

Beyond STEM: The Invisible Career Expectations of Asian American High School Students

North Cooc¹ and Grace MyHyun Kim²

¹ Department of Special Education, Center for Asian American Studies, The University of Texas at Austin

² Department of Curriculum and Instruction, Center for Asian American Studies, The University of Texas at Austin

The overrepresentation of Asian Americans in science, technology, engineering, and math (STEM) occupations can render invisible the early experiences of Asian Americans in other fields. In this study, we provide a national and longitudinal portrait of the occupational expectations of Asian Americans ($n = 2,340$) in high school and their postsecondary years. Multinomial logistic regression models confirm Asian Americans hold high occupational expectations in STEM fields overall. However, longitudinal results also reveal high occupational expectations in arts and sports in Grade 9 that decrease and occupational expectations in business and management that begin low but increase after high school. These longitudinal trends are similar for other students but reveal career trajectories of Asian Americans that receive less attention among researchers. Results show little evidence of misalignment between Asian American occupational expectations and academic subject interests in high school. Gaps in occupational expectations between students categorized as English Learner (EL) and those who are not (non-EL) are also mostly attenuated when accounting for individual and parent backgrounds. The study has implications for supporting Asian American youth interested in non-STEM fields, complicating a characterization of Asian Americans as model minorities uniformly predisposed for STEM fields, and improving Asian American career visibility beyond STEM.

Public Significance Statement

This study provides insights on Asian Americans' career paths. Findings show Asian American high school students hold high occupational expectations in science, technology, engineering, and math (STEM) fields yet also reveal other trajectories that receive less attention. Asian American adolescents hold high occupational expectations in arts and sports in Grade 9 that gradually decrease over time, and their occupational expectations in business consistently increases.

Keywords: Asian Americans, occupational expectations, STEM, English learner, high school


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Asian Americans are the fastest growing racial group in the United States. At nearly 20.5 million in 2015 (6.5%),

the Asian American population is expected to increase about 75% by 2040 (Ong et al., 2016). Despite the growth of and diversity within this population, a dominant perception of Asian Americans is the group's high levels of socioeconomic success, particularly by occupational fields. Indeed, Asian Americans disproportionately select science, technology, engineering, and math (STEM) fields as academic interests in school and later as careers. In 2016, Asian American undergraduates received 13% of all STEM bachelor's degrees, compared to only 7% of all bachelor's degrees overall (National Center for Education Statistics [NCES], 2017). In the labor market, Asian Americans make up 13% of the STEM workforce but only 6% of all workers (Funk & Parker, 2018). Studies have also explored what factors are linked to the overrepresentation of Asian Americans in STEM occupations (e.g., Min & Jang, 2015; Tran et

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North Cooc  <https://orcid.org/0000-0003-1222-1161>

Grace MyHyun Kim  <https://orcid.org/0000-0002-5991-3491>

Correspondence concerning this article should be addressed to North Cooc, Department of Special Education, Center for Asian American Studies, The University of Texas at Austin, University Station, Stop 5300, Austin, TX 78712, United States. Email: ncooc@austin.utexas.edu

al., 2019). These patterns within colleges and the labor market contribute to an image of Asian Americans as inextricably linked to STEM and, in turn, render invisible the experiences of Asian Americans who pursue other fields.

In this article, we provide a national and longitudinal portrait of the occupational expectations of Asian Americans in high school and the early postsecondary years. According to career development literature, “expectations” are an expression of an individual’s realistic or likely career goals, in contrast to “aspirations,” which emphasize an individual’s ideal career goals (Rojewski, 2005). We focus on expectations because they are more likely to predict the career paths that individuals ultimately select (Schoon & Parsons, 2002) and thus may relate to racial disparities within the current labor market.¹ Prior research on the career paths of Asian Americans has focused on their academic experiences in college or their occupational choices in later adulthood (Min & Jang, 2015; Tran et al., 2019), yet we examine the transition from high school into these later stages of career development to identify when early occupational expectations in STEM and non-STEM fields may emerge or change over time, including for students who do not attend college. This formative adolescent period allows us to identify individuals who express early interest in non-STEM fields who would otherwise be overlooked if they switch to STEM during college or later in life. A greater understanding of Asian Americans’ early occupational expectations may reveal career trajectories of Asian Americans that receive less attention and also challenge the limited model minority characterization of Asian Americans as predisposed for STEM.

