operate can offer important insights into effective coaching that may be applied to other racial/ethnic communities. In the United States, some educators have proposed a variety of supplementary educational services to help low achievers for a remedial purpose (Lee 2007). In addition, under the No Child Left Behind (NCLB) Act, low-achieving schools are required to offer supplemental educational services to low-achieving students through private organizations, including for-profit learning centers and community organizations (U.S. Department of Education 2002). Our findings, however, suggest variation in the effectiveness of the commercial SAT test preparation service among students of diverse racial/ethnic backgrounds and even question the effectiveness of private tutoring in boosting academic achievement. Therefore, systematic investigations of racial/ethnic variation in the prevalence, purpose, and effects of various forms of shadow education should extend our understanding of sources of racial/ethnic differences in educational outcomes as well as inform educational policy for designing intervention programs that better reflect specific needs of students of diverse racial/ethnic backgrounds.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Descriptive Statistics by Race/Ethnicity

Variable	All					Mean or proportion (SD)	Mean or proportion (SD)	Mean or proportion (SD)	Mean or proportion (SD)	Mean or proportion (SD)
	East Asian	Other Asian	White	Black	Hispanic					
SAT Score ^a	1009.12 (3.01)	1138.31 (11.52)	997.74 (12.40)	1045.14 (3.34)	833.04 (6.91)	896.19 (9.30)				
Shadow education										
Commercial test preparation course	.12	.30	.15	.10	.16	.11				
Private one-to-one tutoring	.09	.11	.07	.07	.17	.07				
Prior achievement	51.96 (.12)	55.61 (.67)	50.45 (.59)	54.11 (.14)	45.30 (.29)	46.62 (.31)				
SES	.09 (.01)	.31 (.04)	-.01 (.04)	.23 (.01)	-.19 (.02)	-.41 (.02)				
Generation										
1st	.06	.26	.34	.01	.02	.23				
2nd	.11	.37	.41	.05	.07	.35				
3rd	.71	.20	.12	.84	.75	.29				
(Missing)	.11	.17	.14	.10	.15	.12				
Two-parent family	.77	.84	.83	.82	.52	.73				
Number of siblings	2.19 (.02)	1.82 (.07)	2.36 (.09)	2.06 (.02)	2.57 (.05)	2.53 (.05)				
(Missing)	.15	.22	.26	.13	.24	.16				
Parental educational expectations										
Some college or less	.11	.08	.09	.12	.08	.11				
Bachelor's degree	.45	.38	.39	.48	.36	.42				
Advanced degree	.44	.54	.52	.40	.56	.46				
Female	.50	.49	.44	.50	.52	.53				
Region										
Northeast	.19	.13	.18	.21	.15	.12				
Midwest	.26	.17	.16	.31	.16	.14				
West	.20	.55	.44	.15	.07	.45				
South	.35	.15	.23	.33	.62	.30				
Urbanicity										
Urban	.27	.31	.47	.19	.46	.42				

Variable	All		East Asian		Other Asian		White		Black		Hispanic	
	Mean or proportion (SD)		Mean or proportion (SD)		Mean or proportion (SD)		Mean or proportion (SD)		Mean or proportion (SD)		Mean or proportion (SD)	
Suburban	.52		.58		.45		.55		.42		.48	
Rural	.21		.11		.09		.26		.12		.10	
Unweighted <i>N</i>	9,760 (100.0%)		560 (5.7%)		650 (6.7%)		6,190 (63.4%)		1,150 (11.8%)		1,210 (12.4%)	

^aDescriptive statistics for the SAT score include only those students who had valid information about their SAT score ($n = 7,020$).

Table 2

Racial/Ethnic Differences in the Likelihood of Taking a Commercial SAT Test Preparation Course: Logistic Regression Results

	Model 1 (+ unadjusted)	Model 2 (+ controls)
	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)
Race/ethnicity (East Asian omitted)		
Other Asian	-0.871 *** (.226)	-0.794 ** (.237)
White	-1.375 *** (.162)	-1.005 *** (.178)
Black	-0.815 *** (.179)	-0.324 (.205)
Hispanic	-1.308 *** (.181)	-0.878 *** (.191)
Log likelihood	-3427.527	-3233.225
Pseudo (McFadden's) R^2	0.016	0.072

