Understanding Inequality in Higher Education:
Insights from Comparing Asian Americans with Other Racial and Ethnic Groups

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CHAPTER 1

INTRODUCTION

Higher education is associated with a range of positive life outcomes such as labor market, social networks, and marriage (Hout 2012; Stevens, Armstrong, and Arum 2008). However, substantial inequalities in higher education by class, race, and gender remain despite great educational expansions over the past decades (Alon 2009; Karen 2002; Roksa et al. 2007; Roksa, Silver, and Wang 2022; Turner 2004). Sociologists have developed multiple theories to understand educational inequality. However, the predominant theories, including status attainment and cultural capital, have tended to fucus on class and less often attend to race and ethnicity, and in particular to the experiences of Asian Americans. Even in the literature on racial and ethnic inequalities in STEM (science, technology, engineering, and mathematics) education where Asians have high visibility, Asians are either excluded or simply combined with whites.

Asians represent the fastest-growing racial or ethnic group – between 2000 and 2019, the number of Asians grew by over 80%, compared to 70% for Hispanics (Pew Research Center 2021). Asians now account for about 7% of the U.S. population and are expected to continue to grow at a fast rate. Exclusion of Asian Americans from mainstream social stratification literature thus represents a crucial omission. Moreover, compared with other racial and ethnic groups, Asian Americans have quite unique experiences, from being treated as “culturally inferior” by mainstream society a century ago to being accoladed as “model minority” with desirable cultural traits (Lee and Zhou 2015, p.116). Their unique experiences can shape educational processes in ways that can provide novel insights and advance sociological theories of educational inequality.

EXPLAINING EDUCATIONAL INEQUALITY

In the study of educational inequality, sociologists are mainly concerned with how educational opportunities are distributed among different sociodemographic groups. There are two dominant frameworks for understanding educational inequality in sociology: status attainment and cultural capital (Roksa et al. 2022). The status attainment model originated from an examination of the role of education in social mobility, more specifically, how education connects family socioeconomic backgrounds with labor market outcomes (Blau and Duncan 1967). This model has emphasized the crucial role of education in fostering social mobility and thus focused scholarly attention on what factors predict class inequality in educational attainment (Roksa et al. 2022). The cultural capital framework emerged from examining the role of education in reproducing socioeconomic inequality. It primarily centers on examining the role of cultural capital in connecting family socioeconomic background with educational outcomes, that is, familiarity with the dominant culture, and with respect to education, norms and expectations of educational institutions (Bourdieu 1973; Bourdieu and Passeron 1977; Lareau and Weininger 2003). With their origins focused on class inequality, much of the literature in both traditions has focused primarily on class, less often attending to the role of race and ethnicity, and largely ignoring experiences of Asian Americans.

Status Attainment

The classical Blau-Duncan status attainment model argued that education is a key to socioeconomic mobility, and more specifically, that the key contributor to class inequality in labor market outcomes is educational inequality (Blau and Duncan 1967). This has focused scholarly attention on educational inequality, with ample literature showing that students from more socioeconomically advantaged families are more likely to have better educational outcomes (e.g., Brand and Xie 2010; Lawrence and Breen 2016; Pfeffer and Hertel 2015; Reardon 2011; Roksa 2012; Roksa et al. 2007).

While the Blau-Duncan model specified the key relationships, the Wisconsin status attainment model aimed to articulate the mechanisms underlying associations between family background and educational and labor market outcomes. The model incorporates psychosocial factors such as educational expectations and influence of significant others into the status attainment processes, and argues that educational expectations and the influence of significant others play a mediating role in linking family socioeconomic backgrounds with individual's educational outcomes (Sewell, Haller, and Portes 1969). Ample literature has indicated the importance of educational expectations and influence of significant others, particularly, peers in educational attainment processes (e.g., Bozick et al. 2010; Cherng, Calarco, and Kao 2013; Fishman 2020; Hasan and Bagde 2013; Johnson and Reynolds 2013; Liu and Xie 2016).

While these models are helpful for understanding the status attainment processes, they dedicate limited attention to race and ethnicity. Extant literature that attends to race and ethnicity mainly focuses on the challenges experienced by Black and Latinx students (Battle and Lewis 2002; Battle and Pastrana 2007; Portes and Wilson 1976). The literature indicates that family socioeconomic backgrounds play a major role in contributing to educational disadvantages experienced by Black and Latinx individuals relative to whites, and in addition, that black and Latinx individuals benefit less from improvement of family socioeconomic backgrounds relative to their white counterparts (Battle and Lewis 2002; Battle and Pastrana 2007; Kao and Thompson 2003; Quinn 2015; Yeung and Pfeiffer 2009).

Asian Americans are rarely considered in the mainstream status attainment literature. However, a small but growing body of research focusing specifically on Asian Americans indicates that their experiences may be quite different from those of whites as well as other racial and ethnic groups. Asian Americans tend to have similar or better educational outcomes relative to whites and other racial and ethnic minorities (Fishman 2020; Hirschman and Lee 2005; Hsin and Xie 2014; Kao 1995; Kao and Thompson 2003; Liu and Xie 2016; Xie and Goyette 2003). However, the differences between Asians and whites cannot be explained by their family socioeconomic backgrounds (Hsin and Xie 2014; Kao 1995; Kao and Thompson 2003; Liu and Xie 2016). Indeed, several recent studies suggested that Asians' family socioeconomic background may not be associated with their educational outcomes (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016).

STEM Education

The status attainment literature not only focuses on vertical stratification, that is, inequality patterns regarding access to and completion of different levels of education, but also on horizontal stratification, that is, inequality patterns within a certain level of education, such as institutional types or fields of studies within higher education (Roksa et al. 2022). Among many fields of studies within higher education, STEM education has received disproportionate attention. While STEM education is associated with desirable labor market outcomes and is claimed to promote social mobility, pronounced inequalities by race/ethnicity and gender remain in this field (Xie, Fang, and Shauman 2015).

Prior literature on STEM education has examined racial and ethnic inequalities by focusing on differences between white and URM (underrepresented racial/ethnic minorities, typically primarily Black and Latinx) students. URM students are less likely to both pursue and complete STEM degrees than their white peers (e.g., Chang et al. 2014; Griffith 2010; Price 2010; Riegle-Crumb and King 2010; Riegle-Crumb, King, and Irizarry 2019). Notably, the gaps in students' intention to pursue a STEM degree have declined over time while disparities in completing a STEM degree have remained substantial (Anderson and Kim 2006; Chen 2009, 2014; National Science Board 2022; Xie et al. 2015). This literature pays limited attention to experiences of Asian Americans, which is a crucial omission given the high visibility of Asian Americans in STEM.

Ample literature has also examined gender inequality in postsecondary STEM education showing that females are less likely to pursue and obtain STEM degrees than males (England and Li 2006; Ma 2011; Mann and DiPrete 2013; Sax et al. 2016; Weeden, Gelbgiser, and Morgan 2020; Xie and Shauman 2005). However, this literature pays limited attention to whether females from different racial and ethnic backgrounds have similar experiences. This may miss important patterns of the interaction between race and gender inequalities in STEM. The literature on intersectionality argues that each analytical category such as race, gender, or class is not unitary but could work simultaneously to shape social inequality (Collins 2015; Crenshaw 1991; McCall 2005).

Cultural Capital

Literature on cultural capital offers an alternative way of understanding socioeconomic inequality in educational outcomes. Bourdieu (1973; Bourdieu and Passeron 1977) argued that students from socioeconomically advantaged backgrounds have natural familiarity with the dominant culture. Schools usually reward the dominant culture but do not teach it. Thus, students from advantaged backgrounds can effectively transmit their cultural capital into educational success under the disguise of meritocracy. Bourdieu (1973) defined cultural capital as familiarity with dominant culture such as cultural knowledge, and styles of presentation and interactions. More recent work conceptualizes cultural capital as abilities of adjusting to the standards of evaluation of schools (Lareau and Weininger 2003).

Lareau (2011) in particular showed that socioeconomically advantaged families adopt a concerted cultivation parenting style, that is, cultivating children's talents through organized activities and reasoning which are consistent with schools' norms and expectations. In this way, they equip their children with abilities to understand and respond to schools' evaluation standards. Ample literature has shown that cultural capital, and more specifically concerted cultivation, facilitates educational success and contributes to class inequality in K-12 education (Bodovski and Farkas 2008; Cheadle 2008; Potter and Roksa 2013) as well as access to higher education (Kim and Schneider 2005; Plank and Jordan 2001; Roderick, Coca, and Nagaoka 2011). The literature on cultural capital in education pays limited attention to race/ethnicity (e.g., Cheadle 2008; Cheadle and Amato 2011; Gibbs and Downey 2020), and virtually no attention to Asian Americans. A lack of attention to the role of concerted cultivation in explaining Asian Americans' educational success in scholarly literature gives way to popular interpretations of Asians' educational success using the concept of parenting or culture, resulting in a reinforcement of racial stereotype and cultural essentialism (e.g., "Tiger Mother", Chua 2011).

THE PRESENT STUDY

The present study addresses gaps in the prior literature by examining educational experiences of Asian Americans, compared to other racial/ethnic groups, and in particular whites. This dissertation includes three stand-alone empirical chapters, each of which is asking unique questions aimed to push further our understanding of educational inequality. To address the questions posed in the dissertation, I rely on data from the Educational Longitudinal Study (ELS2002), which is collected by the National Center for Education Statistics (NCES). Designed to study student transition from high school to postsecondary education and beyond, ELS2002 collected data from a nationally representative cohort of more than 15,000 high school sophomores in 2002, and followed them in their senior year in 2004, two years after high school in 2006, and eight years after high school in 2012, which is the most recent NCES data with student graduation information more than 6 years after college. Additionally, NCES collected students' high school and college transcript data. ELS2002 includes rich information that makes the dissertation possible.

Chapter 2 addresses a central question about the importance of family background in shaping educational success. While socioeconomic background is one of the key predictors of educational success, it tends to play a much more limited role in the success of Asian Americans (Fishman 2020; Liu and Xie 2016). This chapter thus asks: what can explain the limited role of socioeconomic background in fostering educational success of Asian Americans? Building on the literature on peer influence (Cherng et al. 2013; Duncan, Haller, and Portes 1968; Hasan and Bagde 2013; Sewell et al. 1969), I postulate that peers may be a crucial factor contributing to understanding this puzzle. More specifically, I propose that Asians are more likely to have college-oriented peers regardless of family socioeconomic background due to the narrow frame of educational success that is prevalent among Asians (Lee and Zhou 2015) and the model minority stereotype (Hirschman and Wong 1986). The results from ELS2002 show that peer influence indeed helps to explain a substantial portion of the Asian-white difference in the association between family socioeconomic status and college enrollment. These findings offer novel insights into the role of peers in differentially shaping educational attainment processes across racial/ethnic groups.

Chapter 3 engages with the literature on cultural capital and in particular parenting practices. Prior literature has shown that concerted cultivation, reflecting parenting practices associated with the middle class, shape educational success and contribute to inequalities in educational outcomes (Bodovski and Farkas 2008; Cheadle 2008; Lareau 2011; Potter and Roksa 2013). This chapter asks: what is the role of concerted concertation in understanding the Asian American advantage in college enrollment? Results from ELS2002 indicate that parenting practices associated with concerted cultivation do not contribute to explaining Asians' advantage in college enrollment relative to their white counterparts. Although Asians are advantaged in college enrollment, they do not have more exposure to nor do they benefit more from concerted cultivation compared to their white peers. The results also reveal important differences across students from different socioeconomic backgrounds. These findings illuminate the limits of concerted cultivation and highlight the importance of expanding research on parenting to consider a range of racial/ethnic groups.

The final empirical chapter considers students experiences in STEM (science, technology, engineering, and mathematics). While ample literature has addressed racial/ethnic inequalities in STEM, prior studies have rarely considered the experiences of Asian Americans or how race may interact with gender (Chang et al. 2014; Riegle-Crumb and King 2010; Riegle-Crumb et al. 2019). The central questions guiding this chapter are: how may race and gender interact to shape inequality in pursing and obtaining STEM degrees? What could explain the observed patterns of inequality? Results present a complex picture of the intersection of racial and gender inequality. Asian females have different patterns from white females although they share gender identity, and from Asian males although they share racial identity. Moreover, different mechanisms explain observed Asian-white differences for males and females. These findings reveal new patterns of inequality and highlight the importance of an intersectional approach for understanding inequalities in STEM education.

Taken together, these chapters indicate the importance of incorporating Asian Americans in the mainstream educational inequality literature. They not only shed new light on classical educational inequality theories, such as status attainment and cultural capital, but also inspire researchers to explore new mechanisms that are not considered in the traditional sociological theories on educational inequality.

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CHAPTER 2

UNDERSTANDING THE RELATIVELY HIGH EDUCATIONAL MOBILITY OF ASIAN AMERICANS: THE ROLE OF PEERS

Ample literature has shown that family socioeconomic status is positively associated with educational outcomes. Individuals from socioeconomically advantaged backgrounds have more desirable educational outcomes than their disadvantaged peers in both K-12 and higher education (e.g., Brand and Xie 2010; Lawrence and Breen 2016; Pfeffer and Hertel 2015; Reardon 2011; Roksa 2012; Roksa et al. 2007). However, several recent studies have suggested that Asian Americans may not follow this pattern: Asian Americans tend to have positive educational outcomes regardless of family socioeconomic backgrounds (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016). What explains this unique pattern for Asian Americans?

Prior literature has suggested that educational expectations may contribute to the weaker association between family socioeconomic status and educational outcomes for Asian students (Fishman 2020; Liu and Xie 2016). While educational expectations represent one important dimension of the status attainment process, this literature is missing another key dimension: significant others, and in particular peers (Haller and Portes 1973; Sewell, Haller, and Portes 1969). Peer influence not only plays an important role in predicting individuals' educational outcomes (Cherng, Calarco, and Kao 2013; Fujiyama, Kamo, and Schafer 2021; Hasan and Bagde 2013), but also is an important mechanism in linking individuals' family socioeconomic status and educational outcomes (Duncan, Haller, and Portes 1968; Sewell et al. 1969).

This study examines the extent to which peers, in addition to educational expectations, help to explain the limited role of family socioeconomic status in fostering Asian Americans' college attendance. While prior studies examining this issue have considered K-12 education or overall years of schooling (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016), focusing on transition to higher education is crucial given positive associations between college and a range of life outcomes such as career, marriage, and social networks (Hout 2012; Stevens, Armstrong, and Arum 2008). Socioeconomic inequality in access to higher education also remains large despite educational expansion (Alon 2009; Karen 2002; Roksa et al. 2007), raising important questions about whether all racial/ethnic groups may similarly benefit from their family's socioeconomic resources.

The results, based on nationally representative data, indicate that the association between family socioeconomic status and college enrollment among Asian Americans is relatively weak compared with whites and other racial/ethnic groups. More specifically, family socioeconomic status does not predict college enrollment for Asian Americans. Moreover, peer influence helps to explain a substantial portion of the Asian-white difference in the association between family socioeconomic status and college enrollment, even after adjusting for educational expectations. Supplemental analyses show that the patterns in general hold for different generations of Asians as well as across subgroups of Asian students. Moreover, these patterns pertain primarily to Asians, as other racial/ethnic groups (e.g., Blacks and Mexicans) follow a similar pattern to whites.

The findings reveal the importance of considering racial/ethnic differences in the status attainment processes, and in particular among Asian Americans. While Asian Americans are one of the fastest-growing racial/ethnic groups in the U.S. in recent years (Lee, Ramakrishnan, and Wong 2018), they have received limited attention in mainstream social stratification literature compared with other racial/ethnic minorities (Lee and Kye 2016; Lee et al. 2018; Sakamoto, Goyette, and Kim 2009). Asian Americans have a unique set of experiences. Despite being a racial/ethnic minority, Asian Americans on average have more desirable educational outcomes than their white peers (e.g., Fishman 2020; Hsin and Xie 2014; Kao and Thompson 2003), and their advantage in educational outcomes relative to whites cannot be explained by family socioeconomic status (Hsin and Xie 2014; Kao 1995; Kao and Thompson 2003; Liu and Xie 2016). Their unique experiences may offer novel insights into social stratification processes.

LITERATURE REVIEW

The Role of Socioeconomic Background in Fostering Educational Success

Since the classical Blau-Duncan status attainment model (1967), ample literature has documented the association between family socioeconomic background and educational outcomes. Family socioeconomic status is one of the strongest predictors not only of the years of education completed but also a series of other educational outcomes including academic achievement, access to higher education, and college completion (e.g., Brand and Xie 2010; Lawrence and Breen 2016; Pfeffer and Hertel 2015; Reardon 2011; Roksa 2012; Roksa et al. 2007).

This literature, however, has rarely paid attention to differences in status attainment processes across racial/ethnic groups. What literature does exist in this vein, it has focused on experiences of racial/ethnic groups that have experienced greater challenges in education (Battle and Lewis 2002; Battle and Pastrana 2007; Portes and Wilson 1976). For example, Black and Latinx students receive fewer benefits from an increase in their family socioeconomic status in their educational attainment after two years of high school (Battle and Lewis 2002; Battle and Pastrana 2007). While family socioeconomic status is relatively less important for Black and

Latinx students relative to whites, it still contributes to explaining a large portion of the racial gap relative to whites (Kao and Thompson 2003; Mare and Winship 1988; Quinn 2015; Yeung and Pfeiffer 2009), implying that family socioeconomic status is still an important factor in influencing their educational outcomes.

The patterns for Asian Americans, however, are quite distinct. Asian Americans on average tend to have more desirable educational outcomes, from academic achievement to college enrollment and completion compared with whites and other racial/ethnical groups (Fishman 2020; Hirschman and Lee 2005; Hsin and Xie 2014; Kao 1995; Kao and Thompson 2003; Liu and Xie 2016; Xie and Goyette 2003). In addition, in most cases, family socioeconomic status cannot explain the differences in educational outcomes between Asians and whites (Hsin and Xie 2014; Kao 1995; Kao and Thompson 2003; Liu and Xie 2016). Several recent studies have suggested that socioeconomic status may not even be associated with Asian Americans' educational outcomes at all (e.g., Fishman 2020; Lee and Zhou 2015).

Through in-depth interviews with Chinese and Vietnamese Americans in Los Angeles metropolitan areas, Lee and Zhou (2015) noted that these two groups achieved exceptional educational success such as getting high GPA's and enrolling in prestigious higher education institutions, even among students from disadvantaged socioeconomic backgrounds. Extending these findings to nationally representative data, Liu and Xie (2016) found that the association between family socioeconomic status and educational expectations is weaker for Asian Americans relative to whites. What may explain these differential patterns for Asian Americans?

Fishman (2020) reported that educational expectations partially explain the weaker association between family socioeconomic status and years of schooling for Asian Americans (especially children of Chinese, Indian, Korean, and Vietnamese immigrants) relative to native-born whites. Similarly, Liu and Xie (2016) showed that educational expectations also contribute to explaining the weak association between family socioeconomic status and high school math test scores for Asians relative to whites. While educational expectations are one key dimension of status attainment, this literature has not attended to the other key component: peers.

Peer Influence and Asian American's Educational Mobility

Ample literature has shown that peers are important predictors of a series of educational outcomes from test scores and grades to college enrollment and completion (e.g., Cherng et al. 2013; Fujiyama, Kamo, and Schafer 2021; Hallinan and Williams 1990; Hasan and Bagde 2013; Sacerdote 2011; Sokatch 2006; Vaquera and Kao 2008). Peer influence may be particularly important during adolescence when adolescents spend more time interacting with their peers and also think peers are more accepting and understanding compared with parents (Corsaro and Eder 1990; Kao 2001; McPherson, Smith-Lovin, and Cook 2001). For example, adolescents whose friends have higher test scores or grades are also more likely to achieve higher test scores and grades themselves compared with those whose friends tend to have lower test scores and grades (Fujiyama et al. 2021; Sacerdote 2011; Vaquera and Kao 2008). Moreover, adolescents' friends college expectation and attendance also predict their own college expectation and attendance patterns (Hallinan and Williams 1990; Sokatch 2006).

Peer influence is not only an important factor for predicting individuals' educational outcomes but also is deemed as an important mechanism for explaining socioeconomic inequality in educational outcomes. The Wisconsin status attainment model has argued that the influence of significant others, including peers, is an important mechanism linking individuals' family socioeconomic status and educational outcomes (Duncan et al. 1968; Sewell et al. 1969).

The model postulated that socioeconomically advantaged families tend to have more academically oriented peers, who either directly communicate their educational orientations to individuals for their behaviors or serve as role models, resulting in individuals' relatively high educational orientations and subsequent better education outcomes compared with their less advantaged counterparts. Indeed, peers, especially friends, play an important role in influencing individuals' behavioral patterns including educational outcomes either directly through encouragement/coercion or indirectly by serving as a role model (Crosnoe, Cavanagh, and Elder 2003; Giordano 2003; Hallinan and Williams 1990; McPherson et al. 2001). Moreover, the homophily principle in forming peer networks, that is, individuals with similar status traits tend to affiliate with each other, may reinforce peer influence (Corsaro and Eder 1990; Giordano 2003; McPherson et al. 2001).

Besides socioeconomic inequality, peers are also an important factor in explaining racial inequality in education (Ainsworth-Darnell and Downey 1998; Fordham and Ogbu 1986; Kao 2001). While the effect of peers on educational outcomes may be similar across racial/ethnic groups, variations may exist in levels of peer support for educational achievement (Crosnoe et al. 2003). For example, previous research showed that friends of Asian Americans are more likely to have educationally oriented attitudes and behaviors; they are more likely to plan to go to college and less likely to drop out of high school compared with friends of whites (Kao 2001).[1]

Previous literature also suggests that Asian Americans, regardless of family socioeconomic backgrounds, tend to have peers with academically oriented attitudes and behaviors. Lee and Zhou (2015) argued that the Asian Americans' narrow frame of educational

[1] There is also a rich literature on how peers influence educational inequality between whites and Blacks such as "acting white" thesis and its antithesis (e.g., Ainsworth-Darnell and Downey 1998; Fordham and Ogbu 1986).

success such as aiming for an Ivy League degree or a perfect GPA, are prevalent regardless of their family socioeconomic status. Due to the homophily principle (McPherson et al. 2001), Asians, like other racial/ethnic groups, are more likely to make friends with their same-race peers (Kao 2001; Kao and Joyner 2004; Vaquera and Kao 2008). Thus, Asians, regardless of family socioeconomic status, may have Asian friends with positive educational attitudes and behaviors emphasizing the importance of education in achieving upward social mobility.

Moreover, due to Asian Americans' strong educational outcomes, on average, they have been stereotyped as a model minority. This stereotype applies to Asian Americans as a racialized group, regardless of family socioeconomic backgrounds (Jiménez and Horowitz 2013; Kao 1995; Lee and Zhou 2015; Liu and Xie 2016). With the stereotype, Asian Americans, regardless of socioeconomic backgrounds, may associate with other racial/ethnic peers who have high educational orientations and high academic achievement due to the homophily principle (McPherson et al. 2001). Indeed, Lee and Zhou (2015:61) showed that some white students like to make friends with Asian Americans because they know Asians are "good students". Additionally, the stereotype as well as Asians' high academic achievement tend to place them in academic or college preparatory tracks (Kao and Thompson 2003) where Asians may also be able to form peer networks with students from other racial/ethnic groups, reinforcing their positive educational attitudes and behaviors.

Overall, prior literature shows that peer influence is important for educational outcomes including college enrollment, especially during adolescence, and that Asian Americans may be exposed to peers with positive educational attitudes and behaviors including college-going orientations and behaviors, regardless of family socioeconomic backgrounds. I therefore hypothesize that peers may help to explain the relatively weak association between socioeconomic backgrounds and college attendance for Asians compared with whites.

DATA AND METHODS

This study employs data from the Education Longitudinal Study (ELS) of 2002, which is a nationally representative and longitudinal survey of tenth graders conducted by the National Center for Education Statistics (NCES). Designed to study student transition from secondary to postsecondary education and beyond, ELS surveyed a baseline cohort of tenth graders in 2002, and followed them in 2004, 2006, and 2012, resulting in a final sample of 16,197 students in the original data. Focusing on college entry, the analysis is restricted to students who obtained a high school diploma or equivalent, and have information on college enrollment and race/ethnicity, which results in an analytical sample size of 8,590 students (all sample sizes in the study are rounded to the nearest ten according to the NCES restricted-use data guidelines).