Following social-cognitive career theory (SCCT), we further address the invisible career trajectories of Asian American students by exploring the role of individual and contextual factors. We focus on two mechanisms that receive less attention in the literature on Asian American students’ traditional (STEM) and nontraditional (non-STEM) career goals (Hui & Lent, 2018). The first focuses on early academic interests and the extent to which Asian Americans may select into particular occupations, such as those in STEM, despite interest in other fields. Although evidence of whether individual interest predicts occupational expectations is mixed (Hui & Lent, 2018), assessing this relation is important because of the emotional stresses that misalignment can place on young people (Sheu et al., 2016) and the implications it presents for high school guidance counselors and parents (Kodama & Huynh, 2017; Smith & Allen, 2006). The second mechanism is the role of English. One question is how English learner (EL) status factors into Asian American students’ career decisions, separate from academic performance and interests.² Research shows, for example, Asian Americans may not pursue a career in teaching because of a lack of confidence in their English (Gordon, 2000). This question is important for

examining the career expectations of Asian Americans as nearly 21% are identified as EL in schools (NCES, 2019). By analyzing the degree of misalignment between academic and occupational interest, and the role of EL status in occupational expectations, we shift attention away from the focus on STEM in research literature that includes Asian American student experiences. As a result, this study has implications for supporting Asian Americans pursuing non-STEM career paths and highlighting the diverse academic and professional interests of Asian Americans.

By examining Asian Americans’ educational experiences, career interests, and individual development, this study accounts for and acknowledges the potential roles of different ethnicities, languages, and histories of immigration to the United States. However, as there is limited research on the early career expectations of Asian Americans, the main aims of this study are to (a) assess the longitudinal group trends and (b) identify whether there is an overall effect of academic interest and EL status for this population. Establishing the scope of both is necessary to guide future work that purposefully explores important subgroup differences and the intersecting identities of Asian Americans. The study’s findings not only highlight several of these areas for further inquiry, but also motivate the need for theoretical frameworks in future work that can explain the range of possible Asian American subgroup differences in career expectations and the heterogeneous effects of academic interest and EL status. For these reasons, this initial study focused on trends for Asian Americans as a group.

Background

Timing of Career Expectations

Many studies of career exploration tend to focus on young adults in college, prior to their entry into the labor market (e.g., Riegle-Crumb et al., 2011). Indeed, studies of Asian Americans and career development overwhelmingly examine their experiences in higher education (e.g., Hui & Lent, 2018; Kantamneni et al., 2018; Shen et al., 2014). Higher education research featuring Asian Americans is also less common than research on other racial groups and rarely reflects Asian Americans’ wide ethnic diversity (i.e., Museus et al., 2013). One major disadvantage of sampling only college students is that at this educational stage, they

¹ The terms career “expectations” and “aspirations” are sometimes used interchangeably in the career development literature because the operational definition in empirical research is similar (Mau & Li, 2018; Morgan, 2006). Our study uses “expectations,” but when citing this literature, we follow the term used by the authors.

² Identification and characterization of English learners involve issues of racialization and also often overlook the complex linguistic identities and practices of multilingual students.

are already tracked into professions that require a degree. In contrast, social psychological research suggests that career expectations and trajectories form earlier in adolescence (Bandura et al., 2001). Whereas future occupations may be driven by fantasy during childhood, career expectations become more concrete by adolescence, and youth begin to consciously choose academic and extracurricular activities accordingly. Studies show gender and racial disparities in science and math career aspirations appear before college, yet datasets often do not include Asian Americans or an examination of non-STEM fields (Sikora & Pokropek, 2012).