Note: Unweighted $N = 9,760$. Model 2 includes controls for prior achievement, SES, immigrant generation, two-parent status, number of siblings, parental educational expectations, gender, region, and urbancity.

p < .001,

**
p < .01,

*
p < .05 (two-tailed tests)

Table 3

Racial/Ethnic Differences in the Likelihood of Receiving Private SAT One-to-One Tutoring: Logistic Regression Results

	Model 1 (+ unadjusted)	Model 2 (+ controls)
	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)
Race/ethnicity (East Asian omitted)		
Other Asian	-.418 (.263)	-.526 [†] (.278)
White	-.375 [*] (.189)	-.250 (.245)
Black	.558 ^{**} (.204)	.400 (.256)
Hispanic	-.389 [†] (.216)	-.398 [†] (.233)
Log likelihood	-2837.907	-2762.696
Pseudo (McFadden's) R^2	0.016	0.044

Note: Unweighted $N = 9,760$. Model 2 includes controls for prior achievement, SES, immigrant generation, two-parent status, number of siblings, parental educational expectations, gender, region, and urbancity.

^{***}
p < .001,

^{**}
p < .01,

^{*}
p < .05,

[†]
p < .10 (two-tailed tests)

Table 4

Racial/Ethnic Variation in the Relationship between Prior Achievement and Taking a Commercial SAT Test Preparation Course: Logistic Regression Results

	East Asian		Other Asian		White		Black		Hispanic	
	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)
Prior achievement	.042 ^{**} (.015)	.047 [*] (.019)	-.012 ^{††} (.007)	.000 [‡] (.013)	-.020 [‡] (.013)					
Unweighted <i>N</i>	560	650	6,190	1,150	1,210					
Log likelihood	-174.514	-149.021	-1544.659	-505.767	-291.074					
Pseudo (McFadden's) <i>R</i> ²	0.065	0.114	0.061	0.037	0.089					

Note: Model includes controls for SES, immigrant generation, two-parent status, number of siblings, parental educational expectations, gender, region, and urbanicity in addition to prior achievement.

[†] denotes significant differences from East Asian American students under the $p < .10$

^{**} $p < .001$,

^{**} $p < .01$,

^{*} $p < .05$,

[†] $p < .10$ (two-tailed tests)

Table 5 Racial/Ethnic Variation in the Relationship between Prior Achievement and Receiving Private SAT One-to-One Tutoring: Logistic Regression Results

	East Asian		Other Asian		White		Black		Hispanic	
	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)
Prior achievement	-0.12 (.019)	-0.026 (.030)	-0.023 (** (.007)	-0.045 (***) (.011)	-0.052 (***) (.015)					
Unweighted <i>N</i>	560	650	6,190	1,150	1,210					
Log likelihood	-174.514	-149.021	-1544.659	-505.767	-291.074					
Pseudo (McFadden's) <i>R</i> ²	0.065	0.114	0.061	0.037	0.089					

Note: Model includes controls for SES, immigrant generation, two-parent status, number of siblings, parental educational expectations, gender, region, and urbanicity in addition to prior achievement.

[‡] denotes significant differences from East Asian American students under the $p < .10$

*** $p < .001$,

** $p < .01$,

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

Table 6
Racial/Ethnic Variation in the Relationship between the Two Forms of SAT Coaching and SAT Scores: OLS Results

	East Asian	Other Asian	White	Black	Hispanic
	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)	Coef. (Robust Std. Err.)
Shadow education					
Commercial SAT test preparation course	68.835 *** (15.186)	23.842 ‡ (21.760)	12.286 ‡ (6.279)	14.987 ‡ (9.865)	24.625 ‡ (15.638)
Private SAT one-to-one tutoring	13.402 (15.832)	2.170 (24.426)	9.266 (7.528)	-7.501 (11.436)	12.145 (21.672)
Unweighted <i>N</i>	430	440	4,780	750	620
<i>R</i> ²	.645	.649	.664	.630	.654

Note: Model includes controls for prior achievement, SES, immigrant generation, two-parent status, number of siblings, parental educational expectations, gender, region, and urbanicity.

‡ denotes significant differences from East Asian American students under the $p < .10$

*** $p < .001$,

** $p < .01$,

* $p < .05$,

‡ $p < .10$ (two-tailed tests)