Variables

The dependent variable is immediate college enrollment collected in the second follow-up survey in 2006, two years after high school exit. ELS defines immediate enrollment as enrollment by October of high school exit year if the exit date was between January and July or by the following February if the exit date was after July. The first dependent variable is overall college enrollment, which indicates immediate enrollment in any college (either four-year or two-year) vs. no enrollment. In addition, as access to four-year institutions is more unequal than overall college access and since four-year college enrollment is prioritized by Asian Americans (Lee and Zhou 2015), I also examine four-year college enrollment vs. no enrollment.[2]

[2] While it is common for earlier studies of school transitions to adopt a conditional model (Shavit and Blossfeld 1993), most recent studies tend to use unconditional models (Breen 2010; Breen et al. 2009). Each type of model is

The key independent variables are racial/ethnic group and family socioeconomic status (SES). The main analysis focuses on the comparison between Asian Americans and whites, and thus the racial/ethnic group variable is a dummy variable with Asian American coded 1. In the sensitivity analysis on subgroups of Asian Americans, ELS allows to disaggregate Asian Americans into six subgroups including Chinese, Filipino, Japanese, Korean, Southeast Asian such as Vietnamese, and South Asian such as Indian. I also run sensitivity analysis considering other racial/ethnic groups: Blacks, Mexicans, and Other Latinx. Family SES is a continuous variable reflecting five equally weighted, standardized components: father's education, mother's education, family income, father's occupation, and mother's occupation, constructed by ELS.

The key mediating variable is peer influence, which is measured by number of friends who plan to attend 4-year colleges or universities following the practice of prior studies (e.g., Fletcher 2015; Holland 2010, 2011; Sokatch 2006). Peer college plans have been commonly operationalized as an important indicator of peer influence on individual's college-going behaviors (e.g., Fletcher 2015; Holland 2010, 2011; Sokatch 2006). Moreover, one study focused on ethnic minorities found that friends' college-going plan appears to be the single best predictor of adolescents' four-year college attendance relative to a host of other family factors such as family socioeconomic status (Sokatch 2006).

Since prior studies (e.g., Fishman 2020; Liu and Xie 2016) indicated that students' and parents' educational expectations could also be mediators, they are included in the models. Students' and parents' educational expectations are measured by the highest years of education they expect to obtain. Following the practice of prior studies (Feliciano and Lanuza 2017; Fishman 2020), the specific coding strategies are as follows: less than high school as 11 years,

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associated with advantages and disadvantages (Bar Haim and Shavit 2013). Following most recent studies, I estimate an unconditional model of college attendance.

high school as 12 years, two-year college degree or some college as 14 years, bachelor's as 16 years, master's as 18 years, and doctorate or professional degree as 22 years.

This study also includes a series of control variables. It considers basic demographic controls including gender (female=1), family structure (two-parent family=1), number of siblings, immigration generational status (1.5-2.0 generation=1), and geographic region including Northeast (reference), Midwest, South, and West. Following the practice of prior studies (Feliciano and Lanuza 2017; Fishman 2020; Ramakrishnan 2004), the study differentiates two immigration generations. 1.5-2.0 generation refers to children of two immigrant parents who were both born outside the US while 2.5+ generation refers to children who have at least one parent born in the U.S. It also controls for students' academic ability and achievement including high school GPA and high school math and English standardized test scores. Additionally, it includes a series of high school control variables including high school sector (private school=1), high school urbanicity including urban (reference), suburban, and rural, high school percent of racial/ethnic minority students, and high school percent of the student body receiving free/reduced-price lunch. See Table 1 for descriptive statistics for all variables used in the study.

Table 1. Descriptive Statistics

	Whole Sample	Asian	White
Dependent variables			
Overall college entry	0.77	0.83	0.76
4-year college entry	0.55	0.59	0.54
Key independent variables			
Family socioeconomic status (SES)	0.24	0.05	0.27
	(0.72)	(0.86)	(0.69)
Mediating variables			
Peer influence (number of friends planning to attend 4-year institutions)	3.58	3.65	3.57
	(0.99)	(0.94)	(0.99)
Students' educational expectations	17.47	17.99	17.39
	(2.74)	(2.82)	(2.72)
Parents' educational expectations	17.44	18.37	17.29
	(2.60)	(2.78)	(2.54)

Table 1, continued

Control variables - Student			
Female	0.52	0.52	0.53
Two-parent family	0.70	0.72	0.69
Number of siblings	1.39	1.66	1.35
	(1.13)	(1.54)	(1.06)
1.5-2.0 generation	0.14	0.88	0.03
Region			
Northeast	0.20	0.19	0.20
Midwest	0.30	0.15	0.33
South	0.33	0.19	0.35
West	0.17	0.47	0.12
High school GPA	3.01	3.09	3.00
	(0.64)	(0.63)	(0.64)
High school math & English test score	54.27	53.58	54.39
	(8.97)	(9.71)	(8.83)
Control Variables – High school			
Private	0.27	0.10	0.30
Urbanicity			
Urban	0.29	0.44	0.26
Suburban	0.51	0.50	0.51
Rural	0.21	0.05	0.24
Percent racial/ethnic minority	20.12	49.90	14.97
	(24.27)	(31.11)	(18.53)
Percent free/reduced-price lunch	19.84	26.92	18.64
	(20.17)	(22.48)	(19.51)
N	8,590	1,250	7,340

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: The descriptive table reports proportions for categorical measures and means and standard deviations (in parentheses) for continuous measures. The descriptive table is based on unweighted and unimputed data. Sample sizes are rounded to the nearest 10 for the use of restricted data.

Methods

Given challenges with comparing coefficients across groups and models in logistic regressions (Mood 2010), I estimate a series of linear probability models (LMP) with robust standard errors. Using LPM is warranted as an alternative way of estimating binary outcomes since the probability of both overall college enrollment and four-year college enrollment are in general within the range between 0.2 and 0.8 and sensitivity analysis using logistic regressions, available upon request, also shows that the major patterns are substantially identical from those presented herein (Hellevik 2009; von Hippel 2015; Wooldrige 2010). Moreover, school clustered robust standard errors are used to adjust for students clustered within schools (Arceneaux and Nickerson 2009).

Following the practice of prior studies on Asian Americans using the same or similar NCES data (e.g., Fishman 2020; Liu and Xie 2016), regression models are not weighted.[3] Sensitivity analyses with and without weights are not substantially different from each other, which is consistent with prior studies using NCES data with similar sensitivity analyses (e.g., Fishman 2020), providing additional support for the robustness of the results (Winship and Radbill 1994; Young and Johnson 2012).

After restricting the analytical sample to students who obtained a high school diploma or equivalent, and have complete information on college enrollment and racial/ethnic group, the percent of students missing any one of the variables used in the study is about 30 percent. Missing values are dealt with using multiple imputation with 20 imputations using chained equations (White, Royston, and Wood 2011).

The main analysis proceeds in three steps. The first step is to examine the association between race/ethnicity/SES and college enrollment, and if the association between SES and college enrollment varies by race/ethnicity. The second step is to explore if peer influence is a potential mediator. This includes examining the association between peer influence and college

[3] First, the sample size of Asian Americans is small, especially the even smaller sample sizes (such as less than 100) of each Asian subgroup. Second, the sampling was a function of independent variables included in the regression models, which yields unbiased coefficients and standard errors (Winship and Radbill 1994; Young and Johnson 2012).

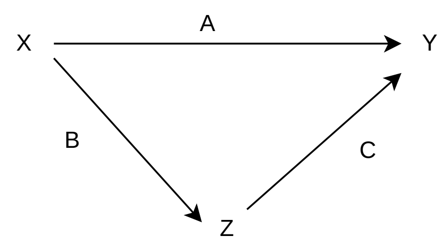
enrollment, and the association between race/ethnicity/SES and peer influence, as well as whether the association between SES and peer influence varies by race/ethnicity.

The third step is a formal mediation analysis to assess if the *difference* in the association between SES and college enrollment across racial/ethnic groups can be explained in terms of the difference in the extent to which this association is mediated by peer influence. As is known, the traditional mediation analysis centers on the extent to which the changes of the effect of a given variable of interest are a result of adding a mediator in the model. For example, in the context of this research, it would be the extent to which the changes in association between SES and college enrollment are a result of adding a meditator, peer influence, in the model. In other words, this means that one believes that the extent to which the positive association between SES and college enrollment can be explained by the fact that SES is positively associated with peer influence, which is positively associated with college enrollment.

However, it is not the mediation analysis that this study aims to examine. Instead, this study is concerned with whether the *difference* in the association between SES and college enrollment across racial groups (e.g., Asians and whites in the main analysis) can be explained in terms of the difference in the extent to which this association is mediated by peer influence since prior studies suggest that the association between SES and college enrollment may vary across racial/ethnic groups. This approach considers the groupwise heterogeneity of treatment effects. I thus extend the traditional form of mediation analysis in linear models to considering groupwise heterogeneity of treatment effects by calculating the extent to which the difference in group-specific treatment effects can be attributed to differential mediation.

I illustrate this approach of mediation in details using a simple path diagram shown in Figure 1. In Figure 1, I have a regression of outcome Y on the treatment X and mediator Z. In this regression, A indicates the direct effect of X on Y, B indicates the direct effect of X on Z, and C indicates the direct effect of Z on Y, with the indirect effect of X on Y given by BC. The total effect of X on Y is equal to A + BC (i.e., the sum of the direct effect A and indirect effect BC). The total effect of X on Y can also be estimated by regressing Y on X alone. The extent to which the total effect of X on Y is mediated by Z is equal to the magnitude of the indirect effect BC. To make this quantity more interpretable, it is common to represent this value in terms of the percentage of the total effect attributable to mediation, as given by [BC/(A + BC)] × 100. This is the traditional form of mediation.

Figure 1. Path Diagram Representing the Regression of the Outcome Y on the Treatment X and the Mediator Z



To extend the approach to considering group heterogeneity, one will need to run separate models for each group to allow for groupwise heterogeneity in the intercept, slope, and error terms. Thus, one can not only calculate the direct, indirect, and total effect of X for each group, but also the extent to which the difference in total effects ΔT is attributable to the difference in the extent to which those effects are mediated by Z. In the main analysis, I only consider two groups, Asians and whites. The difference in the total effect of SES between whites and Asians can be expressed as follows:

$$\Delta T = (A_{white} + B_{white} C_{white}) - (A_{Asian} + B_{Asian} C_{Asian}) \,, \quad (1)$$

where, A_{white} and $B_{white}C_{white}$ refer to the direct and indirect effects of SES for whites while A_{Asian} and $B_{Asian}C_{Asian}$ for Asians. Rearranging equation (1), one gets the following:

$$\Delta T = \Delta D + \Delta I, \tag{2}$$

where $\Delta D = (A_{white} - A_{Asian})$ refers to the difference in direct effects, and $\Delta I = (B_{white}C_{white} - B_{Asian}C_{Asian})$ refers to the difference in indirect effects. The latter quantity represents the amount of the difference in total effects attributable to differential mediation.

After dividing both sides of equation (2) by ΔT and rearranging terms, the share of the difference in total effects attributable to differential mediation can be most succinctly expressed as follows:

$$\frac{\Delta I}{\Delta T} = 1 - \frac{\Delta D}{\Delta T}, \tag{3}$$

This quantity can be converted to a percentage by multiplying by 100. The advantage of this formulation is that both ΔD and ΔT can be calculated directly from standard regression output. The standard error to the estimated share of the difference in total effects due to differential mediation is estimated using the delta method (Feiveson 1999; Oehlert 1992).

After the main analysis, I conduct three sensitivity analyses to assess the robustness of the presented findings. The first sensitivity analysis examines if certain generations of Asian Americans drive the observed Asian patterns presented herein. Following previous research (Feliciano and Lanuza 2017; Fishman 2020; Ramakrishnan 2004), the analysis differentiates two generations of Asian Americans: 1.5-2.0 and 2.5+ generations, and compares the two generations of Asians and 1.5-2.0 generation whites with 2.5+ generation whites. The second sensitivity analysis investigates if the observed patterns of Asian Americans on average apply to different Asian subgroups as Asian Americans, despite racialized as a single racial group, are heterogeneous. The third sensitivity analysis considers whether the patterns observed for Asian

Americans are unique or apply to other racial/ethnic groups in the U.S. such as Black and Latinx students.

RESULTS

Does SES Matter Equally for Asians and Whites?

The analysis begins with addressing the question of whether SES benefits both Asian and white students equally with respect to college enrollment. The first two models in Tables 2 and 3 confirm Asians' advantage: Asians are more likely to enter college in general and four-year institutions in particular compared with their white counterparts (Model 1), and this pattern holds net of SES and a range of controls (Model 2). Table 4 and Table 5 report the expected patterns on differential benefits of SES between Asians and whites. SES is positively associated with college enrollment including both overall college enrollment and four-year college enrollment for whites (Model A1 in Tables 4 and 5); however, SES is not related to college enrollment for Asians (Model B1 in Tables 4 and 5). The differences in the association between SES and college enrollment between Asians and whites are statistically significant based on Wald test, indicating that the association between SES and college enrollment for Asians is statistically significantly weaker than that for whites.

Thus, on the one hand, Asians, on average, are more likely to enroll in colleges than their white counterparts; on the other hand, family SES plays a less important role in their college enrollment compared with their white counterparts. The following sections explore if peer influence contributes to explaining the Asian-white difference in the association between SES and college enrollment.

Table 2. Predicting Overall College Enrollment for the Whole Sample

	Model 1	Model 2	Model 3	Model 4
Asian (ref: white)	0.07***	0.07**	0.06*	0.05*
	(0.01)	(0.02)	(0.02)	(0.02)
SES		0.08***	0.06***	0.06***
		(0.01)	(0.01)	(0.01)
Peer influence			0.07***	0.06***
			(0.01)	(0.01)
Students' educational expectations				0.01***
				(0.00)
Parents' educational expectations				0.00
				(0.00)
Controls	No	Yes	Yes	Yes
N	8,590	8,590	8,590	8,590

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Table 3. Predicting Four-Year College Enrollment for the Whole Sample

	Model 1	Model 2	Model 3	Model 4
Asian (ref: white)	0.09***	0.07*	0.04	0.04
	(0.02)	(0.03)	(0.03)	(0.03)
SES		0.09***	0.07***	0.06***
		(0.01)	(0.01)	(0.01)
Peer influence			0.10***	0.10***
			(0.01)	(0.01)
Students' educational expectations				0.01***
				(0.00)
Parents' educational expectations				0.00
				(0.00)
Controls	No	Yes	Yes	Yes
N	6,660	6,660	6,660	6,660

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Table 4. Predicting Overall College Enrollment, Separated by Race

	Whites				Asians			
	Model A1	Model A2	Model A3	Model A4	Model B1	Model B2	Model B3	Model B4
SES	0.10***	0.08***	0.09***	0.07***	0.02	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Peer influence		0.07***		0.07***		0.02		0.01
		(0.01)		(0.01)		(0.01)		(0.01)
Students' educational expectations			0.02***	0.01***			0.01	0.01
			(0.00)	(0.00)			(0.00)	(0.00)
Parents' educational expectations			0.00	0.00			0.00	0.00
			(0.00)	(0.00)			(0.00)	(0.00)
N	7,340	7,340	7,340	7,340	1,250	1,250	1,250	1,250

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table 5. Predicting Four-Year College Enrollment, Separated by Race

	Whites				Asians			
	Model A1	Model A2	Model A3	Model A4	Model B1	Model B2	Model B3	Model B4
SES	0.11***	0.08***	0.10***	0.08***	0.02	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Peer influence		0.11***		0.10***		0.04**		0.04**
		(0.01)		(0.01)		(0.01)		(0.01)
Students' educational expectations			0.02***	0.01***			0.01*	0.01*
			(0.00)	(0.00)			(0.01)	(0.01)
Parents' educational expectations			0.00	0.00			0.00	0.00
			(0.00)	(0.00)			(0.00)	(0.00)
N	5,720	5,720	5,720	5,720	940	940	940	940

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Exploring the Role of Peer Influence

For peer influence to be able to explain the relatively weaker association between SES and college enrollment for Asians than that of whites, peer influence itself needs to be positively associated with college enrollment and have a weaker association with SES for Asians than that for whites. Models 3 in Tables 2 and 3 show that peer influence is positively and significantly associated with both overall college enrollment and four-year college enrollment, net of race/ethnicity, SES, and other predictors. Since prior studies (e.g., Fishman 2020; Liu and Xie 2016) suggested that students' and parents' educational expectations also account partially for the Asian-white difference in the association between SES and college enrollment, Models 4 in Tables 2 and 3 control for these two predictors, and indicates that peer influence remains positive and statistically significant in both models.

After supporting a positive association between peer influence and college enrollment, the analysis further examines relationships between race/ethnicity, SES, and peer influence. Models 1 in Table 6 show that Asians have on average more friends who plan to attend a four-year college than whites, net of SES and a host of other predictors, and that SES is also positively associated with peer influence such that individuals from more socioeconomically advantaged backgrounds tend to have more friends who plan to enroll in four-year colleges.

With respect to differential benefits of SES, in the overall college enrollment sample, Model A2 and Model A3 show that while SES is positively associated with peer influence for both whites and Asians, the magnitude of SES is statistically significantly smaller for Asians than whites based on Wald test. In the four-year college enrollment sample, Model B2 and B3 indicate that SES is only positively associated with peer influence for whites, and is no longer associated with peer influence for Asians. The differences are statistically significant. Taken together, there is a weaker association between SES and peer influence among Asians than whites. Asians, on average, not only are more likely to have more college-going friends, but also tend to do so across family SES backgrounds relative to their white counterparts.

Table 6. Predicting Peer Influence by Race and SES

	Overall college sample			Four-year college sample		
	Whole sample Model A1	White Model A2	Asian Model A3	Whole sample Model B1	White Model B2	Asian Model B3
Asian	0.21**	---	---	0.25***	---	---
	(0.06)	---	---	(0.07)	---	---
SES	0.23***	0.27***	0.07*	0.22***	0.26***	0.06
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.04)
N	8,590	7,340	1,250	6,660	5,720	9,40

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Peer Influence as an Explanation for Asian-White Differences

Preceding results have indicated that Asians tend to have a higher likelihood of enrollment in college and more college-going friends across family SES backgrounds than whites, and that peer influence is positively associated with college enrollment. These patterns suggest that peer influence might be able to explain Asian-white difference in the association between SES and college enrollment. Tables 4 and 5 formally assess this proposition by presenting mediation analyses on overall college enrollment and four-year college enrollment, respectively, using the method outlined in the Data and Methods section.

The coefficients of SES in Models 1 in both Tables 4 and 5 represent the total effects of SES on college enrollment for whites and Asians, respectively. Models 2 in both tables only consider one mediator, that is, the focal mediator peer influence. A comparison of the coefficients of peer influence in these tables suggests that peer influence is a more important factor for college enrollment for whites relative to Asians. In Models 2, the coefficients of SES represent the direct effects of SES on college enrollment for whites and Asians, respectively. Based on equation (3), the share of the difference in the total effect of SES on overall college enrollment that is attributable to differential mediation of peer influence is about 22 percent.[4] The share of the difference in the total effect of SES on four-year college enrollment that is attributable to differential mediation of peer influence is about 27 percent. Both of the mediations are statistically significant. Thus, peer influence indeed helps to account for a large portion of the limited role of family SES on college enrollment for Asians relative to whites.

Prior studies (e.g., Fishman 2020; Liu and Xie 2016) have indicated that students' and parents' educational expectations partially contribute to explaining the Asian-white difference in the association between family background and educational outcomes such as high school math test scores and highest years of education completed. I thus examine the role of expectations in explaining the Asian-white difference in the association between family SES and college enrollment. Models 3 in Tables 4 and 5 present results with students' and parents' educational expectations as mediators. A comparison of coefficients of educational expectations suggests that the role of educational expectations is similar in college enrollment for whites and Asians. The coefficients of SES in Models 3 represent indirect effects of SES on college enrollment when educational expectations are mediators. Based on equation (3), the share of the difference in the total effect of SES on overall college enrollment that is attributable to differential mediation of educational expectations is about 9 percent. The share of the difference in the total effect of SES on four-year college enrollment that is attributable to differential mediation of peer influence is

[4] Since all tables present numerical values rounded to two decimal places, the calculation of mediation does not use those numbers but numbers directly from equations in Stata without rounding for accuracy.

about 8 percent. Both mediations are statistically significant. Thus, students' and parents' educational expectations also mediate a portion of weaker association between SES and college enrollment for Asians relative to whites.

The study further presents results including both peer influence and students' and parents' educational expectations as mediators shown in Models 4 in Tables 4 and 5. Following equation (3), the share of the difference in the total effect of SES on overall college enrollment that is attributable to differential mediation of peer influence and educational expectations is about 27 percent. The share of the difference in the total effect of SES on four-year college enrollment that is attributable to differential mediation of peer influence and educational expectations is about 31 percent. The results imply that peer influence has a much stronger explanatory power in mediating the Asian-white difference in the association between SES and college enrollment compared with educational expectations. In sum, the results show that Asians are more likely to enroll in colleges regardless of family SES than whites, and peer influence, and, to a lesser extent, educational expectations contribute to explaining the relatively weaker association between SES and college enrollment for Asians relative to their whites counterparts.

Sensitivity Analysis I: Considering the Influence of the Immigration Generation Status

Prior literature argues that immigrants as a selective group usually have strong optimism towards the role of education in helping them and their offspring achieve upward social mobility (Kao and Tienda 1995; Sue and Okazaki 1990; Zhou 1997). This optimism may motivate them to overcome barriers and achieve better educational outcomes. They may also transmit their optimism to their children, equipping them with higher educational motivations and strategies to achieve better educational outcomes, which may be the case regardless of socioeconomic backgrounds (Goyette and Xie 1999; Liu and Xie 2016; Xie and Goyette 2003).

Since most of Asians in the current sample are 1.5-2.0 generation (about 88 percent of the current Asian sample) while most of whites in the current sample are 2.5+ generation (about 97 percent of the current white sample), which is consistent with previous studies focusing on similar cohorts (Kao and Thompson 2003; Zhou 1997), the immigration generation status might be a factor driving the patterns presented above. Although the preceding analyses have controlled for the immigration generational status, they have not considered the interaction between race/ethnicity and generational status as well as an interaction with SES. Table A1 in Appendix A shows that both 1.5-2.0 generation and 2.5+ generation Asians are more likely to attend colleges, both overall and four-year colleges, compared with their 2.5+ generation white counterparts, net of family SES, and a host of other predictors.

Models 1 in Tables A2 and A3 presents associations between SES and college enrollment for each race-generation group. As can be seen in these tables, SES is not associated with college enrollment for both generations of Asians but is positively associated with 2.5+ generation whites. A comparison of coefficients of SES in Models 1 in Table A2 suggests that the associations between SES and overall college enrollment are similar for both generations of Asians, which are weaker than that for 2.5+ generation whites. Wald tests show that only the difference in the associations between 1.5-2.0 generation Asians and 2.5+ generation whites are statistically significant. The lack of significance between 2.5+ generation Asians and 2.5+ generation whites may be driven by small sample size of 2.5+ generation Asians (around 100).

A comparison of coefficients of SES in Models 1 in Table A3 shows that the coefficient of SES for 2.5+ generation Asians is closer to that of 2.5+ generation whites relative to that for

1.5-2.0 generation Asians. Wald tests indicate that only the difference in the associations between 1.5-2.0 generation Asians and 2.5+ generation whites are statistically significant. The lack of significance in the difference between 2.5+ generation Asians and 2.5+ generation whites might be driven by the small sample size of 2.5+ generation of Asians in the four-year college sample (about 80) or might imply that SES plays a similar role in predicting four-year college enrollment for both Asians and whites who are more than two generations removed from migration.

Tables A2 and A3 in Appendix A report the mediation analyses results for how the difference in the association between SES and college enrollment across race-generation groups can be explained in terms of the difference in the extent to which this association is mediated by peer influence. Calculations based on equation (3) show that about 28 percent of the difference in the total effect of SES on overall college enrollment, and about 40 percent on four-year college enrollment between 2.5+ generation Asians and 2.5+ generation whites are attributable to differential mediation of peer influence. About 18 percent of the difference in the total effect of SES on overall college enrollment, and about 22 percent on four-year college enrollment between 1.5-2.0 generation Asians and 2.5+ generation whites are attributable to differential mediation of peer influence. However, only mediations between 1.5-2.0 generation Asians and 2.5+ generation whites are statistically significant.

Mediation for 2.5+ generation Asians is not statistically significant which may be because the association between socioeconomic status and peer influence is similar for 2.5+ generation Asians relative to whites. The lack of statistical significance may reflect the small sample size for 2.5+ generation Asians (about 100 in the overall college sample and 80 in the four-year college sample). Thus, while both generations of Asians are more likely to attend college than whites and SES plays a less important role in predicting overall college enrollment for both generations of Asians, the role of SES in predicting four-year college enrollment seems similar between 2.5+ generation Asians and whites and peer influence does not contribute to explaining interaction between 2.5+ generation Asians and SES. These results show that socioeconomic status plays a limited role in explaining college attendance for all Asians, regardless of generational status. However, the importance of peers in mediating the relationship between SES and race reported in preceding analyses is likely driven by 1.5-2.0 generation Asians.