Understanding the career expectations of Asian Americans in high school or earlier is essential as a significant proportion of Asian American youth are excluded in studies that only sample the career paths of college-educated students. Currently, 42% of Asian Americans 18–24 years old are not enrolled in college, and 46% of Asian Americans age 25 or older do not have a bachelor's degree (NCES, 2019). In addition to including a more representative sample of Asian American youth, one advantage of exploring students' career expectations during high school is that they have more developed ideas about careers than during childhood, as well as more autonomy in selecting classes, particularly available electives (e.g., music) that align with those interests. High school also provides a unique opportunity to identify invisible career expectations and assess the extent to which they may have changed by the time Asian American students enter college or transition to postsecondary life. Such information is relevant for helping Asian American youth navigate academic and career choices and for introducing them to professional role models beyond those in STEM fields only (Kodama & Huynh, 2017; Sheu & Lent, 2015).

Academic Interests and Career Expectations Alignment

One concern with the overrepresentation of Asian Americans within STEM fields is whether the disparity reflects Asian American youth selecting careers because of external pressures over personal interest. Alignment between personal interests and career expectations is important for youth to improve decision-making and career readiness, reduce incongruent goals, and increase overall well-being and self-image (Park & Millora, 2010). Yet, the evidence is mixed as some studies indicate Asian American college students' personal interests predict career goals (e.g., Hui & Lent, 2018; Kelly et al., 2009; Sheu et al., 2010), while others find less of an association (e.g., Leong & Chou, 1994; Leong & Gupta, 2007; Tang et al., 1999). The link may be further mediated by levels of acculturation to dominant U.S. values; some research proposes Asian Americans are guided more by interdependent values that prioritize families and communities over self-expression (e.g., Fouad et al., 2008).

One explanation for inconsistencies in studies on Asian American personal interests and career expectations may be how both constructs are operationalized. Studies measure personal interest and career expectation as a numeric index of occupations perceived as typical for Asian Americans (e.g., Tang et al., 1999); as binary categories of science versus nonscience career domains (e.g., Kelly et al., 2009); or as investigative versus social occupations (e.g., Hui & Lent, 2018).³ One limitation of these measures, particularly those related to career, is that the analyses are unable to capture variation within such broad occupational categorizations or identify specific occupations where there is less alignment with personal interest. Measures of personal interest also overlook the school context and the role of academic subjects for young people. More detailed measures are needed to help address prior inconsistencies between personal interest and career expectations. A better understanding of whether the two constructs are linked has implications for nurturing Asian American youth. For example, if personal interest is not related to career expectations, researchers and educators may need to focus on other ways to support Asian American students' career goals.

English Learner Status

Theories of career choice and interest often specify self-efficacy as a key predictor (e.g., Hui & Lent, 2018). That is, the greater one's self-efficacy beliefs in a particular domain, the more likely one is to select a related career path. Studies operationalize self-efficacy differently. Some ask participants' perceptions of their abilities in specific career domains (e.g., Kim & Choi, 2019) and others using standardized test scores in broad academic domains such as math and science (e.g., Riegle-Crumb et al., 2011). Whether used as a covariate or key predictor, previous measures of self-efficacy may not consider the role of language in students' perceptions of their own abilities in relation to career expectations. However, language background may be influential in career expectations. Research suggests immigrants with low self-perceptions of their English proficiency are more likely to select careers that they perceive as requiring less English (Rangel & Shi, 2019).

Language may be particularly relevant to Asian American students' career expectations given the high proportion who are identified as EL (NCES, 2019). One concern is whether Asian American students identified as EL might select STEM fields despite interest in a more English-intensive occupation. Another possibility is that Asian American EL students might avoid certain occupations because of self-perceptions, as well as the perceptions of others regarding

³ Investigative and Social themed occupations are based on Holland's (1997) classification system. Investigative refers to work environments that encourages scientific competencies and solving abstract, complex problems in original ways. Social refers to work focused on human relationships, teamwork, social interactions, and the welfare of others.

their English skills and credibility in particular fields (Kim, 2020; Leong & Gupta, 2007). For instance, Asian Americans may avoid a career in teaching because of a lack of confidence in their English (Gordon, 2000). Studies also show some Asian American teachers feeling criticized for their accents (Nguyen, 2012). The extent to which EL status aligns with Asian Americans' career expectations has implications for addressing the underrepresentation of Asian Americans in certain fields and challenging perceptions of professional credibility based on race and spoken English.

Theoretical Framework

We used social-cognitive career theory (SCCT; Brown & Lent, 1996; Lent et al., 1994) to conceptualize the roles of personal interest and EL status in the career expectations of Asian American youth. SCCT postulates that individual characteristics and contextual factors influence one's sense of competency (self-efficacy) and expectation of positive outcomes (outcome expectancy) related to an occupation, both of which, in turn, impact personal interests in specific occupations and ultimately, occupational intention and choice. More broadly, individual characteristics (i.e., race, gender, and socioeconomic status) and contextual factors (i.e., cultural values and parent expectations) are theorized to affect one's learning experiences that then shape access to or pursuit of certain careers. The theory has been applied to study the career development processes of diverse groups, including Asian Americans (e.g., Hui & Lent, 2018; Kantamneni et al., 2018; Shen et al., 2014). For example, Shen et al. (2014) examined how culturally relevant contextual factors—parental expectations and internalized stereotyping—mediated the impact of parental pressure support on SCCT constructs of occupational interests and expectations among Asian American college students. The authors found positive effects of parent expectations and internalized stereotyping on occupational expectations. Although career expectations are generally formed during adolescence, SCCT studies on Asian American college students, such as the research by Shen and colleagues, overlook earlier development of their career goals. Furthermore, students' transition following high school is unique as some immediately enter the workforce with jobs that may or may not reflect their earlier career expectations.

In the present study, following the SCCT model, we focus on favorite academic subject and EL status as proxies for personal interest and self-efficacy, respectively, and occupational expectation as the outcome. We use favorite academic subject as a measure of early personal interest to explore the extent of its alignment and association with career expectations for the future. Because personal interest is generally theorized in SCCT to have a positive relation with career expectations, we anticipate a similar effect of favorite academic subject. As previous studies note that challenges to career pathways can take different forms for different

groups, particularly for underrepresented groups in certain fields (Grossman & Porche, 2014), a focus on EL status in career expectations of Asian American youth expands on studies that use SCCT. Prior research suggests that the intersection of race and language operates in ways that marginalize AAPIs within certain fields (Kim, 2020) and may influence their career expectations (Leong & Gupta, 2007). Given that self-efficacy is defined in SCCT as perceptions that one would be competent in an occupation, if some fields (non-STEM) are seen as requiring a particular level and skill with English (Cooc & Kim, in press), then students designated as EL may select out of those fields because they expect they will not be effective in them. Thus, we anticipate EL status is associated with lower occupational expectations in non-STEM fields. We further contribute to SCCT literature and theory by specifically examining the role of favorite academic subject and EL status on career expectations *over time*.

Accounting for environmental context is also needed for examining career expectations of Asian American youth. For example, measures of parent influence, particularly involvement in career planning and socioeconomic background, are likely to be related to interest in specific fields or provide greater awareness of others. Deference to parents and filial piety are consistent with research showing Asian American parents playing a significant role in some Asian Americans' occupational choices, especially those related to prestige and high salary (Roysircar et al., 2010). In addition, as nearly 60% of Asian Americans are born outside of the United States (Budiman et al., 2019), experiences related to immigration may be important to consider in their career trajectories. Asian Americans' concentration in STEM occupations is linked to Asian immigrants arriving with higher levels of college education and a desire to optimize social mobility via education and high-status occupations (Lee & Zhou, 2015; Min & Jang, 2015). Although EL status can be viewed as a contextual factor similar to immigration, we view language classification (e.g., EL or not) as more aligned with self-efficacy given the ways that being classified as EL can harmfully focus on what students do not know (Martínez, 2018). Following SCCT, we included parent influence and immigration as contextual covariates in our models to better disentangle and highlight the roles of favorite academic subject and EL status in career expectations.