Sensitivity Analysis II: Considering Heterogeneity among Asian American Subgroups

While it is valuable to examine Asian Americans as a single racial group for average tendencies in social stratification processes since Asian Americans share many similarities across ethnic subgroups (Goyette and Xie 1999; Kao 1995; Liu and Xie 2016; Sakamoto et al. 2009; Xie and Goyette 2003), previous research also notes the importance of exploring differences across Asian American ethnic subgroups (Feliciano and Lanuza 2017; Fishman 2020; Goyette and Xie 1999; Kao 1995; Kao and Thompson 2003; Sakamoto et al. 2009). Asian American racial category is composed of twenty-four ethnic groups with different socioeconomic backgrounds (Lee et al. 2018), among which, Chinese, Indians, Filipinos, Vietnamese, and Koreans account for more than 80 percent of the U.S. Asian population (Tran, Lee, and Huang 2019). Given the heterogeneity, this study explores if the patterns presented above apply to all Asian subgroups. ELS data allow for disaggregating Asian Americans into the following subgroups: Chinese, Filipino, Japanese, Korean, Southeast Asian (such as Vietnamese), and South Asian (such as Indian).

Table A3 in Appendix A shows that nearly all Asian subgroups are more likely to enroll in college than their white peers, including Chinese, Korean, Southeast Asian, and South Asian, which is consistent with prior findings that these four subgroups are more likely to have higher years of education completed than their white peers (Fishman 2020; Kao 1995).

Models 1 in Tables A5 and A6 in Appendix A present associations between SES and college enrollment for each racial and ethnic group. Table A5 reports results for overall college enrollment. SES is positively associated with overall college enrollment for whites; however, SES is not associated with overall college enrollment for all Asian subgroups. A comparison of these coefficients of SES suggests that all the associations between SES and overall college enrollment for Asian subgroups are similar, and are smaller than that for whites. Wald tests show that the differences are statistically significant for nearly all Asian subgroups except Filipino and Japanese. The lack of significance for Filipino and Japanese might be driven by their small sample sizes (Filipino about 140 and Japanese about 60). This indicates that in general Asian subgroups have weaker associations between SES and overall college enrollment than their white counterparts.

Table A6 reports results for four-year college enrollment. Similarly, SES only plays a statistically significantly positive role in four-year college enrollment for whites but not for any Asian subgroups. A comparison of these coefficients of SES suggests that all the associations between SES and four-year college enrollment for Asian ethnic groups are smaller than that for whites. Wald tests show that the differences are statistically significant for nearly all Asian subgroups except Filipino, Japanese, and Korean. Part of the reason might be the small sample sizes of these subgroups in the four-year college sample (about 100 Filipino, 50 Japanese, 170 Korean). For Filipinos, since the coefficient of SES is closer to that of whites, it is thus also possible that Filipinos may have similar association between SES and four-year college enrollment relative to whites. Thus, in general, Asian subgroups tend to have weaker associations between SES and overall college enrollment.

Tables A4 and A6 in Appendix A examine whether peer influence mediates the interaction between Asian subgroups and SES. Table A5 reports relevant results for overall college enrollment. Based on equation (3), peer influence explains about 21 percent of the weaker association between SES and overall college enrollment for Chinese relative to whites, 37 percent for Filipinos, 30 percent for Japanese, 15 percent for Korean, 19 percent for Southeast Asians, and 27 percent for South Asians. However, only mediations for Chinse and South Asians are statistically significant.

Table A6 reports relevant results for four-year college enrollment. Based on equation (3), peer influence explains about 33 percent of the weaker association between SES and four-year college enrollment for Chinese relative to whites, 23 percent for Korean, 20 percent for Southeast Asians, and 31 percent for South Asians. However, only mediations for Chinese, Southeast Asians, and South Asians are statistically significant. Notably, peer influence barely plays a mediating role for Japanese. Part of the reason may be that the association between SES and peer influence for Japanese is more like whites, who have a positive association between SES and peer influence. Differential mediation of peer influence accounts for more than 100 percent in the difference between SES and four-year college enrollment for Filipino, which may be driven by larger mediation effects of peer influence for whites than Filipinos. Thus, the weaker association between SES and overall college enrollment relative to whites applies to all Asian subgroups, and peer influence contributes to explaining the weaker association for all Asian subgroups except Filipinos, Japanese and Koreans.

Sensitivity Analysis III: Comparison with Other Ethnoracial Groups

The preceding sections mainly compare Asian Americans with whites, which raises the question of whether Asian Americans are indeed unique or if the observed patterns are generalizable to other racial/ethnic minorities such as Black and Latinx students. This section considers Asian, white, Black, and Latinx racial/ethnic groups, with the Latinx category disaggregated into Mexican and other Latinx students following the practice of prior studies (Feliciano and Lanuza 2017; Fishman 2020). Mexicans are the dominant Latinx ethnic group (Kao and Thompson 2003), and account for about two thirds of the Latinx students in the current sample.

Table A4 confirms previous results that Blacks and Latinxs tend to be disadvantaged in college enrollment relative to whites (Kao and Thompson 2003). Models 1 in Tables A5 and A6 show that Blacks and Mexicans have similar associations between SES and college enrollment; however, other Latinx students show patterns similar to Asians, who have a weaker association between SES and college enrollment. Tables A5 and A6 also indicate that peer influence only helps explain the association between SES and four-year college enrollment for other Latinx students relative to whites. Mediations for Blacks and Mexicans are not statistically significant. Thus, although the patterns observed for Asians are not able to generalize to Blacks and Mexicans, the patterns could possibly apply to other Latinx groups. Future research is needed to explore this further by for example disaggregating subgroups (e.g., Cuban, Dominican, Puerto Rican, Central American) that are currently subsumed in the "other Latinx" category.

CONCLUSION

While ample literature has shown that family socioeconomic status is positively associated with educational outcomes (e.g., Brand and Xie 2010; Lawrence and Breen 2016; Pfeffer and Hertel 2015; Reardon 2011; Roksa 2012; Roksa et al. 2007), several recent studies have suggested that this may not be the case for Asian Americans, whose family socioeconomic status may not predict their educational outcomes (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016). This literature, however, has rarely examined factors that may explain differential patterns for Asian Americans. I propose that peers, in addition to educational expectations (e.g., (Fishman 2020; Liu and Xie 2016), may play an important role in understanding the limited role of socioeconomic status for Asian Americans. I evaluate that proposition in the context of college enrollment, given the central role of college education for a host of personal and social outcomes (Hout 2012; Stevens, Armstrong, and Arum 2008).

Based on a nationally representative sample from the Education Longitudinal Study (ELS) of 2002, the results indicate that the association between family socioeconomic status and college enrollment among Asian Americans is relatively weak compared with whites, as well as other racial/ethnic minority groups. More specifically, family socioeconomic status does not predict college enrollment for Asian Americans. This pattern in general holds for different generations of Asians and across Asian ethnic subgroups. This pattern is mostly unique to Asians and does not apply to other racial/ethnic minority groups such as Blacks and Mexican Americans.

Moreover, the results show that peer influence contributes to explaining a substantial portion of the relatively weaker association between family socioeconomic status and college enrollment for Asian Americans relative to whites. Peer influence helps to explain about 20% of the Asian-white difference in the association between family socioeconomic status and overall college enrollment, and about 30% for four-year college enrollment. This holds, net of students' and parents' educational expectations, which have been proposed as key mediators in prior studies (e.g., Fishman 2020; Liu and Xie 2016). Indeed, for the outcomes examined in this study (college enrollment in general and four-year institutions in particular), peer influence emerges as a key mechanism explaining the differential role of socioeconomic status in educational success for Asian students while educational expectations play a relatively smaller mediating role.

These findings contribute to the small body of emerging literature showing that the association between socioeconomic background and educational outcomes is not the same for all racial/ethnic groups, in particular that the association is weak for Asian American students. Fishman (2020) reported a weaker association between SES and educational attainment for Asian students, and Liu and Xie (2016) found the same with respect to math test scores. The present study shows that for access to higher education, SES is not only a weaker predictor for Asians than whites, but SES does not predict college enrollment for Asian students at all. This is an important finding given extensive recent conversations in both academic and policy circles about the role of family background in predicting college access (e.g., Fain 2019; Jaschik 2019; Jump 2019).

Moreover, the findings highlight the role of peer influence in understanding social stratification processes across racial/ethnic groups. Although peers play a central role in the elaborated version of the status attainment model (Duncan et al. 1968; Haller and Portes 1973; Sewell et al. 1969), recent stratification literature has rarely examind how peers mediate status attainment processes. Presented findings highlight the central role of peers by showing not only that peers are related to educational outcomes but they account for differential patterns across racial/ethnic groups. The results indicate that family socioeconomic status is weakly associated with college enrollment for Asian Americans because they tend to have friends with high college-going orientations regardless of family socioeconomic status compared with whites and other racial/ethnic minorities. Thus, peers may be able to help ameliorate socioeconomic inequality for certain racial/ethnic groups if they in general have a peer environment with positive educational attitudes and behaviors regardless of socioeconomic status.

Asian Americans' beneficial peer environment may be due to a combination of structural and cultural factors. Asians tend to have a narrower framing of educational success regardless of family socioeconomic status (Lee and Zhou 2015). This narrower frame of educational success may be a result of them placing a high value on education combined with social barriers presented for immigrants in a host society. Facing discrimination in labor markets, Asians with educationally oriented cultural values and immigrant optimism may strategically rely on education which has more objective evaluation standards for upward social mobility (Dhingra 2018; Lee and Zhou 2015; Louie 2004; Xie and Goyette 2003). Moreover, these values and strategies may be enhanced by the model minority stereotype that is presumed to hold for Asians regardless of family socioeconomic background (Jiménez and Horowitz 2013; Kao 1995; Lee and Zhou 2015; Liu and Xie 2016). Asian Americans feel compelled to conform to the stereotype (Lee and Zhou 2015; Ninh 2021), which not only enhances an academically oriented peer environment but also reinforces the stereotype.

While the narrower frame of educational success and corresponding model minority stereotype may help Asian Americans build an academically oriented peer environment across socioeconomic backgrounds, they also have negative consequences. For example, Asians who do not conform to the narrow frame of educational success or model minority stereotype tend to see themselves as failures (Lee and Zhou 2015) or even commit crimes by pretending to comply with these (Ninh 2021). Even those who conform to these expectations may suffer from social and emotional problems such as low self-esteem and self-efficacy (Massey et al. 2003). Future research is needed to explore other ways to promote a beneficial peer environment, without the negative consequences.

This study also extends prior literature which has often focused on educational expectations as an explanation for variation in outcomes across different racial/ethnic groups, including Asian students (Fishman 2020; Liu and Xie 2016). Presented results indicate that parents' and students' educational expectations contribute to explaining a small portion (about 10%) of the weaker association between family socioeconomic status and college enrollment. Part of the reason may be that all racial/ethnic groups tend to hold high educational expectations across socioeconomic backgrounds (Goyette and Xie 1999; Hauser and Anderson 1991; Kao and Thompson 2003; Kao and Tienda 1998), reflecting the college for all norm and decoupling between family background and educational expectations (Goyette 2008; Rosenbaum 2004). Moreover, educational expectations may be simply aspirational and not related to specific behaviors, and thus may not always translate into educational success (Hanson 1994; Schneider and Stevenson 2000). It is also possible that peer influence may be particularly important during adolescence such that peers may play a more important role in influencing individuals' educational outcomes during this time (Corsaro and Eder 1990; Kao 2001; McPherson et al. 2001) and/or that college going is particularly responsive to peer influences.

Presented analyses do not fully explain the limited role of family socioeconomic status in Asian Americans' college enrollment, suggesting that other factors may play a role. Some studies have suggested that individuals in Asian ethnic communities often share information about school choices and provide educational resources such as supplemental education. This information or educational resources may also be accessible to those from less socioeconomically advantaged backgrounds (Lee and Zhou 2015). Thus, ethnic community resources may contribute to explaining why Asian Americans enroll in college regardless of family socioeconomic backgrounds. In addition, previous literature explaining Asian Americans' educational advantage considers a series factors such as parental educational investment, parenting practices, and students' work ethic (Hsin and Xie 2014; Sun 1998). Future research is needed to investigate whether these factors may also help explain the weak association between family socioeconomic status and educational outcomes for Asian Americans.

Overall, the findings of this study reveal the importance of examining how social stratification patterns vary across racial/ethnic groups and in particular how they may differ for Asian Americans. While Asian Americans are one of the fastest-growing racial/ethnic groups in the U.S. in recent years (Lee et al. 2018), they have received limited attention in mainstream social stratification literature compared with other racial/ethnic minority groups (Lee and Kye 2016; Lee et al. 2018; Sakamoto et al. 2009). This study shows that their unique experiences may offer novel insights into social stratification processes, and additional research is needed to further explore the specific mechanisms producing these unique patterns.

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APPENDIX A

Table A1. Predicting College Enrollment by Race-Generational Status and SES

	Overall college enrollment		Four-year college enrollment	
	Model A1	Model A2	Model B1	Model B2
White 1.5-2.0	0.06*	0.06	0.06	0.03
	(0.03)	(0.03)	(0.04)	(0.04)
Asian 1.5-2.0	0.06***	0.09***	0.07**	0.08***
	(0.02)	(0.02)	(0.02)	(0.02)
Asian 2.5+	0.09**	0.10**	0.11*	0.07
	(0.03)	(0.03)	(0.05)	(0.04)
SES		0.08***		0.09***
		(0.01)		(0.01)
Controls	No	Yes	No	Yes
N	7,490	7,490	5,810	5,810

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.

Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.

Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A2. Predicting Overall College Enrollment, Separated by Race and Generational Status

	Whites 2.5+		Whites 1.5-2.0		Asian 2.5+		Asian 1.5-2.0	
	Model A1	Model A2	Model B1	Model B2	Model C1	Model C2	Model D1	Model D2
SES	0.10***	0.08***	0.02	0.02	0.01	0.02	0.01	0.01
	(0.01)	(0.01)	(0.03)	(0.03)	(0.07)	(0.07)	(0.01)	(0.02)
Peer influence		0.07***		0.05		-0.03		0.02
		(0.01)		(0.03)		(0.05)		(0.01)
N	6,350	6,350	170	170	110	110	850	850

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A3. Predicting Four-Year College Enrollment, Separated by Race and Generational Status

	Whites 2.5+		Whites 1.5-2.0		Asian 2.5+		Asian 1.5-2.0	
	Model A1	Model A2	Model B1	Model B2	Model C1	Model C2	Model D1	Model D2
SES	0.11***	0.08***	0.05	0.05	0.08	0.08	0.00	0.00
	(0.01)	(0.01)	(0.04)	(0.04)	(0.09)	(0.08)	(0.02)	(0.02)
Peer influence		0.10***		0.08		0.00		0.05**
		(0.01)		(0.04)		(0.05)		(0.02)
N	4,960	4,960	120	120	80	80	650	650

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A4. Predicting College Enrollment by Race/Ethnicity and Family SES

	Overall college enrollment		Four-year college enrollment	
	Model A1	Model A2	Model B1	Model B2
Race/Ethnicity (ref: white)				
Asian subgroups				
Chinese	0.14***	0.07**	0.18***	0.09***
	(0.02)	(0.03)	(0.02)	(0.03)
Filipino	0.04	0.02	0.03	-0.01
	(0.04)	(0.04)	(0.05)	(0.05)
Japanese	0.10	0.03	0.13	0.03
	(0.05)	(0.05)	(0.07)	(0.05)
Korean	0.09***	0.03	0.12***	0.06*
	(0.02)	(0.03)	(0.03)	(0.03)
Southeast Asian	-0.02	0.09**	-0.05	0.10**
	(0.03)	(0.03)	(0.04)	(0.03)
South Asian	0.13***	0.09**	0.16***	0.09**
	(0.02)	(0.03)	(0.03)	(0.03)
Other races/ethnicities				
Black	-0.13***	0.09***	-0.17***	0.13***
	(0.02)	(0.01)	(0.02)	(0.02)
Mexican	-0.19***	-0.01	-0.31***	-0.02
	(0.02)	(0.02)	(0.03)	(0.02)
Other Latinx	-0.13***	-0.01	-0.17***	0.00
	(0.02)	(0.02)	(0.03)	(0.02)
SES		0.08***		0.09***
		(0.01)		(0.01)
Controls	No	Yes	No	Yes
N	11,680	11,680	8,980	8,980

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A5. Predicting Overall College Enrollment, Separated by Race/Ethnicity

	White		Chinese		Filipino		Japanese		Korean	
	Model A1	Model A2	Model B1	Model B2	Model C1	Model C2	Model D1	Model D2	Model E1	Model E2
SES	0.10***	0.08***	0.01	0.01	0.04	0.04	-0.05	-0.02	0.02	0.02
	(0.01)	(0.01)	(0.02)	(0.02)	(0.06)	(0.06)	(0.09)	(0.10)	(0.03)	(0.03)
Peer influence		0.07***		0.03		0.01		-0.05		0.04
		(0.01)		(0.02)		(0.04)		(0.08)		(0.03)
N	7,340	7,340	310	310	140	140	60	60	210	210

	Southeast Asian		South Asian		Black		Mexican		Other Latinx	
	Model F1	Model F2	Model G1	Model G2	Model H1	Model H2	Model I1	Model I2	Model J1	Model J2
SES	0.02	0.01	0.02	0.02	0.07***	0.06***	0.05*	0.04	0.04	0.03
	(0.04)	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Peer influence		0.04		-0.04		0.06***		0.06***		0.05*
		(0.02)		(0.03)		(0.01)		(0.01)		(0.02)
N	340	340	200	200	1,520	1,520	1,020	1,020	550	550

Source: U.S. Department of Education, National Center for Education Statistics,
Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A6. Predicting Four-Year College Enrollment, Separated by Race/Ethnicity

	White		Chinese		Filipino		Japanese		Korean	
	Model A1	Model A2	Model B1	Model B2	Model C1	Model C2	Model D1	Model D2	Model E1	Model E2
SES	0.11***	0.08***	0.02	0.02	0.09	0.09	0.00	-0.03	0.05	0.03
	(0.01)	(0.01)	(0.03)	(0.03)	(0.07)	(0.07)	(0.11)	(0.12)	(0.03)	(0.04)
Peer influence		0.11***		0.08*		0.03		0.05		0.05
		(0.01)		(0.03)		(0.06)		(0.07)		(0.04)
N	5,720	5,720	240	240	100	100	50	50	170	170

	Southeast Asian		South Asian		Black		Mexican		Other Latinx	
	Model F1	Model F2	Model G1	Model G2	Model H1	Model H2	Model I1	Model I2	Model J1	Model J2
SES	-0.01	-0.01	0.02	0.02	0.10***	0.08***	0.07**	0.05	0.04	0.03
	(0.05)	(0.05)	(0.05)	(0.05)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
Peer influence		0.06*		-0.01		0.08***		0.08***		0.05*
		(0.03)		(0.04)		(0.01)		(0.01)		(0.02)
N	250	250	150	150	1,200	1,200	710	710	420	420

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include gender, family structure, sibling, generation status, high school GPA, high school math and English test scores, high school sector, urbanicity, region, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

CHAPTER 3

WHO BENEFITS FROM CONCERTED CULTIVATION? UNDERSTANDING ASIAN AMERICANS' RELATIVE ADVANTAGE IN COLLEGE ENROLLMENT

Ample literature has shown that Asian Americans have more desirable educational outcomes, including access to higher education, compared with whites and other racial and ethnic minority groups in the U.S. (see reviews in, Kao and Thompson 2003; Sakamoto et al. 2009).[1] While multiple factors may contribute to understanding Asians' educational advantage (Hsin and Xie 2014; Kao 1995; Lee and Zhou 2015; Liu and Xie 2016; Sun 1998), parenting is one that has received national attention (e.g., "Tiger Mother", Chua 2011). Very few studies, however, have considered the role of parenting in understanding Asians' educational advantage, and the existing literature presents mixed findings (Bodovski and Durham 2010; Gibbs et al. 2017; Kao 1995; Sun 1998, 2011). Moreover, none of the prior studies examine the role of parenting in understanding transition to higher education. Higher education is important for one's social mobility as it is associated with a range of positive life outcomes such as career, social network, and marriage (Hout 2012; Stevens, Armstrong, and Arum 2008).

Prior studies examining the role of parenting in contributing to Asian education advantage also do not consider potential interactions with socioeconomic background. This is a crucial omission since several recent studies indicate that Asian' educational advantage relative to whites holds across socioeconomic backgrounds (Fishman 2020; Lee and Zhou 2015; Liu and

[1] This study only focuses on Asian-white comparison since ample literature has shown that whites are advantaged in access to higher education relative to other racial and ethnic minority groups such as Blacks and Latinxs (e.g., Kao and Thompson 2003; Massey et al. 2003; Roksa 2012; Roksa et al. 2007).

Xie 2016; Wang 2022). Notably, Lee and Zhou (2015) proposed that Asian Americans tend to be advantaged in education because they adopt similar parenting practices across family socioeconomic backgrounds that are akin to the popular middle-class parenting style of concerted cultivation (Lareau 2011). If Asians from less socioeconomically advantaged backgrounds adopt concerted cultivation parenting practices as their more advantaged counterparts do, parenting may be a particularly salient factor in understanding Asians' advantage for the less advantaged group. Thus, this study examines to what extent parenting may play a role in understanding Asians' advantage in access to higher education and whether and how family socioeconomic background may moderate the role of parenting in understanding Asians' advantage.

Analyzing nationally representative data, the study indicates that parenting practices associated with concerted cultivation do not contribute to explaining Asians' advantage in college enrollment relative to their white counterparts. Although Asians are advantaged in college enrollment, they do not have more exposure to nor do they benefit more from concerted cultivation compared with whites. Crucially, these overall patterns hide important differences across socioeconomic backgrounds. Asians from less socioeconomically advantaged backgrounds are advantaged in college enrollment but neither have greater access to nor benefit more from concerted cultivation. Asians from more advantaged backgrounds, however, are similar to their white counterparts in terms of college enrollment and benefit similarly from concerted cultivation parenting practices. These findings contribute to the research examining Asian educational advantage by considering parenting practices, which have received scant attention in the prior literature. Moreover, they illuminate the crucial role that socioeconomic background plays in shaping Asian-white differences in college enrollment as well as the benefits of concerted cultivation.

LITERATURE REVIEW

Parenting and Educational Success

Parenting plays an important role in understanding students' educational success as it reflects a form of cultural capital that students may benefit from in their educational journey. In his seminal work, Bourdieu (1973; Bourdieu and Passeron 1977) argued that socioeconomically advantaged students acquire a natural familiarity with the dominant culture, such as cultural knowledge and linguistic competencies, from their family upbringing. Educational institutions usually reward the dominant culture and, at the same time, treat the dominant cultural knowledge as a given and thus do not teach it. Socioeconomically advantaged students can smoothly transmit their cultural capital to school settings, which leads to better academic performance and completing higher levels of education.

Early conceptualizations tended to interpret cultural capital as institutionalized high-status cultural signals aiming for social exclusion (Lamont and Lareau 1988). More recent work conceptualizes cultural capital as a capacity of socioeconomically advantaged class to respond to the standards of evaluation of educational institutions (Lareau and Weininger 2003). Lareau (2011) argued that socioeconomically advantaged families tend to deliberately cultivate their children's cultural capital to adjust for schools' requirements by practicing a parenting style termed concerted cultivation, referring to developing students' talents through organized activities and extensive reasoning, which is what schools expect in evaluating students' performance. In contrast, less socioeconomically advantaged families tend to adopt a parenting style termed natural growth, meaning that parents see child development as a spontaneous process. A number of studies in K-12 education have shown that students who are raised by the concerted cultivation parenting practices tend to have better academic performance (Bodovski and Farkas 2008; Cheadle 2008; Potter and Roksa 2013).

Parenting continues to play an important role in transition to higher education. Since the process of transition to higher education is complex, students need adequate knowledge, information, and guidance to successfully navigate through it. Prior studies have shown that students who have more such information and knowledge are more likely to enroll in college (Kim and Schneider 2005; Plank and Jordan 2001; Roderick, Coca, and Nagaoka 2011). Drawing on their own experiences, parents from more socioeconomically advantaged backgrounds actively engage in their children's college application processes, such as providing information, seeking out resources, visiting and selecting institutions. However, less advantaged parents usually lack such knowledge and resources and leave their children to navigate the transition processes alone (Lareau 2011; Lareau and Weininger 2008; McDonough 1997; Radford 2013). Prior studies have indicated that concerted cultivation parenting practices such as learning resources at home, parent-child discussion, and parental school involvement are conducive to college enrollment (Perna and Titus 2005; Roksa and Deutschlander 2018; Roksa and Robinson 2017; Rowan-Kenyon, Bell, and Perna 2008).

While the literature contributes to understanding socioeconomic inequality in educational success, it rarely considers the role of parenting in understanding Asians' advantage in access to higher education. Several studies in K-12 education have considered this issue, with mixed results (Bodovski and Durham 2010; Gibbs et al. 2017; Kao 1995; Sun 1998, 2011). While Sun (1998) suggested that parenting practices, such as learning resources at home, parent-child discussion, children's extracurricular activities, etc., may help explain the gap in eighth grade math test scores between East Asians (Chinese, Japanese, and Korean) and their white counterparts, Gibbs et al. (2017) indicated that parenting practices, such as learning resources at home, parent-child interactions, enrolling children in music and organized athletic activities, could not explain the gap in preschool math skills between four-year-old Asian and white children.

Who benefits more?

In addition to the importance of parenting to facilitate student success, another important question is whether some groups of students benefit more from specific parenting practices. Bourdieu (1973) implied that more socioeconomically advantaged class would benefit more from dominant cultural capital since they have the natural familiarity with it. At the same time, DiMaggio (1982) indicated that cultural capital could facilitate mobility such that less advantaged groups may benefit similarly or even more from cultural capital since acquired cultural capital can be an extra asset for them.

Empirical literature on this question is mixed. Some studies show that more advantaged eighth graders garner larger benefits from learning resources at home and parental school involvement in terms of their academic achievement (McNeal 1999; Roscigno and Ainsworth-Darnell 1999). Children aged 6 to 14 from more advantaged families also benefit more from extracurricular activities in math test scores (Jæger 2011). However, other studies show that students from less advantaged families benefit similarly or even more from certain parenting practices. Eighth graders from less advantaged families benefit similarly from parent-child discussion in their science test scores while the less advantaged benefit more from parent-child discussion in enrollment in college (McNeal 1999; Roksa and Robinson 2017). Less advantaged children in primary and middle school also benefit more from parental school involvement in terms of their academic achievement (Domina 2005; Jæger 2011).

A few studies on Asian-white differences in K-12 education similarly reported mixed findings in terms of who benefits more from parenting that is associated with dominant cultural capital. While Kao (1995) suggested that Asian eighth graders benefited less from parenting practices, such as home learning resources, parent-child discussion, extracurricular activities, relative to their white counterparts in terms of eighth-grade course grades, Sun (1998) showed that East Asians benefited similarly from parenting practices, such as educational resources at home, parent-child discussion, children's extracurricular activities, with their white counterparts in terms of eight-grade math test scores.

Prior literature thus does not offer a compelling answer about the extent parenting practices may contribute to the Asian-white differences in educational success or differentially benefit Asian students. Moreover, none of the literature considers students' access to higher education. As growing proportions of students enter higher education (Snyder, de Brey, and Dillow 2019), and as college education garners substantial labor market returns (Hout 2012; Li, Wallace, and Hyde 2019), this is an increasingly important outcome to consider. This study aims to examine the extent to which parenting may play a role in understanding Asians' advantage in access to higher education relative to their white counterparts.

Asians' Educational Advantage across Socioeconomic Backgrounds

In addition to Asians having better educational outcomes, several recent studies also suggested that Asians' educational advantage may hold across socioeconomic backgrounds (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016; Wang 2022). For example, analyzing two nationally representative data, Fishman (2020) showed that Asians, regardless of their parental education, were more likely to obtain higher years of schooling compared with other racial and ethnic groups. Similarly, Wang (2022) indicated that Asians, no matter which family socioeconomic backgrounds they were from, were also more likely to attend college than other racial and ethnic groups.

Several recent studies have aimed to understand why Asians' educational advantage holds across family socioeconomic backgrounds (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016; Wang 2022). Lee and Zhou (2015) argued that Asians held a narrower frame of educational success such as aiming for an Ivy League degree or a perfect GPA, and this success frame was prevalent among Asian families. Lee and Zhou (2015) further argued that the success frame is associated with parenting practices. These parenting practices may be able to expose students to dominant cultural capital. For example, Asian parents, regardless of their socioeconomic backgrounds, try their best to put their children to better-resourced high schools, Honor or AP classes, and supplemental or tutoring education. The authors described how a pair of Vietnamese refugee parents who only had a four-grade education transferred their child's guardianship in order to send him to a competitive public high school.

These prior studies suggested that Asian parents, regardless of their socioeconomic backgrounds, might have similar parenting practices, which may be akin to middle-class parenting style of concerted cultivation. If less advantaged Asians also practice concerted cultivation as their more advantaged counterparts do, the role of parenting in understanding Asians' advantage relative to their white counterparts may be particularly salient for those from less socioeconomically advantaged group. Thus, this study also aims to examine to what extent socioeconomic background may moderate the role of parenting in understanding Asians' advantage in access to higher education.

DATA AND METHODS

This study uses a sample of students from the Educational Longitudinal Study (ELS2002) which was conducted by the National Center for Education Statistics (NCES). ELS2002 is a nationally representative and longitudinal survey of tenth graders in 2002, with follow ups in 2004, 2006, and 2012. The study began with 16,197 students in 2002. ELS2002 is designed to study students' transition from secondary to postsecondary education and beyond and includes rich information on their family upbringing and educational outcomes. This study specifically focuses on students' access to higher education and thus restricts the analytic sample to students who obtained a high school diploma or equivalent and have information on college enrollment information. The sample is also restricted to students who are either white or Asian, leading to an analytical sample size of 8,590 students.[2]

Variables

The dependent variable is immediate college enrollment[3], which is defined by ELS2002 as enrollment in higher education by October of high school exit year if the exit date was between January and July or by the following February if the exit date was after July. This is a binary variable with attending college coded 1.

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[2] All sample sizes in the study are rounded to the nearest ten according to the NCES restricted-use data guidelines.
[3] I have also considered immediate four-year college enrollment as a dependent variable. The results are not substantially different from what is presented herein (see Table A9 and A10 in Appendix A).

The key independent variables are race/ethnicity and parenting. In the main analysis, the study focuses on comparing the general differences between Asians and whites. Race/ethnicity is a binary variable with Asians coded 1. In the supplemental analysis, this study examines the heterogeneity among Asian Americans by considering Asian subgroups. ELS allows to disaggregate Asian Americans into six subgroups including Chinese, Filipino, Japanese, Korean, Southeast Asian such as Vietnamese, and South Asian such as Indian.

Parenting reflects key dimensions of concerted cultivation, including: home learning resources, extracurricular activities, parent-child discussion, and parental school involvement behaviors (Bodovski and Farkas 2008; Cheadle 2008; Lareau 2011). Home learning resources indicate number of the following learning resources a family has: a daily newspaper, regularly received magazine, and more than 50 books. Extracurricular activities indicate number of the following extracurricular activities that students participated: student government, academic honor society, school yearbook or newspaper, school service clubs, school academic clubs, and school hobby clubs.

Parent-child discussion is a composite measure of the frequencies of parent-child discussing the following items with their parents: selecting courses or programs at school, school activities or events of interest, things studied in class, grades, plans and preparation for ACT or SAT tests, going to college, community, national and world events, and things that are troubling students. The Cronbach's alpha for this scale is 0.86, indicating high internal consistency. Parental school involvement behaviors indicate the number of the following activities that parents involve in: belonging to the school's parent-teacher organization, attending meetings of the parent-teacher organization, taking part in the activities of the parent-teacher organization, acting as a volunteer at the school, belonging to any other organization with parents from students' school such as neighborhood or religious organizations.

This study also considers a series of control variables. It includes basic social-demographic variables: family socioeconomic status, gender (female=1), family structure (two-parent family=1), number of siblings, immigration generational status (1.5-2.0 generation=1), and geographic region including Northeast (reference), Midwest, South, and West. Family SES is a continuous measure created by ELS2002 using five equally weighted, standardized components: father's education, mother's education, family income, father's occupation, and mother's occupation. Following previous research (Feliciano and Lanuza 2017; Fishman 2020; Ramakrishnan 2004), this study considers two generations: 1.5-2.0 generation indicates children of two immigrant parents who were both born outside the US whereas 2.5+ generation indicates children who have at least one parent born in the U.S.

Moreover, this study also considers parental educational expectation, high school GPA, and high school math and English test scores as controls since these variables are important predictors of students' college enrollment. Parental educational expectation is a continuous measure, using the following coding strategies following previous research (Feliciano and Lanuza 2017; Fishman 2020): less than high school as 11 years, high school as 12 years, two-year college degree or some college as 14 years, bachelor's as 16 years, master's as 18 years, and doctorate or professional degree as 22 years.

In addition, this study also considers high school control variables as follows: high school sector (private school=1), high school urbanicity including urban (reference), suburban, and rural, high school percent of racial/ethnic minority students, and high school percent of the student body receiving free/reduced-price lunch. See Table 1 for descriptive statistics for all variables used in the study.

Table 1. Descriptive Statistics

	Whole Sample		Asian		White	
	Mean	SD	Mean	SD	Mean	SD
Dependent variable						
College entry	0.77		0.83		0.76	
Key independent variables						
Home learning resources	2.37	0.81	1.94	0.92	2.44	0.77
Extracurricular activities	1.27	1.34	1.54	1.43	1.23	1.32
Parent-child discussion	2.16	0.47	2.07	0.49	2.17	0.47
Parental school involvement	1.71	1.64	1.21	1.46	1.78	1.65
Control variables - Student						
Family SES	0.24	0.72	0.05	0.86	0.27	0.69
Female	0.52		0.52		0.53	
Two-parent family	0.70		0.72		0.69	
Number of siblings	1.39	1.13	1.66	1.54	1.35	1.06
1.5-2.0 generation	0.14		0.88		0.03	
Parental educational expectation	17.44	2.60	18.37	2.78	17.29	2.54
High school GPA	3.01	0.64	3.09	0.63	3.00	0.64
High school math & English test score	54.27	8.97	53.58	9.71	54.39	8.83
Region						
Northeast	0.20		0.19		0.20	
Midwest	0.30		0.15		0.33	
South	0.33		0.19		0.35	
West	0.17		0.47		0.12	
Control variables – High school						
Private school	0.27		0.10		0.30	
Urbanicity						
Urban	0.29		0.44		0.26	
Suburban	0.51		0.50		0.51	
Rural	0.21		0.05		0.24	
Percent racial/ethnic minority	20.12	24.27	49.90	31.11	14.97	18.53
Percent free/reduced-price lunch	19.84	20.17	26.92	22.48	18.64	19.51
N	8,590		1,250		7,340	

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: The descriptive table reports proportions for categorical measures and means and standard deviations (in parentheses) for continuous measures. The descriptive table is based on unweighted and unimputed data. Sample sizes are rounded to the nearest 10 for the use of restricted data.

Methods

This study mainly uses logistic regression since college enrollment is a binary variable. All models include school clustered robust standard errors to adjust for students clustered within schools (Arceneaux and Nickerson 2009).[4] As there are concerns with comparing coefficients across models or interpreting interaction terms in logistic regressions (Mood 2010), this study uses average marginal effects on predicted probabilities (Long and Mustillo 2018; Mize 2019).

As for missing values, there are about 40% students missing any one of the variables used in the study. More specifically, there are about 21% students missing parental school involvement, 19% missing parent-child discussion, 18% missing number of sibling, 13% missing generational status, 13% missing home learning resources, 8% extracurricular activities, 6% high school GPA, 2% high school percent racial/ethnic minority, 1% parental educational expectation, 1% high school math & English test score, and 0.4% high school percent free/reduced-price lunch. To test if the data are missing completely at random (MCAR) or missing at random (MAR), I created a missing indicator variable for each variable in the study with missing the variable coded 1 and then ran a series of logistic regressions to examine if any of the other variables can predict the missingness of each variable (Social Science Computing Cooperative, UW-Madison 2013). The results indicated that the data are missing at random (MAR). Thus, I use multiple imputation with 20 imputations and chained equations to deal with missing cases (White, Royston, and Wood 2011). I also used listwise deletion as a sensitivity analysis. The results are not substantially different from what is presented herein.

[4] Models are not weighted following previous research (e.g., Fishman 2020; Liu and Xie 2016) using the same or similar NCES data due to the small sample size of Asian Americans, particularly for specific Asian ethnic subgroups (e.g., lower than 100 for certain ethnic groups).

RESULTS

Can Parenting Explain Asian-White Differences

For parenting to be able to explain Asians' advantage in college enrollment relative to their white counterparts, Asians would need to have greater exposure to concerted cultivation parenting practices. To examine this possibility, Table 2 considers Asian-white differences in concerted cultivation parenting practices by controlling a series of control variables. Asians and whites have no differences in home learning resources, extracurricular activities, and parental school involvement behaviors. However, Asians have fewer parent-child discussions compared with whites. Thus, Asians in general are very similar in concerted cultivation parenting practices with their white counterparts, implying that parenting may not help explain Asian-white differences in college enrollment.

Table 2. OLS Regression: Asian-White Differences in Predicting Parenting Measures

	Home learning resources	Extracurricular activities	Parent-child discussion	Parental school involvement
Key independent variable				
Asian	-0.11	0.19	-0.08*	0.10
	(0.06)	(0.11)	(0.03)	(0.10)
Control variables - Student				
Family SES	0.30***	0.34***	0.12***	0.48***
	(0.01)	(0.02)	(0.01)	(0.03)
Female	0.06**	0.53***	0.12***	-0.01
	(0.02)	(0.03)	(0.01)	(0.04)
Two-parent family	0.18***	0.20***	0.07***	0.34***
	(0.02)	(0.03)	(0.01)	(0.04)
Number of siblings	-0.01	-0.00	-0.01	0.09***
	(0.01)	(0.01)	(0.01)	(0.02)
1.5-2.0 generation	-0.34***	0.30**	-0.01	-0.66***
	(0.07)	(0.11)	(0.03)	(0.09)

Table 2, continued

Parental educational expectation	0.01**	0.08***	0.02***	0.03***
	(0.00)	(0.01)	(0.00)	(0.01)
Region (ref: Northeast)				
Midwest	-0.01	-0.16**	-0.02	0.12*
	(0.03)	(0.05)	(0.02)	(0.06)
South	-0.06*	-0.04	0.04*	0.33***
	(0.03)	(0.05)	(0.02)	(0.07)
West	-0.04	-0.19**	0.02	0.16*
	(0.04)	(0.07)	(0.02)	(0.07)
Control variables – High school				
Private high school	0.04	0.32***	0.01	0.65***
	(0.03)	(0.06)	(0.02)	(0.07)
Urbanicity (ref: Urban)				
Suburban	-0.01	0.04	-0.01	-0.01
	(0.02)	(0.05)	(0.01)	(0.06)
Rural	-0.07*	0.11	-0.02	0.07
	(0.03)	(0.06)	(0.02)	(0.08)
Percent racial/ethnic minority	-0.00**	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Percent free/reduced-price lunch	0.00	0.00**	0.00	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
Constant	2.11***	-0.72***	1.61***	0.37*
	(0.07)	(0.12)	(0.05)	(0.16)
N	8,590	8,590	8,590	8,590

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table 3 predicts college enrollment. Model 1 shows that Asians are advantaged in college enrollment: even after controlling a host of predictors Asians are around 9% more likely to attend college than their white counterparts. Model 2 adds concerted cultivation measures, all of which predict college enrollment. While concerted cultivation parenting practices are associated with college enrollment, the Asian coefficients remains the same. Asian students are still approximately 9% more likely to attend college. Wald tests show that AME's for Asian-white differences between Model 1 and Model 2 are not statistically different from each other. The sensitivity analysis using KHB method (Karlson, Holm, and Breen 2012) confirms these results. Parenting practices thus do not explain the Asian-white differences in college enrollment.

Table 3. Logistic Regression Analyses Predicting College Enrollment

	Model 1A LO	Model 1B AME	Model 2A LO	Model 2B AME
Key independent variable				
Asian	0.78***	0.09***	0.83***	0.09***
	(0.22)	(0.02)	(0.23)	(0.02)
Home learning resources			0.16***	0.02***
			(0.04)	(0.01)
Extracurricular activities			0.19***	0.02***
			(0.03)	(0.00)
Parent-child discussion			0.31***	0.04***
			(0.08)	(0.01)
Parental school involvement			0.10***	0.01***
			(0.03)	(0.00)
Control variables - Student				
Family SES	0.71***	0.09***	0.57***	0.07***
	(0.06)	(0.01)	(0.06)	(0.01)
Female	0.22***	0.03***	0.13	0.02
	(0.06)	(0.01)	(0.07)	(0.01)
Two-parent family	0.39***	0.05***	0.32***	0.04***
	(0.06)	(0.01)	(0.06)	(0.01)
Number of siblings	-0.09**	-0.01**	-0.10**	-0.01**
	(0.03)	(0.00)	(0.03)	(0.00)
1.5-2.0 generation	0.14	0.02	0.21	0.03
	(0.20)	(0.02)	(0.21)	(0.03)
Parental educational expectation	0.06***	0.01***	0.05**	0.01**
	(0.01)	(0.00)	(0.01)	(0.00)
High school GPA	1.28***	0.16***	1.16***	0.14***
	(0.06)	(0.01)	(0.07)	(0.01)
High school math & English test score	0.04***	0.00***	0.03***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Region (ref: Northeast)				
Midwest	-0.16	-0.02	-0.12	-0.01
	(0.11)	(0.01)	(0.11)	(0.01)
South	-0.30**	-0.04**	-0.32**	-0.04**
	(0.11)	(0.01)	(0.12)	(0.01)

Table 3, continued

West	-0.47***	-0.06***	-0.45**	-0.06***
	(0.14)	(0.02)	(0.14)	(0.02)
Control variables – High school				
Private high school	0.83***	0.10***	0.69***	0.08***
	(0.13)	(0.01)	(0.13)	(0.01)
Urbanicity (ref: Urban)				
Suburban	0.04	0.01	0.03	0.00
	(0.09)	(0.01)	(0.09)	(0.01)
Rural	0.09	0.01	0.06	0.01
	(0.12)	(0.02)	(0.12)	(0.02)
Percent racial/ethnic minority	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Percent free/reduced-price lunch	-0.01*	-0.00**	-0.01**	-0.00**
	(0.00)	(0.00)	(0.00)	(0.00)
N	8,590	8,590	8,590	8,590

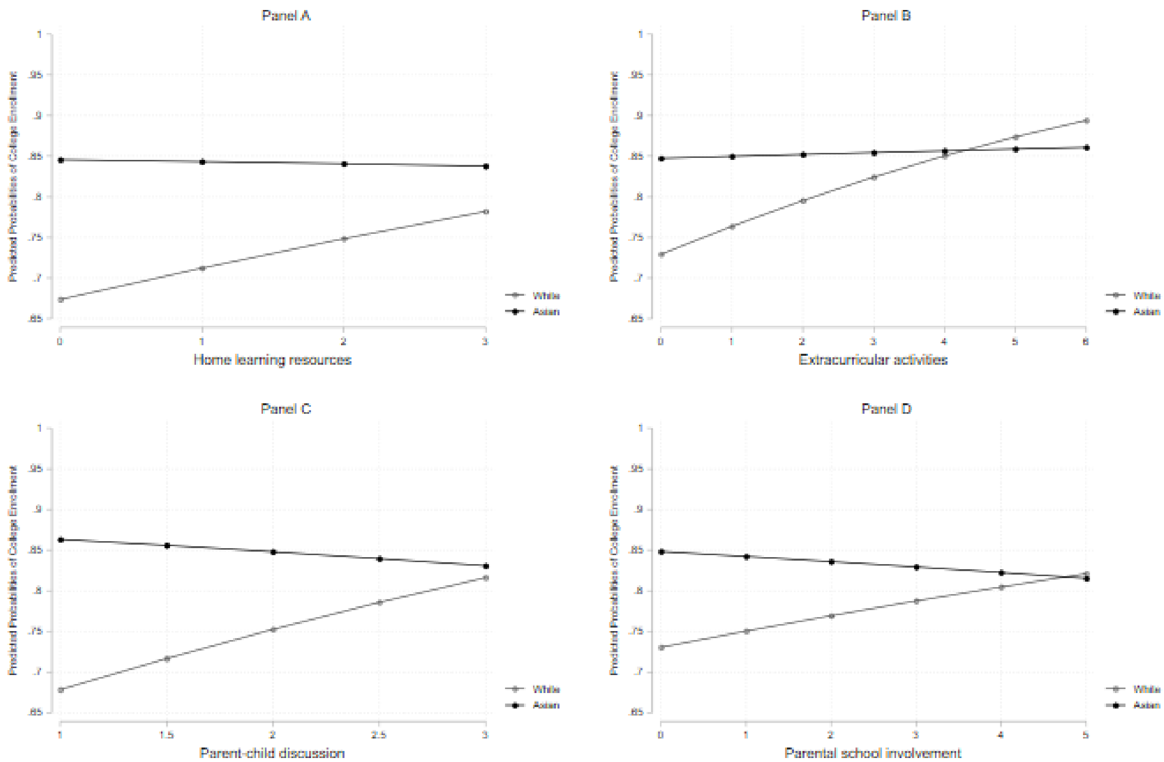
Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Who Benefits More from Concerted Cultivation?

While Asian and white students are similarly exposed to concerted cultivation parenting practices, it is possible that Asian's advantage in college enrollment is related to them benefiting more from these practices. Table A1 presents results examining if benefits of each dimension of concerted cultivation vary between Asians and whites. Since the coefficients of the interaction terms in logistic regressions do not provide any straightforward information about both the significance and magnitude of the interaction effects, I calculated average marginal effects (AME's) on predicted probabilities of college enrollment to help interpret the interaction effects (Mize 2019). I first calculated average marginal effects of each parenting measure on college enrollment for Asians and whites separately. This refers to the first difference, which indicates if parenting is significantly associated with college enrollment for each racial/ethnic group. The second difference is a Wald test of the two first differences, which indicates if Asians' AME's are statistically different from those of whites', that is, whether this interaction term is statistically significant.

The results are illustrated in Figure 1. In general, these patterns are similar across the four dimensions of concerted cultivation. Concerted cultivation parenting practices tend to be positively associated with college enrollment for whites. However, they seem not to be related to Asians' college enrollment as these trend lines are rather flat. Indeed, the average marginal effects of parenting measures (first difference) for whites are positive and significant while those for Asians could not be differentiated from zero, which means that the effect is null. Wald tests (second difference) show that the AME's of those four dimensions of concerted cultivation between Asians and whites are statistically different from each other. These results indicate that Asians do not benefit more from concerted cultivation in college enrollment relative to whites. On the contrary, they benefit less. Indeed, concerted cultivation parenting practices are not related to Asians' college enrollment, while they are related to college enrollment for whites. These results also indicate that Asians' advantage in college enrollment cannot be explained by differential benefits from concerted cultivation parenting practices.

Figure 1. Predicted Probability of College Enrollment by Race/Ethnicity and Parenting for the Whole Sample.
Source: U.S. Department of Education, National Center for Education Statistics,
Education Longitudinal Study of 2002.
Note: The figure is based on Table A1.



Variations by Family Socioeconomic Backgrounds

Previous research also suggested that Asians' educational advantage may hold across socioeconomic backgrounds (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016; Wang 2022) and that parenting practices may be similar across family socioeconomic backgrounds among Asian Americans (Lee and Zhou 2015). This raises the question of whether family socioeconomic background may be able to moderate the role of parenting in understanding Asian's educational advantage, particularly, the possible salience of parenting in understanding Asian-white differences for the less advantaged group.

Table 4 reports results regarding the association between race and college enrollment separated by family socioeconomic backgrounds. More specifically, I differentiated two socioeconomic groups by categorizing half of the sample as more socioeconomically advantaged group while the other half as less socioeconomically advantaged group considering the small sample size of Asian Americans in the whole sample. Model 1 of Panel A in Table 4 shows that Asians are more likely to attend college than their white counterparts among less socioeconomically advantaged students. More specifically, Asians are about 15 percent more likely to attend college than their white counterparts, net of a host of other predictors (Model 1B). However, Model 1 of Panel B in Table 4 shows that for more socioeconomically advantaged group, Asians do not have an advantage in college enrollment relative to their white counterparts. In addition to not being statistically significant, the Asian-white difference among more advantaged students is close to zero (2%).

Table 4. Logistic Regression Analyses Predicting College Enrollment, Separated by Family Socioeconomic Backgrounds

	Model 1A LO	Model 1B AME	Model 2A LO	Model 2B AME
Panel A: Less socioeconomically advantaged students				
Asian	0.93***	0.15***	0.99***	0.15***
	(0.25)	(0.04)	(0.26)	(0.04)
Home learning resources			0.17***	0.03***
			(0.05)	(0.01)
Extracurricular activities			0.23***	0.04***
			(0.04)	(0.01)
Parent-child discussion			0.33***	0.05***
			(0.10)	(0.02)
Parental school involvement			0.12**	0.02**
			(0.04)	(0.01)
N	4,300	4,300	4,300	4,300

Table 4, continued

Panel B: More socioeconomically advantaged students				
Asian	0.27	0.02	0.32	0.02
	(0.31)	(0.02)	(0.32)	(0.02)
Home learning resources			0.26***	0.02***
			(0.08)	(0.01)
Extracurricular activities			0.12*	0.01*
			(0.06)	(0.00)
Parent-child discussion			0.31*	0.03*
			(0.14)	(0.01)
Parental school involvement			0.10**	0.01**
			(0.04)	(0.00)
N	4,290	4,290	4,290	4,290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

The second model in Table 4 adds concerted cultivation measures. All of the concerned cultivation indicators are related to college enrollment for both more and less socioeconomically advantaged students. However, the coefficient for Asian students do not change. AME for Asian-white difference in Model 2 is not statistically different from that in Model 1, which holds for both more and less socioeconomically advantaged groups. Concerted cultivation parenting practices thus do not contribute to explaining Asian-white differences in college enrollment.