Lastly, researchers emphasize the minoritized status of Asian Americans within particular professional fields, as well as how they may be deterred from fields in which they are underrepresented or that they perceive to be racially exclusive (Kim, 2020; Louie, 2004). Early career expectations for Asian American youth in fields such as business, teaching, and engineering may differ because of perceived levels of challenge to entering those fields. Although we are unable to measure which fields they may view as more

racially biased, we contribute to SCCT research by assessing when career expectations may form, for which occupations Asian American adolescents may develop favorable views, and the extents to which their favorite academic subject and EL status relate to career expectations in certain occupations.

Present Study

Using nationally representative data on high school students, we examined the early career expectations of Asian Americans over time. To compare career expectations in STEM and non-STEM fields, we disaggregated career expectations by the eight most common occupations reported among students. Our research questions are the following: (a) What are the career expectations of Asian Americans and to what extent do they change from high school to early postsecondary life? (b) What are the associations between favorite academic subject and EL status with career expectations for Asian Americans, controlling for individual and parent background factors? We hypothesized that Asian Americans would hold career expectations in a range of STEM and non-STEM fields early in high school, but career expectations in STEM would increase over time to reflect their greater representation in the STEM workforce. Although we anticipated some misalignment, we hypothesized that Asian American students' favorite academic subject in high school would on average be positively associated with career expectations in similar areas. Lastly, we hypothesized that Asian American students who were identified as ELs, despite their level of academic performance and favorite academic subject, would be less likely to hold career expectations in non-STEM fields.

Method

Data Source and Participants

We used data on student occupational expectations from the High School Longitudinal Study of 2009 (HSLs:09). HSLs:09 used a stratified, two-stage random sample design with schools selected in the first stage and students randomly selected from the sampled schools in the second stage (Duprey et al., 2018). As a nationally representative study of over 23,000 students from 940 public and private schools, HSLs:09 followed the same cohort in Grade 9, Grade 11, and 3 years after high school. The study focused on understanding students' transition from high school to postsecondary education and into the workforce with the purpose of identifying when and why young people pursue different academic courses, majors, and careers. In addition to measures of academic achievement and parent demographics, students completed surveys on interests and goals, schooling experiences, and home activities. Although a

major focus of HSLs:09 is student interest in STEM fields, the survey instruments asked about all academic subjects and professional careers. When combined with surveys of parents' professional backgrounds, school involvement, and educational expectations, HSLs:09 is an ideal data source for describing the career goals of young people during a critical transition period and exploring factors that may influence these trajectories. For all analyses, we used the restricted HSLs:09 datafiles containing detailed information on career choice.

We focused on a subsample of 2,340 Asian American students (5.5% of weighted sample).⁴ HSLs:09 used the following five categories to identify Asian American students in the dataset: Chinese ($n = 460$), Filipino ($n = 390$), Southeast Asian ($n = 520$), South Asian ($n = 500$), and other East Asian (Korean or Japanese, $n = 480$). The subsample represents the largest Asian American subgroups. Although HSLs:09 categories for Asian Americans do not identify ethnic diversity within each subgroup, when analyzed with the appropriate weights, the subsample generalizes to Asian Americans nationally during the data collection period. For comparison purposes, we also included students who did not identify as Asian ($n = 21,160$) when examining unadjusted trends in career expectations over time. In our analyses of the role of favorite subject and EL status on career expectations, we focus on Asian Americans. We control for Asian American subgroups in these analyses but did not disaggregate results to our research questions by the five ethnic and regional categories for substantive and practical reasons. Primarily, a lack of prior research on how and whether the subgroups might differ over time in relation to the key constructs (early academic interest, EL status, and career expectations) posed a challenge to reporting and explaining multiple pairwise comparisons that may not have a clear pattern.

Measures

Occupational Expectation

Our main outcome is from an open-ended survey question at each time point asking students their expected occupation at age 30. HSLs:09 grouped student responses into nearly 500 occupations. However, as many of the occupations had few student responses, for parsimony and reliable model estimates, we regrouped the occupations into the following eight categories: management or business; engineering; life or physical science; social sciences and services; law; education; arts and sports; and health. We also included a separate category for all "other."

⁴ Sample size rounded to nearest 10 as required by National Center for Education Statistics when using restricted data.