This lack of changes in coefficients across models is not surprising given lack of notable differences in parenting practices across groups. Table 5 presents results on Asian-white differences in concerted cultivation parenting practices, separately for more and less socioeconomically advantaged groups. The results indicate that Asian and white students from less socioeconomically advantaged backgrounds have similar amounts of concerted cultivation. For students from more socioeconomically advantaged backgrounds, the results are mixed depending on the measures: for home learning resources and parental school involvement, there is no difference between groups. Asians have fewer parent-child discussions than whites but participate in more extracurricular activities than their white counterparts. Overall, thus, this lack of consistent pattern implies a lack of systematic difference in parenting practices between Asians and whites.[5]

Table 5. OLS regression: Asian-White Differences in Predicting Parenting Measures, Separated by Family Socioeconomic Backgrounds

	Home learning resources	Extracurricular activities	Parent-child discussion	Parental school involvement
Less socioeconomically advantaged students				
Asian	-0.15	-0.00	-0.05	-0.05
	(0.10)	(0.14)	(0.05)	(0.15)
Controls	Yes	Yes	Yes	Yes
N	4,300	4,300	4,300	4,300
More socioeconomically advantaged students				
Asian	-0.05	0.36**	-0.11*	0.25
	(0.07)	(0.13)	(0.05)	(0.15)
Controls	Yes	Yes	Yes	Yes
N	4,290	4,290	4,290	4,290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

The final set of analyses consider interaction terms between concerted cultivation measures and race/ethnicity, separately for students from more and less socioeconomically advantaged family backgrounds (Table A2). I calculated average marginal effects (AME's) on

[5] This implies that parenting practices follow similar patterns between Asians and whites such that family SES is positively associated with parenting practices. This also in part contributes to understanding why parenting practices are not able to explain the Asian-white gap in college enrollment separately by family SES.

predicted probabilities of college enrollment to interpret the interaction effects. The results are visually illustrated in Figures 2 and 3, for less and more socioeconomically advantaged group, respectively. Figure 2 indicates that students from less socioeconomically advantaged backgrounds follow a similar pattern as the whole sample. That is, Asians benefit less from concerted cultivation. And concerted cultivation is positively associated with college enrollment for whites but is not associated with college enrollment for Asians. These Asian-white differences are statistically significant for all dimensions of concerted cultivation except for parental school involvement (which is only marginally significant at $p<0.1$). However, students from the more socioeconomically advantaged group follow a very different pattern, as indicated in Figure 3. For this group, there are no differential benefits between Asians and Whites from concerted cultivation parenting practices for college enrollment. Both Asian and white students benefit similarly from concerted cultivation parenting practices.

Thus, the overall patterns of Asian-white differences hide unique patterns observed across sociodemographic groups. Asians from less socioeconomically advantaged background have advantage in college enrollment, even though they benefit less from concerted cultivation. This is in contrast to Asians from more socioeconomically advantaged background who do not have advantage in college enrollment and benefit similarly from concerted cultivation.

Figure 2. Predicted Probability of College Enrollment by Race/Ethnicity and Parenting for the Less Socioeconomically Advantaged Group.
Source: U.S. Department of Education, National Center for Education Statistics,
Education Longitudinal Study of 2002.
Note: The figure is based on Panel A of Table A2.

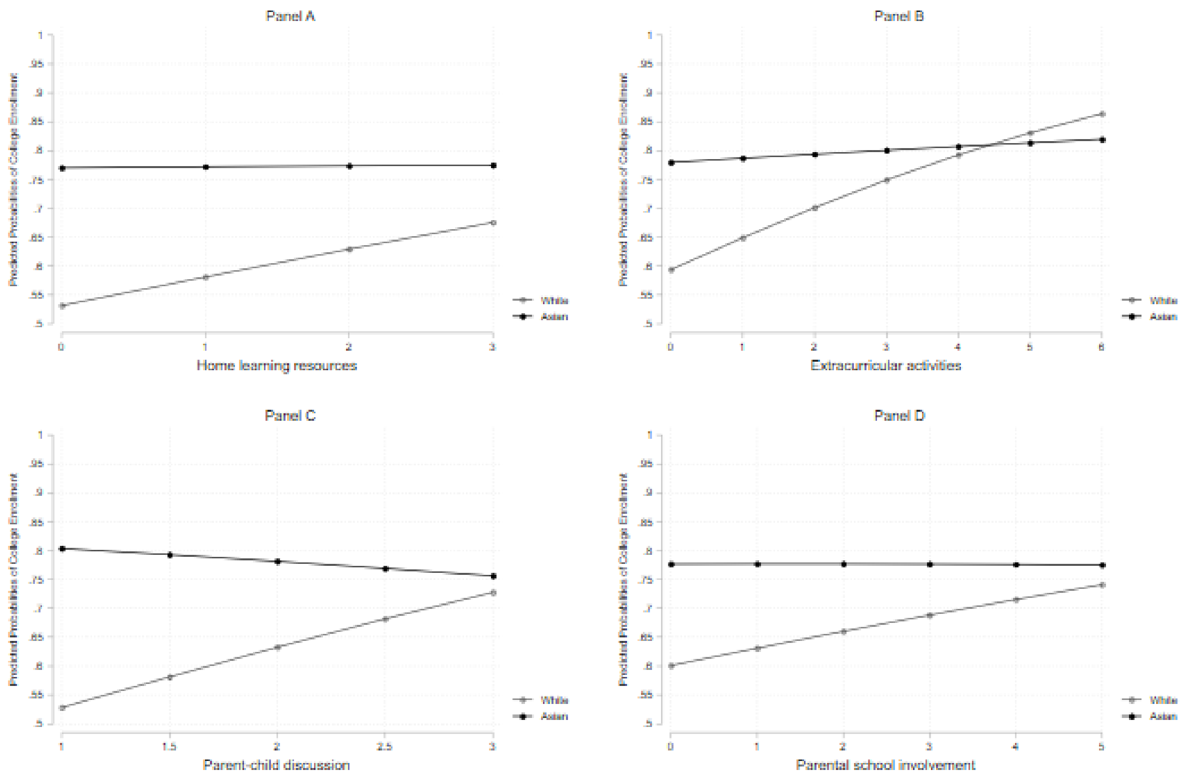
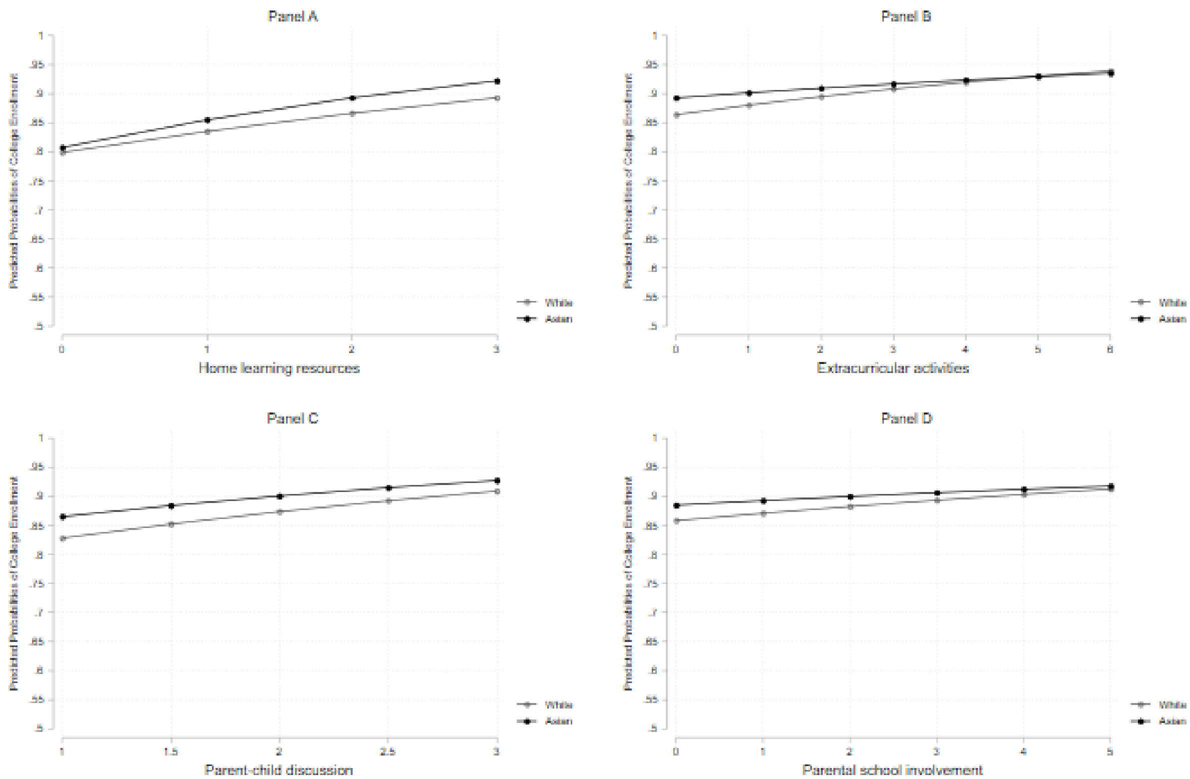


Figure 3. Predicted Probability of College Enrollment by Race/Ethnicity and Parenting for the More Socioeconomically Advantaged Group.
Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: The figure is based on Panel B of Table A2.



Supplemental Analysis: Considering Asian American Heterogeneity

While it is important to consider Asians as a single racial group and investigate the general patterns for Asians (Sakamoto et al. 2009), it should also be noted that Asians are quite heterogeneous including around twenty-four ethnic groups (Lee, Ramakrishnan, and Wong 2018), among which Chinese, Indians, Filipinos, Vietnamese, and Koreans account for more than 80 percent of the U.S. Asian population (Tran, Lee, and Huang 2019). Supplemental analysis thus examines if the general Asian patterns apply to Asian ethnic subgroups by considering the following ethnic subgroups: Chinese, Filipino, Japanese, Korean, Southeast Asian (such as Vietnamese), and South Asian (such as Indian) as distinguished by ELS2002.

Table A3 presents racial differences in college enrollment, showing that only Chinese, Southeast Asians, and South Asians have advantage in college enrollment while Filipinos, Japanese, and Koreans do not.

Table A4 examines who has more concerted cultivation parenting practices. In general, the patterns are consistent with the findings reported for an aggregated Asian category. Nearly all Asian ethnic subgroups either have similar or less concerted cultivation except for Chinese and Japanese who have more extracurricular activities than their white counterparts, although even those two groups are similar to whites on other concerted cultivation measures. There are thus no consistent differences in concerned cultivation parenting practices between whites and any Asian subgroups. And the comparison between Model 1 and Model 2 in Table A3 shows that concerted cultivation does not explain racial differences in college enrollment. In terms of who benefits more from concerted cultivation, the results in Table A5 are also consistent with those for the aggregated Asian category. That is, Asians in general do not benefit more from concerted cultivation parenting practices in college enrollment.

The final supplemental analysis examines if patterns vary across family socioeconomic backgrounds. Table A6 indicates that patterns for the less socioeconomically advantaged group are similar with those in the whole sample while those for the more socioeconomically advantaged group are not since Asians' advantage in college enrollment only exist in less socioeconomically advantaged groups. Comparison between Model 1 and Model 2 in Table A6 also shows that concerted cultivation parenting practices does not contribute to explaining Asian-white differences in college enrollment. Thus, while there are some variations among Asian ethnic groups, in general, the patterns for Asian ethnic groups are quite consistent with the general patterns found for an aggregated Asian category.

CONCLUSION

Ample literature has shown that Asian Americans are advantaged in education, including college enrollment, relative to their white counterparts (see reviews in, Kao and Thompson 2003; Sakamoto et al. 2009). While prior literature considers various explanations for Asians' educational advantage (Hsin and Xie 2014; Kao 1995; Lee and Zhou 2015; Liu and Xie 2016; Sun 1998), very few studies examine the role of parenting, and their results are mixed (Bodovski and Durham 2010; Gibbs et al. 2017; Kao 1995; Sun 1998, 2011). Focusing on transition to higher education, this study examines whether parenting plays a role in understanding Asians' advantage in college enrollment, relative to their white counterparts, and whether and how family socioeconomic background may moderate the role of parenting, especially its possible salience for the less advantaged group.

Analyses from a nationally representative sample of high school students from the Educational Longitudinal Study (ELS) of 2002 indicate that concerted cultivation parenting practices do not play a role in explaining Asians' advantage in college enrollment. Although Asians have advantages in college enrollment, they do not have more exposure to concerted cultivation, nor do they benefit more from it compared with their white counterparts. To the contrary, Asians tend to have similar exposure to concerted cultivation as their white counterparts but are less likely to benefit from it. Indeed, concerted cultivation parenting is positively related to college enrollment for white students but not Asian students.

In addition, the results reveal important variations across socioeconomic backgrounds. Asians from less socioeconomically advantaged backgrounds have an advantage in college enrollment, but neither have more exposure to concerted cultivation nor benefit more from it relative to their white peers. However, Asians from more socioeconomically advantaged backgrounds do not have an advantage in college enrollment and they benefit similarly from concerted cultivation as their white counterparts.

While recent research implied that less advantaged Asians practice concerted cultivation as much as their more advantaged counterparts (Lee and Zhou 2015), which would make parenting particularly salient for understanding Asian-white differences among the less advantaged students, presented analyses do not support this argument. The findings of this study indicate that Asian students on average are not exposed to more concerted cultivation parenting practices than their white counterparts in either sociodemographic group. Indeed, less advantaged Asians do not have more exposure to concerted cultivation than whites and they benefit less from it.

Although the findings do not support predictions from the previous literature, they reveal important differences by family socioeconomic backgrounds. More advantaged Asians are similar to their white counterparts in terms of college enrollment and in how much they benefit from concerted cultivation. Less advantaged Asians have notably different experiences. Although they have similar amount of concerted cultivation and benefit less from it, they still manage to outperform their white counterparts from similar family backgrounds. Further analysis shows that parenting is not even associated with their probability of college enrollment.

Previous research has shown that parenting continues to play an important role in understanding socioeconomic inequality in access to higher education (Perna and Titus 2005; Roksa and Deutschlander 2018; Roksa and Robinson 2017; Rowan-Kenyon, Bell, and Perna 2008). The lack of importance of parenting for Asians, more specifically less advantaged Asians, implies that other cultural practices may be more prominent predictors of educational success for certain groups than parenting. For example, Asians have a more authoritative family culture and thus Asian students may feel pressured to satisfy their parents' expectations (Fishman 2020; Sue and Okazaki 1990; Tao and Hong 2014) even if parents do not actively engage in their schooling. Thus, while concerted cultivation parenting practices may be salient for white students, that may not hold for all of the racial/ethnic groups. Future research is needed to further explore whether and how other cultural practices, in addition to parenting, may shape access to higher education across different racial/ethnic groups.

The findings also noted that although less advantaged Asians have similar amount of exposure to concerted cultivation as their white peers, they benefit less from it. One possible explanation may be that educational gatekeepers in schools do not respond to their parenting practices as positively as to those of whites. It is also possible that Asian parents may learn to adopt different forms of concerted cultivation but not enact it in the same way as whites. For example, although they may engage in discussions with their children, the quality of discussion may not be compatible with the evaluation standards of educational systems. Future research would benefit from exploring whether concerted cultivation practices are enacted the same way across different racial/ethnic groups as well as how teachers respond to similar forms of concerted cultivation for different racial/ethnic groups.

The relative advantage of less advantaged Asians and null role of parenting also suggest that they may rely on other cultural resources, such as those of their communities. Lee and Zhou (2015) argued that less advantaged Asian parents usually rely on cultural resources within their ethnic communities to provide a leg up for their children. For example, in the Chinese ethnic community in Los Angeles, a bilingual "Chinese Yellow Book" is accessible to everyone including information on neighborhood and school districts, and supplemental education and tutoring service. Parents from less advantaged socioeconomic background could rely on this information to place their children in better-quality schools and academic tracks. Moreover, Asian ethnic community provides a series of supplemental education classes with a wide range of prices, helping students not only improve their academic but also extracurricular profiles for college enrollment. Some of the supplemental education is free of charge provided by ethnic churches and community centers. Future research is needed to explore if and how ethnic communities play a role in understanding Asians' educational advantage.

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Appendix A

Table A1. Logistic Regression: Asian-White Differential Benefits from Parenting in Predicting College Enrollment

	Model 1	Model 2	Model 3	Model 4
Key independent variables				
Asian	1.35***	0.96***	2.16***	0.98***
	(0.34)	(0.24)	(0.56)	(0.24)
Home learning resources	0.26***			
	(0.04)			
Extracurricular activities		0.25***		
		(0.04)		
Parent-child discussion			0.51***	
			(0.09)	
Parental school involvement				0.14***
				(0.03)
Interactions terms				
Asian × Home learning resources	-0.29*			
	(0.14)			
Asian × Extracurricular activities		-0.22*		
		(0.09)		
Asian × Parent-child discussion			-0.68**	
			(0.25)	
Asian × Parental school involvement				-0.20*
				(0.10)
Controls	Yes	Yes	Yes	Yes
Constant	-6.22***	-5.31***	-6.38***	-5.76***
	(0.33)	(0.32)	(0.34)	(0.32)
N	8,590	8,590	8,590	8,590

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A2. Logistic Regression: Asian-White Differential Benefits from Parenting in Predicting College Enrollment, Separated by Family Socioeconomic Backgrounds

	Model 1	Model 2	Model 3	Model 4
Panel A: Less socioeconomically advantaged students				
Asian	1.42***	1.11***	2.41***	1.08***
	(0.37)	(0.27)	(0.60)	(0.26)
Home learning resources	0.27***			
	(0.05)			
Extracurricular activities		0.30***		
		(0.04)		
Parent-child discussion			0.57***	
			(0.10)	
Parental school involvement				0.17***
				(0.04)
Interactions terms				
Asian × Home learning resources	-0.26			
	(0.16)			
Asian × Extracurricular activities		-0.25*		
		(0.10)		
Asian × Parent-child discussion			-0.74**	
			(0.28)	
Asian × Parental school involvement				-0.17
				(0.12)
N	4,300	4,300	4,300	4,300
Panel B: More socioeconomically advantaged students				
Asian	0.08	0.33	0.39	0.30
	(0.56)	(0.35)	(0.94)	(0.38)
Home learning resources	0.30***			
	(0.08)			
Extracurricular activities		0.17**		
		(0.06)		
Parent-child discussion			0.44**	
			(0.15)	
Parental school involvement				0.13***
				(0.04)
Interactions terms				
Asian × Home learning resources	0.11			
	(0.23)			
Asian × Extracurricular activities		-0.07		
		(0.15)		

Table A2, continued

Asian × Parent-child discussion			-0.03	
			(0.42)	
Asian × Parental school involvement				-0.04
				(0.14)
N	4,290	4,290	4,290	4,290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Table A3. Logistic Regression Analyses Predicting College Enrollment

	Model 1A LO	Model 1B AME	Model 2A LO	Model 2B AME
Race/ethnicity (ref: white)				
Chinese (ref: white)	1.23***	0.13***	1.23***	0.13***
	(0.31)	(0.03)	(0.31)	(0.03)
Filipino	0.30	0.04	0.36	0.04
	(0.35)	(0.04)	(0.35)	(0.04)
Japanese	0.63	0.07	0.63	0.07
	(0.52)	(0.05)	(0.53)	(0.06)
Korean	0.41	0.05	0.40	0.05
	(0.29)	(0.03)	(0.29)	(0.03)
Southeast Asian	0.85***	0.10***	0.92***	0.10***
	(0.26)	(0.03)	(0.26)	(0.02)
South Asian	1.12**	0.12***	1.12**	0.12***
	(0.35)	(0.03)	(0.35)	(0.03)
Parenting				
Home learning resources			0.16***	0.02***
			(0.04)	(0.01)
Extracurricular activities			0.19***	0.02***
			(0.03)	(0.00)
Parent-child discussion			0.33***	0.04***
			(0.08)	(0.01)
Parental school involvement			0.10***	0.01***
			(0.03)	(0.00)
N	8,590	8,590	8,590	8,590

Source: U.S. Department of Education, National Center for Education Statistics,
Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A4. OLS Regression: Asian-White Differences in Predicting Parenting Measures

	Home learning resources	Extracurricular activities	Parent-child discussion	Parental school involvement
Chinese (ref: white)	-0.11	0.49***	-0.05	0.08
	(0.07)	(0.11)	(0.04)	(0.13)
Filipino	-0.15	-0.06	-0.11*	0.06
	(0.09)	(0.14)	(0.05)	(0.17)
Japanese	-0.02	0.42*	-0.06	0.14
	(0.11)	(0.20)	(0.06)	(0.22)
Korean	-0.00	0.20	0.01	0.18
	(0.08)	(0.14)	(0.04)	(0.16)
Southeast Asian	-0.18*	-0.02	-0.10*	0.08
	(0.08)	(0.12)	(0.05)	(0.14)
South Asian	-0.12	0.13	0.04	0.24
	(0.09)	(0.15)	(0.05)	(0.16)
Controls	Yes	Yes	Yes	Yes
N	8,590	8,590	8,590	8,590

Source: U.S. Department of Education, National Center for Education Statistics,
Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A5. Logistic Regression: Asian-White Differential Benefits from Parenting in Predicting College Enrollment

	Model 1	Model 2	Model 3	Model 4
Race/ethnicity × Parenting	*Home learning resources*	*Extracurricular activities*	*Parent-child discussion*	*Parental school involvement*
Chinese (ref: white)	-0.50	-0.41*	-0.85	-0.11
	(0.34)	(0.18)	(0.56)	(0.21)
Filipino	-0.31	-0.12	0.47	-0.10
	(0.31)	(0.31)	(0.66)	(0.26)
Japanese	-0.63	-0.56	-0.30	-0.37
	(0.69)	(0.34)	(1.28)	(0.29)
Korean	-0.18	-0.20	-0.78	-0.00
	(0.29)	(0.16)	(0.61)	(0.18)
Southeast Asian	-0.15	-0.04	-0.65*	-0.22
	(0.19)	(0.16)	(0.28)	(0.15)
South Asian	-0.21	-0.44**	-0.48	0.01
	(0.29)	(0.17)	(0.62)	(0.21)
Controls	Yes	Yes	Yes	Yes
N	8,590	8,590	8,590	8,590

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A6. Logistic Regression Analyses Predicting College Enrollment, Separated by Family Socioeconomic Backgrounds

	Model 1A	Model 1B	Model 2A	Model 2B
	LO	AME	LO	AME
Panel A: Less socioeconomically advantaged students				
Race/ethnicity (ref: white)				
Chinese (ref: white)	1.17***	0.18***	1.17***	0.17***
	(0.35)	(0.04)	(0.35)	(0.04)
Filipino	1.03*	0.16*	1.04*	0.16*
	(0.49)	(0.06)	(0.50)	(0.07)
Japanese	1.06	0.16	1.05	0.16
	(0.69)	(0.09)	(0.72)	(0.09)
Korean	0.73*	0.12*	0.72*	0.11*
	(0.34)	(0.05)	(0.35)	(0.05)
Southeast Asian	0.75*	0.12**	0.85**	0.13**
	(0.29)	(0.04)	(0.30)	(0.04)
South Asian	1.29**	0.19***	1.28**	0.19***
	(0.42)	(0.05)	(0.43)	(0.05)
Parenting				
Home learning resources			0.16***	0.03***
			(0.05)	(0.01)
Extracurricular activities			0.23***	0.04***
			(0.04)	(0.01)
Parent-child discussion			0.35***	0.06***
			(0.10)	(0.02)
Parental school involvement			0.12***	0.02***
			(0.03)	(0.01)
N	4,300	4,300	4,300	4,300
Panel B: More socioeconomically advantaged students				
Race/ethnicity (ref: white)				
Chinese (ref: white)	0.81	0.06*	0.90	0.06*
	(0.49)	(0.03)	(0.50)	(0.03)
Filipino	-0.30	-0.03	-0.17	-0.02
	(0.40)	(0.04)	(0.40)	(0.04)
Japanese	0.20	0.02	0.21	0.02
	(0.66)	(0.05)	(0.70)	(0.05)
Korean	0.11	0.01	0.05	0.00
	(0.42)	(0.03)	(0.42)	(0.04)
Southeast Asian	-0.18	-0.02	-0.01	-0.00
	(0.50)	(0.05)	(0.50)	(0.04)
South Asian	0.89	0.06*	0.93	0.06*
	(0.51)	(0.03)	(0.54)	(0.03)

Table A6, continued

Parenting				
Home learning resources			0.27***	0.02***
			(0.08)	(0.01)
Extracurricular activities			0.13*	0.01*
			(0.06)	(0.00)
Parent-child discussion			0.31*	0.03*
			(0.14)	(0.01)
Parental school involvement			0.10**	0.01**
			(0.04)	(0.00)
N	4,290	4,290	4,290	4,290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A7. OLS regression: Asian-White Differences in Predicting Parenting Measures, Separated by Family Socioeconomic Backgrounds

	Home learning resources	Extracurricular activities	Parent-child discussion	Parental school involvement
Less socioeconomically advantaged students				
Chinese (ref: white)	-0.15	0.48***	-0.03	-0.10
	(0.09)	(0.14)	(0.06)	(0.17)
Filipino	-0.12	-0.12	-0.02	0.10
	(0.13)	(0.17)	(0.08)	(0.28)
Japanese	0.08	-0.04	-0.03	0.02
	(0.24)	(0.25)	(0.11)	(0.44)
Korean	-0.09	0.14	0.06	0.22
	(0.13)	(0.18)	(0.07)	(0.24)
Southeast Asian	-0.23*	-0.15	-0.07	-0.14
	(0.11)	(0.15)	(0.06)	(0.18)
South Asian	-0.14	-0.17	0.14	0.03
	(0.16)	(0.19)	(0.08)	(0.24)
Controls	Yes	Yes	Yes	Yes
N	4,300	4,300	4,300	4,300
More socioeconomically advantaged students				
Chinese (ref: white)	-0.07	0.45**	-0.07	0.27
	(0.10)	(0.17)	(0.06)	(0.19)
Filipino	-0.18	-0.02	-0.17*	0.08
	(0.13)	(0.19)	(0.07)	(0.22)
Japanese	-0.06	0.65**	-0.08	0.24
	(0.11)	(0.22)	(0.08)	(0.26)
Korean	0.13	0.34	-0.02	0.29
	(0.10)	(0.18)	(0.06)	(0.21)
Southeast Asian	-0.29*	-0.00	-0.22*	0.15
	(0.13)	(0.24)	(0.09)	(0.30)
South Asian	-0.06	0.37	-0.01	0.48*
	(0.11)	(0.20)	(0.07)	(0.21)
Controls	Yes	Yes	Yes	Yes
N	4,290	4,290	4,290	4,290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A8. Logistic Regression: Asian-White Differential Benefits from Parenting in Predicting College Enrollment

	Model 1	Model 2	Model 3	Model
Race/ethnicity × Parenting	*Home learning resources*	*Extracurricular activities*	*Parent-child discussion*	*Parental school involvement*
Less socioeconomically advantaged students				
Chinese (ref: white)	-0.40	-0.56**	-0.88	-0.10
	(0.37)	(0.18)	(0.60)	(0.26)
Filipino	-0.45	0.06	-0.88	0.22
	(0.46)	(0.41)	(0.88)	(0.47)
Japanese	-1.27	-0.19	-0.16	-0.73
	(1.12)	(0.69)	(2.04)	(0.41)
Korean	0.00	-0.21	-0.26	0.04
	(0.42)	(0.19)	(0.63)	(0.23)
Southeast Asian	-0.21	-0.10	-0.69*	-0.13
	(0.19)	(0.17)	(0.32)	(0.16)
South Asian	-0.08	-0.59*	-0.15	-0.10
	(0.39)	(0.25)	(0.80)	(0.29)
Controls	Yes	Yes	Yes	Yes
N	4,300	4,300	4,300	4,300
More socioeconomically advantaged students				
Chinese (ref: white)	-0.53	0.20	0.00	0.07
	(0.71)	(0.60)	(1.09)	(0.49)
Filipino	0.19	-0.09	1.62	-0.11
	(0.38)	(0.30)	(1.00)	(0.30)
Japanese	0.21	-0.51	0.00	0.03
	(0.87)	(0.35)	(1.49)	(0.46)
Korean	0.11	-0.14	-1.44	-0.03
	(0.34)	(0.26)	(1.14)	(0.26)
Southeast Asian	2.02	0.42	0.07	-0.32
	(1.04)	(0.51)	(0.70)	(0.29)
South Asian	-0.27	-0.12	-1.05	0.29
	(0.48)	(0.26)	(0.79)	(0.33)
Controls	Yes	Yes	Yes	Yes
N	4,290	4,290	4,290	4,290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data. Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A9. Logistic Regression Analyses Predicting Four-Year College Enrollment

	Model 1A LO	Model 1B AME	Model 2A LO	Model 2B AME
Key independent variable				
Asian	0.79**	0.08**	0.86**	0.09***
	(0.27)	(0.03)	(0.27)	(0.03)
Home learning resources			0.19***	0.02***
			(0.05)	(0.01)
Extracurricular activities			0.25***	0.03***
			(0.04)	(0.00)
Parent-child discussion			0.55***	0.06***
			(0.10)	(0.01)
Parental school involvement			0.12***	0.01***
			(0.03)	(0.00)
Control variables - Student				
Family SES	0.80***	0.09***	0.61***	0.06***
	(0.07)	(0.01)	(0.07)	(0.01)
Female	0.13	0.01	-0.03	-0.00
	(0.08)	(0.01)	(0.08)	(0.01)
Two-parent family	0.39***	0.04***	0.29***	0.03***
	(0.08)	(0.01)	(0.08)	(0.01)
Number of siblings	-0.07	-0.01	-0.08*	-0.01*
	(0.04)	(0.00)	(0.04)	(0.00)
1.5-2.0 generation	0.00	0.00	0.08	0.01
	(0.25)	(0.03)	(0.27)	(0.03)
Parental educational expectation	0.08***	0.01***	0.06***	0.01***
	(0.02)	(0.00)	(0.02)	(0.00)
High school GPA	1.88***	0.21***	1.72***	0.18***
	(0.09)	(0.01)	(0.09)	(0.01)
High school math & English test score	0.06***	0.01***	0.06***	0.01***
	(0.01)	(0.00)	(0.01)	(0.00)
Region (ref: Northeast)				
Midwest	-0.34*	-0.04*	-0.28*	-0.03*
	(0.14)	(0.01)	(0.14)	(0.01)
South	-0.40**	-0.04**	-0.41**	-0.04**
	(0.14)	(0.01)	(0.14)	(0.01)
West	-0.90***	-0.10***	-0.87***	-0.09***
	(0.16)	(0.02)	(0.15)	(0.02)
Control variables – High school				
Private high school	0.84***	0.09***	0.63***	0.07***
	(0.15)	(0.02)	(0.15)	(0.02)
Urbanicity (ref: Urban)				
Suburban	-0.22	-0.02*	-0.25*	-0.03*
	(0.12)	(0.01)	(0.11)	(0.01)
Rural	-0.26	-0.03	-0.33*	-0.03*
	(0.15)	(0.02)	(0.15)	(0.02)

Table A9, continued

Percent racial/ethnic minority	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Percent free/reduced-price lunch	-0.01**	-0.00**	-0.01***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
N	6,660	6,660	6,660	6,660

Source: U.S. Department of Education, National Center for Education Statistics,
Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Table A10. Logistic Regression Analyses Predicting Four-Year College Enrollment, Separated by Family Socioeconomic Backgrounds

	Model 1A LO	Model 1B AME	Model 2A LO	Model 2B AME
Panel A: Less socioeconomically advantaged students				
Asian	0.85**	0.12**	0.93**	0.12**
	(0.32)	(0.04)	(0.34)	(0.04)
Home learning resources			0.17**	0.02**
			(0.06)	(0.01)
Extracurricular activities			0.29***	0.04***
			(0.05)	(0.01)
Parent-child discussion			0.62***	0.08***
			(0.12)	(0.02)
Parental school involvement			0.13**	0.02**
			(0.04)	(0.01)
N	3,310	3,310	3,310	3,310
Panel B: More socioeconomically advantaged students				
Asian	0.47	0.03	0.51	0.04
	(0.36)	(0.02)	(0.36)	(0.02)
Home learning resources			0.30***	0.02***
			(0.09)	(0.01)
Extracurricular activities			0.20**	0.02**
			(0.06)	(0.01)
Parent-child discussion			0.49**	0.04**
			(0.16)	(0.01)
Parental school involvement			0.15***	0.01***
			(0.04)	(0.00)
N	3,350	3,350	3,350	3,350

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Control variables include family SES, gender, family structure, sibling, generational status, parental educational expectation, region, high school GPA, high school math and English test scores, high school sector, urbanicity, percent minority, and percent free/reduced-price lunch. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

CHAPTER 4

UNDERSTANDING ASIAN AMERICANS' ADVANTAGE IN STEM: EXAMINING RACE AND GENDER INEQUALITIES IN STEM MAJOR PREFERENCE AND DEGREE COMPLETION

STEM (science, technology, engineering, and mathematics) occupations are usually associated with higher earnings and higher social status (Xie and Killewald 2012). Thus, pursuing careers in STEM fields is considered as a viable way for those from disadvantaged social status to achieve upward social mobility (Xie, Fang, and Shauman 2015). College degree in STEM is usually the ticket to pursuing careers in such fields (Xie and Shauman 2005). The importance of STEM degrees in social mobility may increase as more STEM jobs are projected to grow in labor markets according to multiple reports by U.S. Bureau of Labor Statistics (Terrell 2007; U.S. Bureau of Labor Statistics 2022; Vilorio 2014).

While STEM education is important for entering STEM occupations, notable gaps remain by race/ethnicity and gender (see a review, Xie et al. 2015). Prior literature on race/ethnicity in STEM education usually focuses on examining experiences of URM (underrepresented racial and ethnic minority) students relative to their non-URM peers (Chang et al. 2014; Griffith 2010; Price 2010; Riegle-Crumb and King 2010; Riegle-Crumb, King, and Irizarry 2019). Prior research has paid limited attention to Asian Americans, who are either omitted from analyses or combined with whites into a non-URM category. Given the high visibility of Asian Americans in STEM education, understanding how race/ethnicity is related to students intending and completing STEM degrees is limited and incomplete without understanding experiences of Asian Americans in these fields.

Moreover, while ample literature has examined gender gaps in STEM education (England and Li 2006; Ma 2011; Mann and DiPrete 2013; Morgan, Gelbgiser, and Weeden 2013; Sax et al. 2016; Weeden, Gelbgiser, and Morgan 2020; Xie and Shauman 2005), scholars have paid less attention to whether females from different racial and ethnic backgrounds have similar experiences. Some studies have indicated that Black females may have quite different experiences than white females in STEM education (Riegle-Crumb and King 2010), suggesting the necessity of examining the intersection between race/ethnicity and gender. This is particularly important when considering Asian students' experiences. While Asians are serotyped as being good at math (Lee and Zhou 2015; Ma 2010), females are stereotyped as not being good at math (Correll 2001, 2004; Thébaud and Charles 2018), implying that Asian females and Asian males may have quite different experiences compared with their white counterparts (Beasley and Fischer 2012; Ma 2010; Ma and Liu 2017).

Focusing on an Asian-white comparison, this study examines how the intersection of race and gender is related to students' preferences for and completion of STEM degrees. Additionally, this study investigates factors that could explain the observed differences by race and gender. Analyzing nationally representative data from Education Longitudinal Study of 2002, the results indicate that Asian males are more likely to prefer a STEM major than white males. While Asian females are less likely to prefer a STEM major than white males, they are more likely to do so than white females. Moreover, precollege academic preparation plays a major role in explaining the gap between Asian males and white males, and occupational expectations account for most of the gaps between females of both races and white males. After considering all mediators, Asians of both genders are similar to white males in STEM major preference while white females are still disadvantaged. In terms of STEM degree attainment, Asians of both genders are similar to white males. While white females are less likely to obtain a STEM degree relative to white males, the gap is greatly reduced after considering STEM major preference and occupational expectations. Overall, the findings reveal different mechanisms that contribute to the observed patterns by race and gender and highlight the importance of an intersectional approach for understanding inequalities in STEM education.

LITERATURE REVIEW

Race and Gender Differences in Postsecondary STEM Education

Ample literature has examined racial/ethnic differences in postsecondary STEM education, particularly, the differences between underrepresented racial and ethnic minorities (URM), including students who identify as Black, Latinx, and Native American, and non-URM students, including whites or whites and Asians. Much prior research focuses on explaining disparities in entry into STEM fields and completion of STEM degrees between URM and non-URM students (e.g., Chang et al. 2014; Griffith 2010; Price 2010; Riegle-Crumb and King 2010; Riegle-Crumb, King, and Irizarry 2019). Recent studies indicate that while URM students have gradually reached parity with whites in declaring a STEM major over the past several decades, they are still disadvantaged in earning a STEM degree (Anderson and Kim 2006; Chen 2009, 2014; National Science Board 2022a; Xie et al. 2015).

While prior literature makes great contributions to understanding challenges faced by URM students in postsecondary STEM education, it pays less attention to the experiences of Asian Americans. Asian Americans are either excluded from many studies or combined with whites as racial and ethnic groups that are overrepresented in STEM education. However, national reports on educational statistics have documented Asians' advantage in both intention for STEM majors and completion of STEM degrees relative to whites. For example, the NCES (National Center for Education Statistics) report in 2009 based on Beginning Postsecondary Studies data showed that while about 20 percent of whites enrolled in a STEM filed during their undergraduate years, almost 50 percent of Asians/Pacific islanders did so (Chen 2009). The NCES report in 2014 further showed that there is a higher percentage of Asians obtaining a STEM degree than their white counterparts (Chen 2014).

While these descriptives point to notable differences between Asians and whites , prior literature has rarely paid attention to examining Asian-white differences in STEM education, let alone explaining why Asian Americans have higher achievement with respect to both intending and completing STEM degrees as a racial and ethnic minority (Xie et al. 2015). Given the high visibility of Asian Americans in STEM education, exploring Asian Americans' experiences in STEM education is an indispensable part of understanding the complete picture of racial and ethnic differences in postsecondary STEM education in the U.S.

Besides racial and ethnic differences in postsecondary STEM education, ample literature has also examined gender inequalities. While females have closed the gaps and even became advantaged in college enrollment and completion relative to males over the past decades (Buchmann and DiPrete 2006; DiPrete and Buchmann 2013), they continue to be underrepresented in postsecondary STEM education (England and Li 2006; Ma 2011; Mann and DiPrete 2013; Sax et al. 2016; Weeden et al. 2020; Xie and Shauman 2005). Using four national longitudinal datasets covering four decades (1970 to 2010) collected by NCES, Mann and DiPrete (2013) found that females are less likely to enter a STEM field relative to their male counterparts. Weeden et al. (2020) further indicated that males are more than twice as likely as females to obtain a bachelor's degree in STEM among a cohort of college entrants in 2004. The underrepresentation of females in intending and completing STEM degrees persists according to the most recent report of national educational statistics (National Science Foundation 2021). Extensive studies also investigate why females continue to be underrepresented in STEM education despite having surpassed males in many other aspects in higher education (e.g., Legewie and DiPrete 2014; Morgan, Gelbgiser, and Weeden 2013; Riegle-Crumb et al. 2012; Sax et al. 2016; Stearns et al. 2020; Weeden et al. 2020).

While ample literature has contributed to understanding differences by race or gender, separately, prior studies pay less attention to whether females from different racial and ethnic backgrounds have similar experiences in STEM education (Beasley and Fischer 2012; Ma and Liu 2017; Riegle-Crumb and King 2010). Treating race or gender as separate analytical lenses assumes that experiences of a certain race may apply to both males and females, or that experiences of a certain gender may apply to all races. This assumption is problematic. The intersectional approach argues that the social world is complex. Each analytical category such as race, gender, or class is not unitary and mutually exclusive, but could mutually constitute a complex system of relationships with multiple dimensions and modalities, which could work simultaneously to determine social inequality and individuals' experiences (Collins 2015; Crenshaw 1991; McCall 2005). Thus, treating race and gender in the aggregate would omit important inequality patterns and mechanisms that may be observed by simultaneously considering variation by race and gender.

A few previous studies have attended to the importance of intersectionality in STEM education (Beasley and Fischer 2012; Ma and Liu 2017; Riegle-Crumb and King 2010). For example, after controlling for precollege academic preparation and math attitudes, Riegle-Crumb and King (2010) indicated that the gap in declaring a physical science or engineering major between Black female and white male students entering college in 2004 appears smaller than that between white females and white males, and that Black males are statistically significantly more likely to declare a physical science or engineering major than white males. Prior studies that include Asians also suggest that Asian females may have quite different experiences than white females. Analyzing a cohort of college entrants in 1992, Ma and Liu (2017) reported that the predicted probability of obtaining a computer science, physical science, math, and engineering degree for Asian females appears higher than that for white females but appears slightly lower than white males and much lower than Asian males, after controlling precollege academic preparation. More generally, prior literature indicates that females are often stereotyped as not being good at STEM (Correll 2001, 2004; Thébaud and Charles 2018) while Asians are stereotyped as being good at STEM (Lee and Zhou 2015; Ma 2010). Although Asian females share racial identity with Asian males, they share gender identity with white females. An intersectional analysis is thus necessary to fully understand gender and racial inequality in postsecondary STEM education.

Explanations for Race and Gender Differences in Postsecondary STEM Education

A life course perspective views entry into and completion of STEM education as a pipeline in which earlier experiences for STEM education lay foundations for a later stage (Berryman 1983). Prior studies have shown that precollege factors play a decisive role in entrance into and completion of STEM education (Legewie and DiPrete 2014; Weeden et al. 2020; Xie and Killewald 2012). Prior literature on STEM entrance and completion (Ma 2011; Mann and DiPrete 2013; Morgan et al. 2013; Riegle-Crumb et al. 2012, 2019; Weeden et al. 2020) tends to focus on three sets of factors when explaining racial and gender inequalities in postsecondary STEM education: precollege academic preparation for STEM education, math attitudes, and occupational expectations.

Precollege Academic Preparation

STEM fields adopt more universalistic evaluation standards, which believe that entrance and success in the field rely on relevant skills and abilities (Merton 1973). According to the cumulative advantage/disadvantage theory, inequalities accumulate over time and earlier favorable positions will beget further relative gains (Diprete and Buchmann 2006; Merton 1968). Thus, precollege academic preparation may be decisive as the first step in accumulating advantages in intending and subsequently completing STEM degrees. Indeed, STEM fields usually require extensive accumulation of prior knowledge. For example, while it is common and possible for individuals with STEM education to choose non-STEM careers, it is usually difficult for those without STEM education to pursue STEM careers (Xie et al. 2015). Ample literature has also shown that precollege academic preparation such as math test score and math and science course-taking are some of the strongest predictors for entrance into STEM fields and completion of a STEM degree (Legewie and DiPrete 2014; Tai et al. 2006; Wang 2013; Xie and Shauman 2005)

In the literature on gender differences in STEM education, precollege academic preparation is one of the most common explanations examined (Morgan et al. 2013; Riegle-Crumb et al. 2012; Stearns et al. 2020; Turner and Bowen 1999; Weeden et al. 2020). Prior literature argues that females tend to trail males in math test scores and math and science course-taking, which could potentially explain why women are less likely to enter STEM fields and complete a STEM degree later (Berryman 1983; Turner and Bowen 1999). However, recent studies show that gender differences in math test scores and math and science course-taking have declined over time, and that small gender differences in precollege academic preparation only contribute to explaining a small portion of the gender gap in entrance into STEM fields and completion of STEM degrees (Mann and DiPrete 2013; Morgan et al. 2013; Riegle-Crumb et al. 2012; Riegle-Crumb and Grodsky 2010; Weeden et al. 2020; Xie and Shauman 2005).

Much of the prior literature on racial differences in postsecondary STEM education also considers the role of precollege academic preparation (Ma and Liu 2017; Riegle-Crumb and King 2010; Riegle-Crumb et al. 2019). Most of the literature compares URM's with whites, largely excluding Asians from the conversation on racial inequalities in STEM. The gaps between URM's and whites in precollege academic preparation including math test scores and math and science course-taking are still substantial, although the gap in course-taking has declined in recent years (Riegle-Crumb and Grodsky 2010). The large gap in prior academic experiences explains a large portion of the disparities between URM's and whites in entrance into STEM fields and completion of STEM degrees (Riegle-Crumb and King 2010; Riegle-Crumb et al. 2019). The most recent national report on high school students math and science achievement and course-taking shows that Asians tend to stand out in terms of math test scores and math and science course-taking relative to all other groups, including whites (National Science Board 2019). Rare studies that explicitly consider Asians suggest that academic preparation may help to explain Asians' advantage in STEM (Ma and Liu 2017).

In summary, prior findings indicate that females have almost closed the gap with males in precollege academic preparation such as math test scores and math and science course-taking; however, Asian-white differences remain. This may suggest an advantage for Asian males in academic preparation over others and perhaps an advantage of Asian females over white females. While precollege academic preparation contributes to explaining a small portion of gender differences in STEM, it is not known whether and how much it contributes to Asian-white differences in STEM, not to mention the intersection between gender and racial identity for Asians and whites.

Math Attitudes

Social cognitive theory argues that self-reflection, including self-efficacy and affective states, play an important role in predicting individuals' behaviors in everyday lives (Bandura 1986). Applying this theory to STEM research, prior studies have shown that individuals' self-reflective attitudes towards math and science competencies are closely related to their entrance and persistence in STEM education (Maltese and Tai 2011; Tai et al. 2006; Wang 2013; Xie and Shauman 2005). Prior literature has also shown that the psycho-social attitudinal factors such as math self-efficacy and affect also contribute to explaining gender and racial differences in postsecondary STEM education.

Literature on gender differences in postsecondary STEM education indicates that due to gender stereotypes, females tend to have lower math self-efficacy and express less interest in learning math and science and pursuing careers in STEM fields relative to their male counterparts, even if they have the same level of math achievement (Correll 2001, 2004; Else-Quest, Hyde, and Linn 2010; Sadler et al. 2012; Thébaud and Charles 2018). Math self-efficacy and affect contribute to explaining a portion of gender differences in entrance into and completion of STEM education (Ma 2011; Mann and DiPrete 2013; Sax et al. 2016; Weeden et al. 2020). However, the explanatory power of those factors tends to be greatly reduced once math achievement is considered (Riegle-Crumb and King 2010; Weeden et al. 2020).

Prior studies on race/ethnic differences have also examined the role of math self-efficacy and affect in explaining experiences of URM's and whites in STEM education. URM students tend to report comparable or even higher self-efficacy and affect compared with their white counterparts, and the attitudinal factors do not contribute to racial and ethnic differences in postsecondary STEM education (Litzler, Samuelson, and Lorah 2014; Riegle-Crumb and King 2010; Riegle-Crumb, Moore, and Ramos-Wada 2011). While Asians are typically not included in the literature on racial differences in STEM education, at least some studies suggest that Asians tend to hold the highest interest in STEM education and at least comparable self-efficacy in math abilities as whites (DeWitt et al. 2011; Lee and Zhou 2015; Litzler et al. 2014), implying that these attitudinal factors may contribute to explaining Asians' relative advantage in STEM education.

Besides math self-efficacy and affect, another psycho-social factor that is closely related to math and science achievement has received virtually no attention in the literature on explaining gender and racial differences in postsecondary STEM entrance and completion: growth mindset. Growth mindset reflects the belief that abilities in math and science are not fixed but can be developed through learning. Growth mindset is positively associated with math and science achievement (Blackwell, Trzesniewski, and Dweck 2007; Dweck 2000, 2015; Grant and Dweck 2003). Asians tend to report higher growth mindset towards STEM relative to whites (Lee and Zhou 2015). This suggests that math growth mindset may also play a role in understanding Asian-white differences in STEM preference and attainment. Moreover, some studies showed that growth mindset can help to reduce gender stereotype and increase females' math achievement in K-12 education (Degol et al. 2018; Law et al. 2021), implying that growth mindset may also help to increase females' representation in postsecondary STEM education.

In summary, prior findings indicate that males tend to have more positive math attitudes than females. There is also some indication that Asians may have more positive math attitudes than whites. Thus, Asian males may be particularly advantaged in these attitudes while Asian females may also have more favorable attitudes than white females. While math attitudes contribute to a portion of gender differences in STEM education, to what extent they may contribute to Asian-white differences, and especially Asian-white differences at the intersection of race and gender, is not known.

Occupational Expectations

Occupational expectations represent a critical factor in the Wisconsin status attainment model, linking family background with occupational attainment (Sewell, Haller, and Portes 1969). A revised model by Xie and Goyette (2003) argued that occupational expectations could also predict educational attainment, especially when considering individual's intended fields of study. While occupational expectations have received much attention in the general literature on social inequality, they are rarely considered in the literature on STEM education or studies of major selection and degree completion (Legewie and DiPrete 2014; Morgan et al. 2013; Tai et al. 2006; Weeden et al. 2020).

Literature on gender differences in career choices has long implied that occupational preferences are related to gender differences in entrance into STEM fields and completion of STEM degrees. The socialization model postulates that females and males are socialized into preference for different careers based on stereotypical gender roles. For example, females, stereotyped as caring and nurturing, orient towards occupations interacting with people, which are less compatible with STEM occupations (Ceci, Williams, and Barnett 2009; Eccles 2011; Hakim 2002; Jacobs 1989). Thus, females may not intend to major in a STEM field at the very beginning or persist in the STEM field over time. While this argument is implied, empirical literature rarely incorporates occupational expectations in the analysis on gender differences in

STEM intentions and degree completion. Although, several recent studies showed that having STEM occupational expectations in high school is positively related to entrance into and completion of STEM education and contributes to a large portion of the gender differences (Morgan et al. 2013; Weeden et al. 2020).