Favorite Subject

In Grades 9 and 11, students selected their favorite subject from the following: English, foreign language, science, art, music, mathematics, physical education or gym, religion, health education, computer science, social studies (history, government, or civics), career preparation, or other. As some subjects had few respondents, estimating the effect of all 13 on career expectations would be difficult and complicate the model. Furthermore, because of some similarities in subjects and a greater focus on STEM in U.S. schools, we grouped favorite subject into STEM (science, math, computer) and non-STEM (all other).

EL Status and Immigration

School transcript records indicated a student's EL status as related to school services (0 = did not enroll in English as a second language class; 1 = enrolled in English as a second language class). A related but separate variable documents the student's first language (0 = not English; 1 = English). HSLS:09 classified students as first-generation immigrants if they were "foreign-born citizens," "resident aliens," or "eligible noncitizens"; second-generation immigrants if they were U.S.-born citizens with at least one foreign-born parent; and third-generation immigrant or higher if they were U.S. or foreign-born citizens and both parents were U.S.-born.

Academic Achievement

We account for the role of early academic achievement in occupational expectations using two measures. The first is a student's underlying math ability on a continuous theta scale that provides a norm-referenced assessment of algebraic reasoning relative to the population of ninth grade students in 2009 (Ingels et al., 2011). The assessment used a two-stage design. The first stage consisted of items with a range of difficulty followed by a second stage that adapted items to the appropriate level of students. Our second measure of academic achievement is a student's grade point average (GPA) in Grade 9.

Parent Background

We used multiple measures to describe the potential influence of parents on their children's career goals. The first consists of each parent's self-reported occupation. We used the same coding scheme as for students' career expectations. We also included a continuous composite measure for socioeconomic status from HSLS:09 survey developers that combines parent education level, occupational prestige, and income. Lastly, from the student survey, we used an indicator of whether the parent helped with an "education/career" plan.

Analysis

To describe Asian American students' career expectations over time, we fitted an unconditional multinomial

logistic regression model to predict a polychotomous categorical outcome variable. In this study, the outcome can take any of the eight possible occupational expectation fields that students indicated at each time point. The multinomial model compares the effect of predictors on each occupational expectation relative to the reference outcome. We selected expectation in a health-related field as the reference based on the frequency distribution. As there were only three time points, we used a general specification of time with three dichotomous variables: Grade 9 (reference), Grade 11, and approximately 3 years after high school. We included student dummy variables for race as the other predictors in the unconditional model. We specified robust standard errors that account for the clustering of observations within students. For interpretation purposes, we applied the full sample to estimate the main model, which we then used to estimate and plot marginal probabilities of each occupation by the student group of interest (Asian Americans and all other). To examine the role of favorite academic subject and EL status in occupational expectation, we included the variables in the main model and also controlled for other individual characteristics (e.g., academic achievement) and parent characteristics (e.g., socioeconomic status, SES).

We conducted all analyses to account for the complex survey design of the HSLS:09 and to address missing data. First, we applied the corresponding sample weights (i.e., W4W1STU) provided by HSLS:09 to generalize our results to the population of ninth grade students in 2009, as well as replicate weights to derive appropriate standard errors for each estimate. Second, we imputed missing data for all variables using chained equations that pooled together results from 10 imputed datasets. The variables with the most missing values were parent occupation (31% and 46%)—possibly because not all parents work and not all children have two identified parents. Missing data on the outcome variables increased over time (11%, 14%, and 27%). We found less missing data for the two key predictors in EL status (7%) and favorite subject (23%). All analyses and imputation procedures were conducted in Stata 14.1 (StataCorp, 2015).