While prior literature on racial inequalities in STEM education does not attend to the role of occupational expectations either, literature examining Asians' educational advantage suggests that occupational expectations may play an important role (Xie and Goyette 2003). Xie and Goyette (2003) argued that Asian Americans, as a marginalized racial and ethnic group in the U.S., may encounter many barriers in their upward social mobility such as discrimination. To reduce such barriers, they tend to choose paths on which success is more dependent on objective evaluation standards such as higher education or science and technically-based occupations. Analyzing a national sample of eighth graders, they found that Asians are more likely to expect occupations with a high representation of Asians and high earnings than whites, and that these occupational expectations contribute to explaining why Asians are more likely to select majors associated with lucrative occupations in college. While they did not explicitly focus on STEM, their findings suggest that STEM occupational expectations may contribute to the Asian-white differences in STEM.

In summary, prior literature suggests that females are less likely to expect STEM occupations while Asians may be more likely to expect STEM occupations. Moreover, while STEM occupational expectations could explain a large portion of gender differences in STEM education, little is known about whether and how they may explain Asian-white differences, especially at the intersection of gender and race.

DATA AND METHODS

This study uses data from the Educational Longitudinal Study (ELS2002), which is administered by the National Center for Education Statistics (NCES). Designed to study student transition from high school to postsecondary education and beyond, ELS2002 collected data from a nationally representative cohort of more than 15,000 high school sophomores in 2002, and followed them in their senior year in 2004, two years after high school in 2006, and eight years after high school in 2012, which is the most recent NCES data with student graduation information 6 years after college. Additionally, NCES collected students' high school and college transcript data, providing detailed information on their course-taking histories and fields of study.

Given focus on the comparison between Asian and white students and two particular outcomes, this study uses two analytical samples. The first analytical sample, *STEM Major Preference Analytical Sample*, includes Asian and white students who enrolled in four-year college immediately after high school and have a valid answer to the question about their college major preference upon college entry (N=41,10).[1] The second analytical sample, *STEM Degree Attainment Analytical Sample*, includes individuals in the first analytical sample who have obtained a bachelor's degree and have valid information on their field of study for their bachelor's degree attained (N=2,990).[2]

[1] All sample sizes in the study are rounded to the nearest ten according to the NCES restricted-use data guidelines.
[2] In this sample, the graduation rate eight years after college entry is around 78%, which is reasonable given that this is a more restricted sample than usually considered in national estimates and that students have two additional years to complete their degrees. The national average 6-year graduation rate for the 2004 cohort is 70% for Asians and 62% for whites who attended 4-year college full-time (National Center for Education Statistics 2020).

Variables

The dependent variables are STEM major preference upon college entry and STEM degree attainment eight years after college entry.[3] Both are binary variables with preferring a STEM major coded 1 (vs. preferring a non-STEM major coded 0) and obtaining a STEM degree coded 1 (vs. obtaining a non-STEM degree coded 0). Following the practices of previous research, the study defines STEM fields to include mathematics, natural sciences (including physical sciences and biological/agricultural sciences), engineering/engineering technologies, and computer/information sciences (Chen 2009; Riegle-Crumb et al. 2012; Riegle-Crumb and King 2010; Tilbrook and Shifrer 2022).

The key independent variables are race and gender. To consider their intersection, analyses consider four groups: white males (reference group), white females, Asian males, and Asian females.

Drawing on previous literature, I consider three groups of mediating variables that could potentially explain race and gender differences in STEM major preference and degree attainment. The first group of mediating variables are academic preparation including (1) student math standardized test scores in their high school senior year, (2) whether students completed advanced math courses indicated in their high school transcripts including Algebra III, Finite Math, Statistics, Pre-calculus, and Calculus, and (3) whether students completed advanced science courses defined as Biology 2, Chemistry 2, and Physics 2 following previous literature (Riegle-Crumb et al. 2012, 2019; Riegle-Crumb and King 2010).

[3] The information on STEM major preference was collected two years after college entry. The variable name in ELS2002 is F2B15, and the exact wording of the question is "when you began at [institution name], what field of study did you think you would most likely pursue?" The information on STEM degree attainment comes from postsecondary transcript data.

The second group of variables include students' attitudes related to math: math self-efficacy, math affect, and math growth mindset. Math self-efficacy indicates students' confidence in their math abilities collected in the senior year of high school, which is created by combining students' responses (1=almost never, 2=sometimes, 3=often, or 4=almost always) to the following five items: "can do an excellent job on math tests," "can understand difficult math texts," "can understand difficult math class," "can do excellent job on math assignments," and "can master math class skills." The Cronbach's alpha for the items is 0.9, indicating high internal consistency.

Student math affect measures students' positive evaluations of math collected in the sophomore year of high school, reflecting their responses (1=strongly disagree, 2=disagree, 3=agree, or 4=strongly agree) to the following three items: "gets totally absorbed in mathematics," "thinks math is fun," and "thinks math is important." The Cronbach's alpha for the items is 0.8, indicating high internal consistency.

Student math growth mindset reflects students' beliefs that math abilities can be improved through learning collected in the sophomore year of high school. This measure includes students' opinions (1=strongly disagree, 2=disagree, 3=agree, or 4=strongly agree) on the following two items "most people can learn to be good at math," and "have to be born with ability to be good at math." The second item is reverse coded to make high values in this measure indicate growth mindset. The Cronbach's alpha for the items is 0.6, indicating acceptable internal consistency. I also run sensitivity analysis by replacing the composite measure with these two items individually in the model and the results are not substantively different from what is presented herein.

The last mediator considered is STEM occupational expectations. ELS2002 collected students' expected occupations at their age 30 in the senior year of high school. I categorize this variable into STEM vs. non-STEM occupational expectations using the same definition as that for STEM vs. non-STEM majors.

This study also includes student family socioeconomic (SES) background and immigrant status as control variables since prior literature suggests that these factors are confounding factors that can contribute to the race and gender gap in STEM major intention and attainment (Chen 2009; National Science Board 2022b). Family SES, created by ELS2002, is a continuous measure combining five equally weighted, standardized components: father's education, mother's education, family income, father's occupation, and mother's occupation. Immigrant status is measured by students' birthplace, born in the U.S. or outside the U.S. This is a dummy variable with foreign born coded 1, indicating the status of being an immigrant.

Methods

Focusing on binary outcomes, this study employs logistic regressions with school clustered robust standard errors, accounting for students clustered within schools (Arceneaux and Nickerson 2009).[4] Given the concerns about comparing coefficients across groups and models in logistic regressions (Mood 2010), this study reports average marginal effects on predicted probabilities (Long and Mustillo 2018; Mize 2019). As for mediation analysis, I use the KHB method, which is designed specifically for logistic regressions to account for the rescaling problems (Karlson, Holm, and Breen 2012).

[4] Following previous research focusing on Asian Americans using the same or similar NCES data (e.g., Fishman 2020; Liu and Xie 2016), models are not weighted due to the small sample size of Asian Americans. Moreover, results from sensitivity analyses based on weighted data are not substantively different from what is presented herein.

The missing data patterns are similar between the two analytical samples used in the study. About 36% students miss one of the variables used in each analytical sample. More specifically, about 18 percent of students are missing math growth mindset, 17 percent math affect, 12 percent occupational expectations, 10 percent foreign born, 6 percent math self-efficacy, 6 percent advanced math course-taking, and 6 percent advanced science course-taking. Considering a relatively high percentage of missing data, I tested if the data are missing completely at random (MCAR) or missing at random (MAR), which indicated that the data are missing at random (MAR). [5] Thus, I use multiple imputation with 20 imputations and chained equations to deal with missing cases (White, Royston, and Wood 2011).

RESULTS

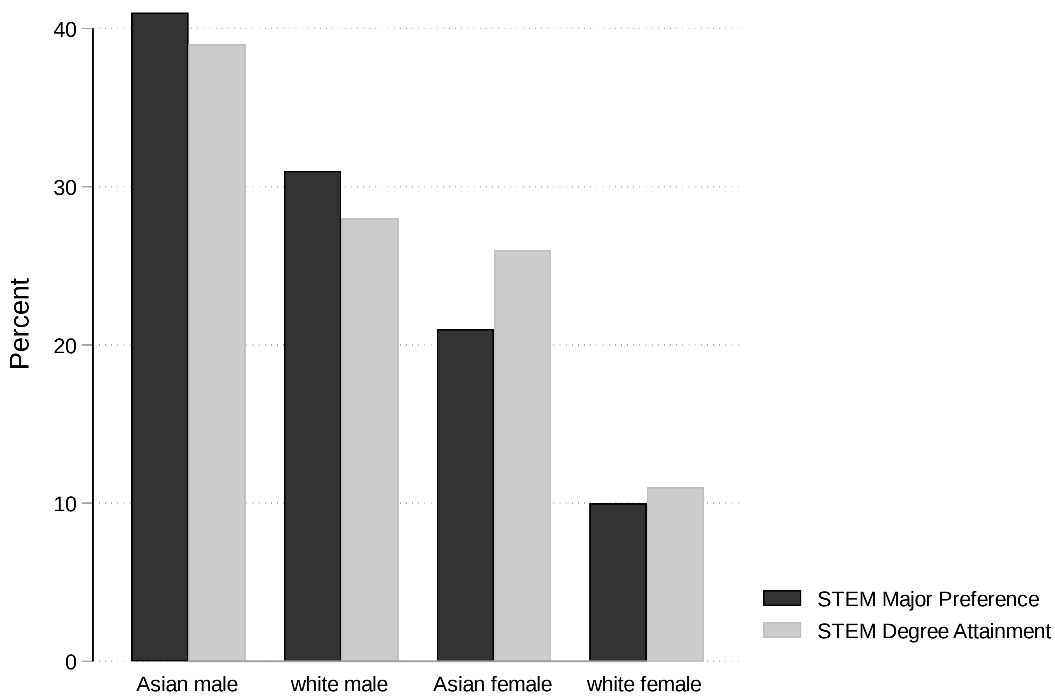
Descriptive Patterns

Figure 1 presents percentages of students who intend to major in STEM upon college entry and who attained a STEM degree eight years after college entry for each race and gender group. In general, males are more likely to report a STEM major preference upon college entry than females.[6] Moreover, within each gender group, Asians are more likely to prefer a STEM major than whites. More specifically, Asian males are the most likely to report a preference for a STEM major upon college entry among the four race-gender groups. Almost half (about 41%) of Asian males prefer a STEM major, followed by about one third (31%) of white males and about

[5] More specifically, I created a missing indicator variable for each variable used in the study with missing the variable coded 1. Then I ran a series of logistic regressions to examine if any of the other variables can predict the missingness of each variable (Social Science Computing Cooperative, UW-Madison 2013).
[6] All differences reported in the descriptive analyses are statistically significant based on results from the Bonferroni multiple-comparison test (with $p<0.008$).

a quarter of Asian females (about one fifth, 21%). White females are the least likely to report a STEM major preference (about 10%).

Figure 1. Race and Gender Gaps in STEM Major Preference and Degree Attainment
Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.



With respect to STEM degree attainment eight years after college entry, there is no clear overall gender divide since white males and Asian females are similar in terms of obtaining a STEM degree. About a quarter of them obtained a STEM degree, 28% for white males and 26% for Asian females. However, within each race group, males are still more likely to obtain a STEM degree. Moreover, there is a race gap within each gender group, that is, a higher percentage of Asians tend to obtain a STEM degree than whites. In general, Asian males are the most likely to obtain a STEM degree (about 40%), followed by white males and Asian females.

White females are least likely to obtain a STEM degree. Overall, the patterns between STEM major preference and degree attainment are similar. The only difference is that while Asian females are less likely to prefer a STEM major upon college entry than white males, they reach parity with white males in obtaining STEM degrees.

To understand what factors may contribute to the patterns observed in Figure 1, I report race and gender differences in three groups of potential mediating variables in Table 1 and Table 2 for each analytical sample, respectively. Table 1 reports relevant results for the *STEM Major Preference Analytical Sample*. The results indicate a clear race difference in terms of advanced math and science course-taking with Asians, including both males and females, being more likely to complete advanced math and science courses in high school. There is no gender difference in course-taking within each race group. Moreover, Asian males have the highest math test scores, followed by white males and Asian females who have similar math test scores. White females have the lowest math test scores.

Table 1. Descriptive Statistics for the STEM Major Preference Analytical Sample

	Whole sample	white male	white female	Asian male	Asian female
Dependent variable					
Major preference upon enrolling	0.21	0.31	0.10*	0.41*	0.21*
Math academic preparation					
Math test score	58.00	59.27	56.37*	60.68*	58.78
	(7.78)	(7.63)	(7.28)	(8.47)	(8.55)
Completed advanced math courses	0.83	0.81	0.81	0.91*	0.89*
Completed advanced science courses	0.34	0.30	0.30	0.54*	0.56*
Math attitudes					
Math self-efficacy	2.80	2.94	2.69*	2.94	2.66*
	(0.79)	(0.79)	(0.79)	(0.79)	(0.74)
Math affect	2.48	2.52	2.38*	2.76	2.63
	(0.72)	(0.74)	(0.70)	(0.70)	(0.68)
Math growth mindset	2.82	2.83	2.75*	3.01*	3.00*
	(0.62)	(0.63)	(0.60)	(0.68)	(0.63)

Table 1, continued

STEM occupational expectations	0.14	0.24	0.05*	0.27	0.07*
Background factors					
Family SES	0.49	0.57	0.50*	0.27*	0.27*
	(0.71)	(0.65)	(0.67)	(0.89)	(0.88)
Foreign born	0.08	0.02	0.02	0.41*	0.41*
N	4,110	1,540	1,900	310	360

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: The descriptive table reports proportions for categorical measures and means and standard deviations (in parentheses) for continuous measures and is based on unweighted and unimputed data. Sample sizes are rounded to the nearest 10 for the use of restricted data.
* indicates a statistically significant difference between each race-gender category and white males based on results from the Bonferroni multiple-comparison test (with p<0.008).

Regarding different measures reflecting math attitudes, gender is a salient factor in driving the differences in math self-efficacy. Males tend to report higher math self-efficacy than females for both racial groups, and there is no racial difference in math self-efficacy within each gender group. Moreover, white females report lower interest in math relative to the other three groups. Race is a salient factor when considering math growth mindset with Asians being more likely to have math growth mindset than whites. Moreover, while Asians males and females are similar in math growth mindset, white males are more likely to have math growth mindset than white females.

As for expected occupations at age 30, males including both Asians and whites are more likely to report STEM occupational expectations compared with females. The gap is large, with the percentage of males expecting STEM occupations being almost 4 to 5 times that of females. More specifically, around a quarter of males expect STEM occupations compared with only 5-7 percent of females.

Table 2 reports relevant results for the *STEM Degree Attainment Analytical Sample*. The patterns are similar to those in Table 1.

Table 2. Descriptive Statistics for the STEM Degree Attainment Analytical Sample

	Whole sample	white male	white female	Asian male	Asian female
Dependent variable					
STEM degree attainment	0.21	0.28	0.11*	0.39*	0.26
Math academic preparation					
Math test score	59.07	60.34	57.50*	61.63	59.97
	(7.36)	(7.11)	(6.86)	(8.52)	(8.04)
Completed advanced math courses	0.87	0.86	0.86	0.93	0.91
Completed advanced science courses	0.37	0.33	0.32	0.58*	0.58*
Math attitudes					
Math self-efficacy	2.83	2.98	2.72*	2.98	2.69*
	(0.79)	(0.78)	(0.79)	(0.78)	(0.72)
Math affect	2.48	2.52	2.39*	2.76	2.65
	(0.72)	(0.74)	(0.70)	(0.68)	(0.69)
Math growth mindset	2.82	2.82	2.76	3.00*	3.00*
	(0.61)	(0.63)	(0.58)	(0.67)	(0.60)
STEM occupational expectations	0.14	0.24	0.06*	0.30	0.07*
Background factors					
Family SES	0.57	0.66	0.58	0.39*	0.33*
	(0.70)	(0.64)	(0.67)	(0.85)	(0.86)
Foreign born	0.08	0.03	0.02	0.36*	0.40*
N	2,980	1,060	1,400	230	290

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: The descriptive table reports proportions for categorical measures and means and standard deviations (in parentheses) for continuous measures and is based on unweighted and unimputed data. Sample sizes are rounded to the nearest 10 for the use of restricted data.
* indicates a statistically significant difference between each race-gender category and white males based on results from the Bonferroni multiple-comparison test (with p<0.008).

Explaining Race and Gender Differences in STEM Major Preference

Table 3 presents a series of logistic regression models predicting race and gender differences in STEM major preference with the three groups of mediators added sequentially.[7] Model 1 presents the baseline model: the association between race and gender groups and STEM major preference controlling background factors, including family SES and immigrant status.

[7] Table 3 reports average marginal effects (see details in the methods section). Table A1 in the Appendix reports the corresponding log odds for reference.

Asian males are 8 percent more likely to report a STEM major preference than white males, while Asian females and white females are 12 percent and 21 percent less likely to prefer a STEM major, respectively.

Table 3. Logistic Regression Predicting STEM Major Preference: Average Marginal Effects

	Model 1	Model 2	Model 3	Model 4	Model 5
Race and Gender (ref: white male)					
White female	-0.21***	-0.20***	-0.19***	-0.11***	-0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Asian male	0.08*	0.00	0.05	0.05	0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Asian female	-0.12***	-0.15***	-0.11***	-0.02	-0.04
	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)
Background					
Family SES	0.01	-0.02**	0.01	0.02*	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Foreign born	0.04	0.05	0.03	0.05	0.04
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Academic preparation					
Math test score		0.01***			0.00
		(0.00)			(0.00)
Advanced math		0.09***			0.05**
		(0.02)			(0.02)
Advanced science		0.08***			0.06***
		(0.02)			(0.01)
Math attitudes					
Math self-efficacy			0.05***		0.02**
			(0.01)		(0.01)
Math affect			0.09***		0.05***
			(0.01)		(0.01)
Math growth mindset			0.01		0.00
			(0.01)		(0.01)
STEM occupational expectations				0.61***	0.54***
				(0.02)	(0.03)
N	4,110	4,110	4,110	4,110	4,110

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Subsequent analyses investigate contributions of each group of mediators to the race and gender differences in STEM major preference. Model 2 shows that all three academic preparation measures are positively related to STEM major preference. They also fully explain Asian males’ advantage in STEM major preference relative to white males. The AME (average marginal effect) of Asian males is no longer statistically significant and the magnitude is close to zero after adding the academic preparation factors compared with the baseline model. However, these factors barely explain differences between females of both races and white males: AME’s for Asian and white females remain statistically significant and of similar magnitudes. The KHB mediation analysis confirms the above results, that is, academic factors only help explain the difference in STEM major preference between Asian males and white males, almost explaining all of the gap.

Model 3 considers the contribution of math attitudes to the racial/gender differences in STEM preference. Both math self-efficacy and math affect are positively associated with STEM major preference while math growth mindset is not. After adding these measures, the AME for Asian males slightly decreases and is no longer statistically significant. The magnitude for AME’s for white females and Asian females also decreases slightly, although those AME’s remain statistically significant. The KHB analysis shows that math attitudes only contribute to explaining the difference between white females and white males, explaining about 13 percent of the gap.

Model 4 examines the contribution of the STEM occupational expectations to the race/gender differences in STEM preference. The results indicate that STEM occupational expectations are positively associated with STEM major preference and have a notable magnitude: expecting STEM occupations early on in high school is associated with a 61 percentage point increase in the probabilities of preferring a STEM major upon college entry on average. Moreover, the AME's of Asians including both males and females are no longer statistically significant after considering STEM occupational expectations and the magnitude is notably reduced for Asian females. While the AME for white females remains statistically significant, the magnitude is reduced to almost half. The KHB mediation analysis indicates that occupational expectations contribute to explaining about 37 percent of the gap between white females and white males, and 80 percent of the gap between Asian females and white males, but do not contribute to explaining the gap between Asian males and white males.

Model 5 includes all three groups of mediators. Advanced math and science course-taking, math self-efficacy, math affect, and STEM occupational expectations remain positive in relation to STEM major preference while math test score is no longer statistically significant compared with the baseline model. The AME's for Asians are no longer statistically significant and their magnitudes are close to zero. While the AME for white females remain statistically significant, its magnitude decreases in half. The KHB mediation analysis confirms the above results. After accounting for all mediators, there are no differences between Asians (including both males and females) and white males. Moreover, variables considered in this analysis explain about half of the difference between white females and white males.

A comparison across these models suggests that STEM occupational expectations play a major role in explaining the gap between females (including Asians and whites) and white males. After considering STEM occupational expectations in Model 4, the AME for Asian females is no longer statistically significant and the magnitude reduces to almost zero. Similarly, the magnitude of AME for white females is notably reduced, even though it remains statistically significant. A comparison between Model 4 and Model 5 further suggests that occupational expectations play a major role as the AME's for females of both races are similar in terms of both significance and magnitude although Model 5 considers a host of other mediating variables besides occupational expectations. Indeed, the KHB mediation decomposition analysis based on Model 5 confirms that occupational expectations are the major factor explaining the differences between females of both races and white males compared with other mediating variables. More specifically, occupational expectations account for more than 80 percent of the gap.

In addition, a comparison across models suggests that academic preparation plays a major role in explaining the gap between Asian males and white males. Asian males' advantage disappears when considering academic preparation in Model 2, and the KHB analysis shows that math attitudes and occupational expectations do not mediate the gap between Asian males and white males in Models 3 and 4. A comparison between Model 2 and Model 5 further suggests the salience of academic preparation in explaining the racial gap among males since the significance and magnitude of the AME for Asian males are similar although more mediating variables are included in Model 5. The KHB mediation decomposition analysis based on Model 5 confirms that academic preparation plays a major role in explaining the gap between Asian males and white males. More specifically, academic preparation contributes to explaining around 60 percent of the gap.

Explaining Race and Gender Differences in STEM Degree Attainment

Table 4 presents a series of logistic regression models predicting race and gender differences in STEM degree attainment with the three groups of mediators added sequentially.[8]

[8] Table 4 reports average marginal effects (see details in the methods section). Table A2 in the Appendix reports the corresponding log odds for reference.

Model 1 reports the results for the baseline model, that is, the association between race and gender groups and STEM degree attainment, net of background factors. The results show no differences in STEM degree attainment between Asians of both genders and white males while white females are disadvantaged in STEM degree attainment relative to white males. On average, the probability of obtaining a STEM degree for white females are 17 percentage points lower than that of white males, net of background factors.

Table 4. Logistic Regression Predicting STEM Degree Attainment: Average Marginal Effects

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Race and Gender (ref: white male)						
White female	-0.17***	-0.15***	-0.14***	-0.10***	-0.08***	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Asian male	0.06	-0.02	0.04	0.04	-0.01	-0.01
	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)
Asian female	-0.06	-0.10***	-0.04	0.02	-0.01	0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Background						
Family SES	0.02*	-0.01	0.02	0.03**	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Foreign born	0.11***	0.12***	0.08**	0.11***	0.09**	0.08**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Academic preparation						
Math test score		0.01***			0.00***	0.00**
		(0.00)			(0.00)	(0.00)
Advanced math		0.09***			0.06*	0.04
		(0.02)			(0.03)	(0.03)
Advanced science		0.10***			0.09***	0.07***
		(0.02)			(0.02)	(0.02)
Math attitudes						
Math self-efficacy			0.07***		0.04***	0.03**
			(0.01)		(0.01)	(0.01)
Math affect			0.09***		0.06***	0.04***
			(0.01)		(0.01)	(0.01)
Math growth mindset			-0.01		-0.01	-0.01
			(0.01)		(0.01)	(0.01)

Table 4, continued

STEM occupational expectations				0.44***	0.35***	0.16***
				(0.03)	(0.03)	(0.03)
STEM major preference upon entry						0.27***
						(0.02)
N	2,980	2,980	2,980	2,980	2,980	2,980

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Subsequent analyses examine contributions of each group of mediators to the race and gender differences, mainly differences between white females and white males, in STEM degree attainment sequentially from Model 2 to Model 4. Model 2 only considers academic preparation variables which are all positively associated with STEM degree attainment. The AME for white females barely changes compared with that in the baseline model. The KHB analysis indicates that academic preparation variables do not contribute to explaining the gap between white females and white males in STEM degree attainment.

Model 3 considers math attitudes, with math self-efficacy and affect being positively related to STEM degree attainment and math growth mindset not. While the AME for white females remains significant, the magnitude decreases. The KHB analysis confirms that math attitudes explain about 18 percent of the gap between white females and white males in STEM degree attainment.

Model 4 examines the contribution of STEM occupational expectations to the gender gap among whites. Similar to the findings regarding STEM major preference, STEM occupational expectations are positively related to STEM degree attainment and they increase the probability of obtaining a STEM degree by 44 percentage points on average. The magnitude of AME for white females decreases substantially after considering occupational expectations. The KHB analysis indicates that occupational expectations explain about 33 percent of the gap between white females and white males in STEM degree attainment.

Model 5 includes all mediating variables, all of which are positively related to the STEM degree attainment except for math growth mindset. The AME for white females is lowest in this model, compared to any of the preceding models. The KHB analysis indicates that all the mediators contribute to explaining about half of the gap between white females and white males in STEM degree attainment. Model 6 additionally considers the contribution of STEM major preference upon college entry to explaining the gender gap among whites in STEM degree attainment. STEM major preference upon college entry is positively related to STEM degree attainment, even net of all of the other mediators. On average, reporting a STEM major preference upon college entry is associated with a 23 percentage point increase in the probability of obtaining a STEM degree, net of other factors. The KHB analysis shows that all variables in Model 6 help explain around 70 percent the gender gap in STEM degree attainment among whites.

A comparison across these models suggests that STEM occupational expectations and STEM major preference upon college entry play major roles in explaining the gender gap in STEM degree attainment among whites. The magnitude of AME for white females decreases substantially only after considering STEM occupational expectations and STEM major preference upon college entry. For example, a comparison between Models 4 and 5 shows that the magnitude of AME for white females changes only slightly after adding all mediators relative to considering only STEM occupational expectations. A comparison between Models 5 and 6 indicates that the AME for white females reduces to almost one half of its magnitude after adding STEM major preference, in addition to all other mediators. Indeed, the KHB mediation decomposition analysis shows that around three quarters of the gap between white females and white males in STEM degree attainment is explained by these two variables.

Supplemental Analysis: Persistence to a STEM Degree

In addition to explaining STEM major preference and STEM degree attainment, I also estimate models predicting persistence to a STEM degree. I focus on students who reported a STEM major preference upon college entry and identify three outcomes these students had eight years after college entry: persist to a STEM degree, switch to a non-STEM degree, and leave college without a degree. These restrictions result in an analytical sample of around 780 students. The sample sizes for Asian males and Asian females for each category of the outcome variable are less than 100. Due to the small sample size, these results need to be interpreted with caution.[9]

More specifically, I run two separate logistic regressions: predicting switching to a non-STEM degree vs. persisting to a STEM degree, and predicting leaving college without a degree vs. persisting to a STEM degree, respectively.[10] Table A3 presents results predicting switching to a non-STEM degree vs. persistence to a STEM degree. Model 1 presents the baseline model, indicating that only white females are more likely to switch to a non-STEM degree compared with white males while there are no differences between Asians of both genders and white males. Adding all the mediators in Model 2, white females are no longer statistically significantly disadvantaged compared with white males, and the magnitude of the AME for white females

[9] Another caveat is that in this sample, the association between predictors and STEM persistence will be downwardly biased because students who reported a STEM major preference are highly selected on the predictors.
[10] I use two separate logistic regression models instead of a multinomial regression model because marginal effects calculated in a multinomial regression model would capture inappropriate contrasts, that is, switching to a non-STEM degree vs. a combined category of persistence to a STEM degree and leaving college without a degree, and leaving college without a degree vs. a combined a category of persistence to a STEM degree and switching to a non-STEM degree. I also run a multinomial logistic regression model, and the results are comparable to what is presented herein.

reduces to almost half, indicating that the mediators examined in this study substantially contribute to explaining the gap between white females and white males.

Table A4 reports the results predicting leaving college without a degree vs. persistence to a STEM degree. Model 1 presents the baseline model, indicating that Asian females are less likely to leave college without a degree compared with white males. While the sign of the AME for Asian males is also negative and the magnitude is fairly large, the results are not statistically significant, which may be in part related to the small sample size. There is no difference between white females and white males. Considering all the mediators in Model 2 does not reduce the magnitude of the AME for Asian females, indicating that variables considered in presented analyses are not able to explain the differences between Asian females and white males.

Overall, these results indicate that other race and gender groups are doing at least as well as white males in terms of persistence to a STEM degree vs. other outcomes, net of a host of factors considered in the study.

CONCLUSION

While STEM occupations are typically well-paid and have high social prestige, they exhibit notable race and gender inequalities (Xie et al. 2015). These differences may reflect racial and gender inequalities in STEM major preference and STEM degree attainment as the STEM pipeline model argues that earlier preference for a STEM major and subsequent attainment of a STEM degree build step by step towards a STEM career (Berryman 1983). Prior literature on STEM education has considered differences between URM and non-URM students but has paid limited attention to Asians despite their high visibility in the field. Moreover, prior literature examines race and gender differences in STEM separately, rarely attending to the intersection of race and gender. To address these gaps in the literature, the present study examines the intersection between race and gender in STEM major preference and STEM degree attainment by focusing on an Asian-white comparison.

Based on data from ELS2002, the results indicate that Asian males are more likely to report a STEM major preference upon college entry than white males, and although Asian females are less likely to report such preference than white males, they are more likely to do so than white females. After considering three sets of mediators, there are no differences between Asians of both genders and white males in STEM major preference while differences remain between white females and white males. Notably, distinct mechanisms explain racial and gender differences. Parity between Asian males and white males is almost entirely attributed to academic preparation while the parity between Asian females and white males is primarily explained by occupational expectations. The gap between white females and white males is mainly attributed to occupational expectations (about 80%), and to a less extent math attitudes (about 20%).

With respect to STEM degree attainment, Asians of both genders are similar to white males even in the baseline model while white females are less likely to complete STEM degrees than their white peers. After considering three sets of mediators, the gap between white females and white males is reduced by about 70% although white females still remain disadvantaged relative to white males (about 4 percentage points). The reduction in the gap between white males and females is largely attributed to STEM major preference upon college entry (about 50%), followed by occupational expectations (about 30%) and math attitudes (about 20%).

While finding Asian advantage in STEM is not surprising, this study is unique in examining the mechanism that explain Asian-white differences, and in particular examining those differences at the intersection of race and gender. Asian males are advantaged relative to all other race-gender groups while Asian females are only advantaged relative to white females. Moreover, those differences only apply to STEM major preference. There are no differences between Asians of both genders and white males. Thus, while Asian females are less likely to prefer a STEM major, they are equally likely to obtain a STEM degree compared with white males.

Notably, the mechanisms that explain racial and gender differences vary. The advantage of Asian males relative to white males in STEM major preferences is mainly explained by academic preparation while the disadvantage of Asian females relative to white males is mainly explained by occupational expectations. Similar to Asian females, the gap between white females and white males is strongly related to occupational expectations and not to academic preparation. These different mechanisms indicate that academic preparation is important for understanding racial inequalities in STEM but is not for gender inequalities. This is consistent with prior studies comparing URM and white students (Morgan et al. 2013; Riegle-Crumb et al. 2012, 2019; Riegle-Crumb and King 2010; Weeden et al. 2020; Xie and Shauman 2005). Thus, to reduce racial gaps in STEM, including Asian-white gaps, interventions need to decrease inequalities in academic preparation such as math achievement and advanced math and science course-taking. As racial differences in math and science course-taking have declined over time, more efforts need to be oriented toward increasing parity in math achievement (Riegle-Crumb and Grodsky 2010).

Presented findings also reveal the importance of occupational expectations for understanding gender inequalities in STEM, but not for racial inequalities. While occupational expectations are critical for understanding educational inequality more broadly (Sewell et al.

1969; Xie and Goyette 2003), they are rarely examined in the literature on STEM education. Several recent studies that considered occupational expectations showed that occupational expectations are important for understanding gender inequality in STEM education (Morgan et al. 2013; Weeden et al. 2020). The findings presented herein are consistent with these prior studies and also extend them by showing that occupational expectations do not contribute to explaining Asian-white differences. Future research needs to examine whether occupational expectations contribute to understanding differences between URM and non-URM students.

The findings suggest that to reduce the gender gap in STEM education, females need to receive more encouragement to pursue STEM occupations. Females tend to be stereotyped as being caring, nurturing, and people-oriented, while STEM occupations are often presented as not being compatible with stereotyped female roles (Ceci et al. 2009; Cheryan, Master, and Meltzoff 2015; Eccles 2011; Hakim 2002; Jacobs 1989). Thus, to boost STEM occupational expectations for females, both gender stereotypes and stereotypes towards STEM occupations need to change. Otherwise, gender inequality in STEM becomes a self-reinforcing system: due to gender stereotypes and stereotypes about STEM occupations, females do not aspire to pursuing STEM occupations, and in turn, are less likely to prefer a STEM major and obtain a STEM degree. This leads to further underrepresentation of females in STEM careers, which then legitimates gender stereotypes and stereotypes about STEM occupations (Weeden et al. 2020). Some possible first steps may include exposing females to role models in STEM fields and diversifying the STEM workforce.

The study also reveals the differences between Asian females and white females, further indicating the importance of intersectionality. Asian females are not disadvantaged relative to white males in STEM degree attainment even in the baseline model, and they reach parity with white males in major preference after considering various mediators. White females, on the other hand, remain disadvantaged relative to white males with respect to both outcomes, even after considering all of the meditators. Occupational expectations account for almost all of the gap between Asian females and white males in STEM preferences. While occupational expectations also play a major role in explaining the gap between white females and white males, math attitudes also contribute substantially to that gap. Indeed, the descriptive tables show that Asian females are more similar to white males in terms of math attitudes.

This may imply that Asian stereotypes may help counteract some of the gender stereotypes that Asian females encounter. Indeed, in a qualitative study of Chinese and Vietnamese Americans in the Los Angeles Metropolitan Areas, Lee and Zhou (2015) documented several stories of Asian females who chose a STEM career because they took advantage of this racial stereotype. For example, Kathy, a Vietnamese American female, who chose to be a math teacher because “people hold the stereotype that Asian people are good at math, so maybe I would make a good math teacher.” (Lee and Zhou 2015:128).While this racial stereotype may help Asian females, the stereotype is not without negative consequences. Asian students who do not conform to the stereotype may struggle with their ethnic identities since they are not the typical Asians who are good at academics, particularly STEM. Moreover, Asians usually gauge their performance using their co-ethnics as reference groups rather than other racial and ethnic groups. Consequently, Asians tend to have lowest self-esteem although they have the highest academic achievement (Lee and Zhou 2015; Massey et al. 2003). Additional research is needed to understand how STEM-related stereotypes may differentially impact experiences and outcomes of Asian males and females.

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Appendix A

Table A1. Logistic Regression Predicting STEM Major Preference: Log Odds

	Model 1	Model 2	Model 3	Model 4	Model 5
Race and Gender (ref: white male)					
White female	-1.40***	-1.33***	-1.28***	-0.94***	-0.90***
	(0.10)	(0.10)	(0.10)	(0.11)	(0.12)
Asian male	0.33*	0.01	0.25	0.36	0.10
	(0.14)	(0.16)	(0.15)	(0.19)	(0.19)
Asian female	-0.65***	-0.93***	-0.63***	-0.15	-0.36
	(0.16)	(0.17)	(0.16)	(0.19)	(0.19)
Background					
Family SES	0.07	-0.16**	0.05	0.15*	0.02
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)
Foreign born	0.26	0.33	0.19	0.38	0.32
	(0.17)	(0.17)	(0.16)	(0.21)	(0.20)
Academic preparation					
Math test score		0.05***			0.01
		(0.01)			(0.01)
Advanced math		0.71***			0.50**
		(0.16)			(0.17)
Advanced science		0.50***			0.55***
		(0.10)			(0.12)
Math attitudes					
Math self-efficacy			0.37***		0.19**
			(0.06)		(0.07)
Math affect			0.59***		0.49***
			(0.07)		(0.08)
Math growth mindset			0.04		0.02
			(0.08)		(0.09)
STEM occupational expectations				3.12***	3.00***
				(0.13)	(0.14)
N	4,110	4,110	4,110	4,110	4,110

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A2. Logistic Regression Predicting STEM Degree Attainment: Log Odds

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Race and Gender (ref: white male)						
White female	-1.12***	-1.02***	-0.97***	-0.75***	-0.64***	-0.38**
	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)	(0.14)
Asian male	0.29	-0.09	0.24	0.23	-0.07	-0.07
	(0.18)	(0.19)	(0.19)	(0.20)	(0.21)	(0.22)
Asian female	-0.32	-0.65**	-0.21	0.13	-0.09	0.06
	(0.18)	(0.20)	(0.19)	(0.19)	(0.21)	(0.23)
Background						
Family SES	0.14*	-0.11	0.13	0.22**	0.04	0.05
	(0.07)	(0.07)	(0.07)	(0.08)	(0.08)	(0.09)
Foreign born	0.64***	0.76***	0.53**	0.73***	0.70***	0.64**
	(0.17)	(0.18)	(0.18)	(0.19)	(0.20)	(0.22)
Academic preparation						
Math test score		0.07***			0.03***	0.03**
		(0.01)			(0.01)	(0.01)
Advanced math		0.75***			0.55*	0.39
		(0.23)			(0.26)	(0.27)
Advanced science		0.70***			0.73***	0.65***
		(0.12)			(0.13)	(0.14)
Math attitudes						
Math self-efficacy			0.49***		0.32***	0.28**
			(0.08)		(0.08)	(0.09)
Math affect			0.63***		0.50***	0.39***
			(0.08)		(0.09)	(0.09)
Math growth mindset			-0.05		-0.10	-0.08
			(0.09)		(0.11)	(0.11)
STEM occupational expectations				2.23***	2.08***	1.17***
				(0.13)	(0.14)	(0.17)
STEM major preference upon entry						1.79***
						(0.14)
N	2,980	2,980	2,980	2,980	2,980	2,980

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

Table A3. Logistic Regression Predicting Switching to a Non-STEM Degree vs. Persistence to a STEM Degree

	Model 1		Model 2	
	LO	AME	LO	AME
Race and Gender (ref: white male)				
White female	0.60**	0.14**	0.37	0.08
	(0.19)	(0.05)	(0.22)	(0.05)
Asian male	-0.07	-0.02	-0.04	-0.01
	(0.26)	(0.06)	(0.29)	(0.06)
Asian female	0.21	0.05	-0.08	-0.02
	(0.33)	(0.08)	(0.36)	(0.07)
Background				
Family SES	-0.20	-0.05	0.02	0.00
	(0.12)	(0.03)	(0.14)	(0.03)
Foreign born	-0.52	-0.11	-0.61	-0.12
	(0.31)	(0.06)	(0.34)	(0.06)
Academic preparation				
Math test score			-0.06***	-0.01***
			(0.01)	(0.00)
Advanced math			-0.36	-0.08
			(0.51)	(0.11)
Advanced science			-0.40*	-0.08*
			(0.19)	(0.04)
Math attitudes				
Math self-efficacy			-0.13	-0.03
			(0.14)	(0.03)
Math affect			-0.24	-0.05
			(0.16)	(0.03)
Math growth mindset			0.25	0.05
			(0.17)	(0.03)
STEM occupational expectations			-0.79***	-0.17***
			(0.19)	(0.04)
N	650	650	650	650

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * $p<0.05$ ** $p<0.01$ *** $p<0.001$ (two-tailed tests).

Table A4. Logistic Regression Predicting Leaving College Without a Degree vs. Persistence to a STEM Degree

	Model 1		Model 2	
	LO	AME	LO	AME
Race and Gender (ref: white male)				
White female	0.06	0.01	0.02	0.00
	(0.26)	(0.05)	(0.29)	(0.05)
Asian male	-0.60	-0.10	-0.46	-0.06
	(0.33)	(0.05)	(0.37)	(0.05)
Asian female	-1.53**	-0.20***	-1.69*	-0.18***
	(0.56)	(0.05)	(0.69)	(0.05)
Background				
Family SES	-1.01***	-0.17***	-0.66***	-0.10***
	(0.16)	(0.02)	(0.18)	(0.02)
Foreign born	-0.61	-0.09	-0.86	-0.11*
	(0.42)	(0.06)	(0.48)	(0.05)
Academic preparation				
Math test score			-0.08***	-0.01***
			(0.02)	(0.00)
Advanced math			-1.16*	-0.20*
			(0.51)	(0.10)
Advanced science			-0.38	-0.05
			(0.27)	(0.04)
Math attitudes				
Math self-efficacy			-0.11	-0.02
			(0.18)	(0.03)
Math affect			-0.06	-0.01
			(0.22)	(0.03)
Math growth mindset			0.42	0.06
			(0.22)	(0.03)
STEM occupational expectations			-0.10	-0.01
			(0.27)	(0.04)
N	530	530	530	530

Source: U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002.
Note: LO stands for Log Odds; AME stands for Average Marginal Effects. Sample sizes are rounded to the nearest 10 for the use of restricted data.
Standard errors in parentheses. * p<0.05 ** p<0.01 *** p<0.001 (two-tailed tests).

CHAPTER 5

CONCLUSION

Sociologists of education have relied on two dominant frameworks for understanding educational inequality: status attainment and cultural capital. Both of those have been grounded in examining class inequality, and only more recently have started to pay more attention to racial/ethnic inequalities, and rarely to experiences of Asian Americans (Roksa, Silver, and Wang 2022). While it is well known that Asian Americans have strong educational outcomes (Fishman 2020; Lee and Zhou 2015; Liu and Xie 2016; Sakamoto, Goyette, and Kim 2009), little research has examined what facilitates those desirable educational outcomes or how they may interact with socioeconomic status or gender.

SUMMARY OF FINDINGS

Analyzing ELS2002 data, this dissertation includes three distinct studies that highlight different aspects of Asian Americans' experiences in higher education. Chapter 2 addresses the role of socioeconomic background in shaping educational outcomes, and in particular, recent findings suggesting that socioeconomic background may play a limited role in fostering educational success for Asian Americans. Focusing on access to higher education, the findings indicate that socioeconomic background indeed plays a relatively weak role in predicting college enrollment for Asians relative to whites and other racial and ethnic groups. More specifically, the findings show that family socioeconomic background is not related to Asians' college enrollment. This pattern is consistent for different ethnic groups among Asians but is unique for

Asians since the data reveals that other racial and ethnic groups, such as Blacks and Mexicans, have patterns similar to whites.

The central question addressed in this study is: what can explain the limited role of socioeconomic background in fostering educational success of Asian Americans? The results show that peer influence, more specifically, friends' college orientation, contributes to explaining a substantial portion of the limited role of family socioeconomic background in fostering Asians' college enrollment relative to whites. Specifically, peer influence contributes to explaining about 20% of the gap between Asians and whites in the association between family socioeconomic background and overall college enrollment including both four-year and two-year colleges, and about 30% of the gap in four-year college enrollment. This pattern holds even after considering educational expectations. Indeed, for the outcomes examined in this study (college enrollment in general and four-year institutions in particular), peer influence emerges as a key mechanism explaining the differential role of socioeconomic status in educational success for Asian students while educational expectations play a relatively smaller mediating role.

Chapter 3 engages with the literature on cultural capital, and in particular parenting practices related to concerted cultivation, to examine inequality in college access. Although Asians are more likely to enroll in college than whites, the findings show that concerted cultivation does not contribute to explaining Asians' advantage in college enrollment. Asians neither have more exposure to concerted cultivation nor do they benefit more from it in college enrollment relative to their white counterparts. In contrast, they have similar exposure to concerted cultivation but benefit less from it in college enrollment compared with their white peers. The analysis also shows that concerted cultivation is not related to college enrollment for Asians but is positively related to college enrollment for whites.

In addition, the findings reveal notable variation across socioeconomic backgrounds. Only Asians from less socioeconomically advantaged backgrounds are advantaged in college enrollment relative to their white counterparts while Asians from more socioeconomically advantaged backgrounds are similar in college enrollment relative to their white counterparts. At the same time, concerted cultivation does not explain the advantage of Asian students from less socioeconomically advantaged backgrounds: Asians from less socioeconomically backgrounds neither have nor benefit more from concerted cultivation relative to their white peers: they have similar exposure to concerted cultivation but benefit less from it compared to their white peers. However, Asians from more socioeconomically advantaged backgrounds benefit similarly from concerted cultivation as their white counterparts.

Chapter 4 examines how students' intention to pursue a STEM (science, technology, engineering and mathematics) field and likelihood of graduating with a STEM degree vary at the intersection of race and gender. The results show that Asian males are more likely to indicate a STEM major preference upon college entry than white males. While Asian females are less likely to prefer STEM majors than white males, they are more likely to do so than white females. Regression analyses indicate that precollege academic preparation explains almost all the difference between Asian males and white males while STEM occupational expectations explain almost all of the gap between Asian females and white males. Thus, although Asians of both genders reach parity with white males after all mediators are included in the models, the mechanisms are different for Asian males and Asian females. Even after all of the mediators are considered, white females are still disadvantaged relative to white males in terms of STEM major preference.

With respect to STEM degree attainment, there are no differences between white males and Asians of either gender in the baseline model. However, white females continue to be disadvantaged relative to white males even after considering all three sets of mediators and STEM major preference upon college entry. Although the disadvantage remains, the gap decreases from 17 percentage points to 4 percentage, showing that almost 70% of the gap is explained by the mediators considered. The results reveal that the primary factor contributing to the gap in STEM degree attainment between white males and white females is STEM major preference, followed by occupational expectations and math attitudes.

IMPLICATIONS FOR RESEARCH

Overall, the three chapters contribute to social stratification literature, more specifically, inequality in higher education literature by considering the educational experiences of Asian Americans. They challenge and extend classical sociological theories on educational inequality, and also inspire new directions for future research.

Chapter 2 and Chapter 3 extend two classical social stratification theories, including status attainment and cultural capital. They indicate that the classical social stratification theories may not apply to all racial and ethnic groups, and in particular, Asian Americans. Chapter 2 shows that for access to higher education, socioeconomic background is not only a weaker predictor for Asians than whites, but it does not predict college enrollment for Asian students at all. Thus, a fundamental tenet of the status attainment model – that family background is a key predictor of educational outcomes – does not hold for Asian Americans. Similarly, Chapter 3 shows that concerted cultivation parenting practices are positively related to college enrollment for white students but not Asian students. Thus, the key finding from prior literature about the importance of parenting practices, and concerted cultivation in particular, for fostering academic success, does not hold for Asian Americans. These findings not only show the benefits of including Asian Americans in the mainstream social stratification literature by shedding new light on classical stratification theories but also by prompting future research to explore explanations for the deviations of Asian Americans from previously observed patterns.

Chapter 2 has taken the first step to explore why socioeconomic background is not related to college enrollment of Asian Americans. It shows that family socioeconomic status is weakly associated with college enrollment for Asian Americans because they tend to have friends with high college-going orientations regardless of family socioeconomic status compared with whites and other racial/ethnic minorities. While peer influence contributes to explaining the weak association between socioeconomic background and college enrollment for Asians, it does not fully explain it, suggesting that other factors may play a role. One potential set of explanations worthy of consideration in future research is the role of ethnic communities. Some studies have suggested that individuals in Asian ethnic communities often share information about school choices and provide educational resources such as supplemental education. This information or educational resources may also be accessible to those from less socioeconomically advantaged backgrounds (Lee and Zhou 2015). Thus, ethnic community resources may contribute to explaining why Asian Americans enroll in college regardless of family socioeconomic backgrounds.

Chapter 3 shows that concerted cultivation parenting practices are not consequential for college enrollment among Asians, nor do they contribute to explaining the Asian-white differences in college enrollment. Future research is needed to understand the limited role of parenting practices in fostering success for Asian students, and especially for Asians from less advantaged backgrounds. One possibility may be that educational gatekeepers in schools do not respond to their parenting practices as positively as to those of whites. It is also possible that Asian parents from less advantaged backgrounds may learn to adopt different forms of concerted cultivation but not enact it in the same way as whites. Future research would thus benefit from exploring whether concerted cultivation practices are enacted the same way across different racial/ethnic groups as well as how teachers respond to similar forms of concerted cultivation of different racial/ethnic groups.

Ethnic communities may also play a role in explaining the limited role of concerted cultivation in fostering success of Asian students. As mentioned previously, less advantaged Asians may rely on resources in their ethnic communities which may help ameliorate socioeconomic inequality. Thus, both Chapters 2 and 3 suggest the importance of ethnic communities in understanding the limited role of socioeconomic background and concerted cultivation for Asians' educational advantage. Future surveys would benefit from incorporating relevant information on ethnic communities and future qualitative research could contribute by further exploring the role of ethnic communities in shaping parenting practices and educational outcomes. This line of inquiry could provide a more accurate understanding of the experiences of Asian Americans, and more generally of factors that shape racial/ethnic inequalities in education.

The unique contributions of Chapter 4 are revealing the mechanism that explain Asian-white differences in pursuing and obtaining STEM degrees, and in particular, examining those differences at the intersection of race and gender. The findings illuminate how different mechanisms operate for gender vs. race. In particular, occupational expectations have emerged as central to understanding gender inequalities in STEM, although not Asian-white differences. Future studies examining how occupational expectations are formed, and then reinforced or challenged though schooling, would be especially valuable. Future research would also benefit from examining whether occupational expectations contribute to explaining differences between URM and non-URM students, and especially women from different racial/ethnic backgrounds. Presented findings imply that Asian stereotypes may help counteract some of the gender stereotypes that Asian females encounter, facilitating their greater success in STEM. Future research is needed to understand how STEM-related stereotypes may differentially impact experiences and outcomes of Asian males and females.

Overall, future research focusing on Asian Americans could deepen our understanding of educational inequality by exploring new mechanisms that are not considered in traditional sociological theories and literature that less attends to race and ethnicity, in particular, Asian Americans, and also by exploring mechanisms underlying those deviated inequality patterns of Asian Americans. Thus, future research on Asian Americans could help to advance understanding of racial/ethnic inequality in education, and broaden classical explanations related to status attainment and cultural capital.

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