Results

Table 1 provides a weighted descriptive summary of Asian American students in Grade 9 and, for contextual reference, their peers. In general, Asian American students come from higher SES backgrounds but are less likely to speak English as a first language and more likely to be born outside the United States. Nearly half are second-generation immigrants. About 71% of Asian American parents reported working in non-STEM occupations. Academic performance according to math scores and GPA is higher among Asian Americans students compared with their peers. The most frequently reported favorite academic subject for

Table 1
Weighted Descriptive Summary of Students

Variables	Asians (<i>n</i> = 2,340)		All other (<i>n</i> = 21,160)		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Female	0.490	0.500	0.494	0.500	.884
Socioeconomic status	0.297	0.864	0.021	0.761	.015
English native language	0.470	0.499	0.885	0.319	.000
English learner	0.078	0.268	0.015	0.123	.180
U.S.-born	0.676	0.468	0.954	0.209	.000
First generation	0.380	0.486	0.053	0.223	.000
Second generation	0.520	0.500	0.116	0.320	.000
Third generation	0.100	0.300	0.832	0.374	.000
Chinese	0.195	0.397	—	—	
Filipino	0.166	0.372	—	—	
Southeast Asian	0.221	0.415	—	—	
South Asian	0.214	0.410	—	—	
Other East Asian	0.204	0.403	—	—	
Math theta score (ninth grade)	0.592	1.018	−0.029	0.942	.000
GPA (ninth grade)	3.117	0.792	2.669	0.904	.001
Parent involved in career	0.645	0.479	0.562	0.496	.718
Parent 1 non-STEM job	0.708	0.455	0.857	0.350	.031
Parent 2 non-STEM job	0.719	0.449	0.860	0.347	.044
Favorite class (ninth grade)					
English	0.072	0.258	0.085	0.279	.493
Foreign language	0.054	0.225	0.052	0.222	.663
Science	0.117	0.321	0.097	0.296	.558
Art	0.105	0.307	0.090	0.286	.910
Music	0.105	0.307	0.084	0.277	.462
Math	0.189	0.391	0.148	0.355	.480
Physical education	0.141	0.348	0.191	0.393	.311
Computer science	0.028	0.164	0.023	0.151	.823
Social studies	0.082	0.274	0.089	0.285	.372
Career expectation (ninth grade)					
Management/business	0.035	0.184	0.035	0.184	.939
Engineering	0.084	0.278	0.064	0.245	.422
Life/physical science	0.029	0.168	0.038	0.191	.503
Community/social services	0.021	0.144	0.024	0.152	.946
Law	0.033	0.180	0.040	0.196	.648
Education	0.019	0.137	0.039	0.192	.003
Art/sport	0.091	0.287	0.129	0.335	.394
Health	0.266	0.442	0.203	0.402	.323
Don't know	0.353	0.478	0.293	0.455	.257

Note. STEM = science, technology, engineering, and math; GPA = grade point average. Sample weight W4W1STU applied. Sample size rounded to nearest 10 as required by National Center for Education Statistics. *p*-values from *t*- or *z*-test of means. *Source:* U.S. Department of Education, The High School Longitudinal Study of 2,009 (HSL:09), Restricted Dataset.

Asian Americans in Grade 9 is math (18.9%), followed by physical education (14.1%), science (11.7%), art (10.5%), and music (10.5%), none of which were statistically different from other students. Expectation of an occupation in a health care field is the most common for Asian Americans in Grade 9. However, despite differences in individual and parent backgrounds, expectations in health care and other fields were similar for Asian Americans and their peers.

Trends in Career Expectations Over Time

In Figure 1, we present results from unadjusted multinomial logistic models predicting career at age 30 for the most frequently cited occupations. In contrast to Table 1, the

model results are based on the longitudinal sample. The most common expectation among Asian Americans in Grade 9 is occupations in health care (23.0%), followed by arts and sports (12.1%), engineering (9.2%), life and physical sciences (4.5%), and law (4.1%). Career expectation in health care and engineering increases slightly in Grade 11 before sharply decreasing about 4 years after high school. Expectation to have an occupation in business management follows a unique trend: few show an interest in Grade 9 (3.0%), but this more than triples over time (10.0%). In contrast to STEM and business fields, expectation in arts and sports is highest in Grade 9 and then quickly decreases. Expectations in community service, education, and law remain consistently low over time. Overall, the trajectory of Asian Americans' career expectations follows a comparable shape as similarly aged peers. Lastly, although not displayed in Figure 1, we note that similar to other peers, a high proportion of Asian Americans indicated "do not know" as a career expectation at each time point (23.1% to 37.1% for all students).

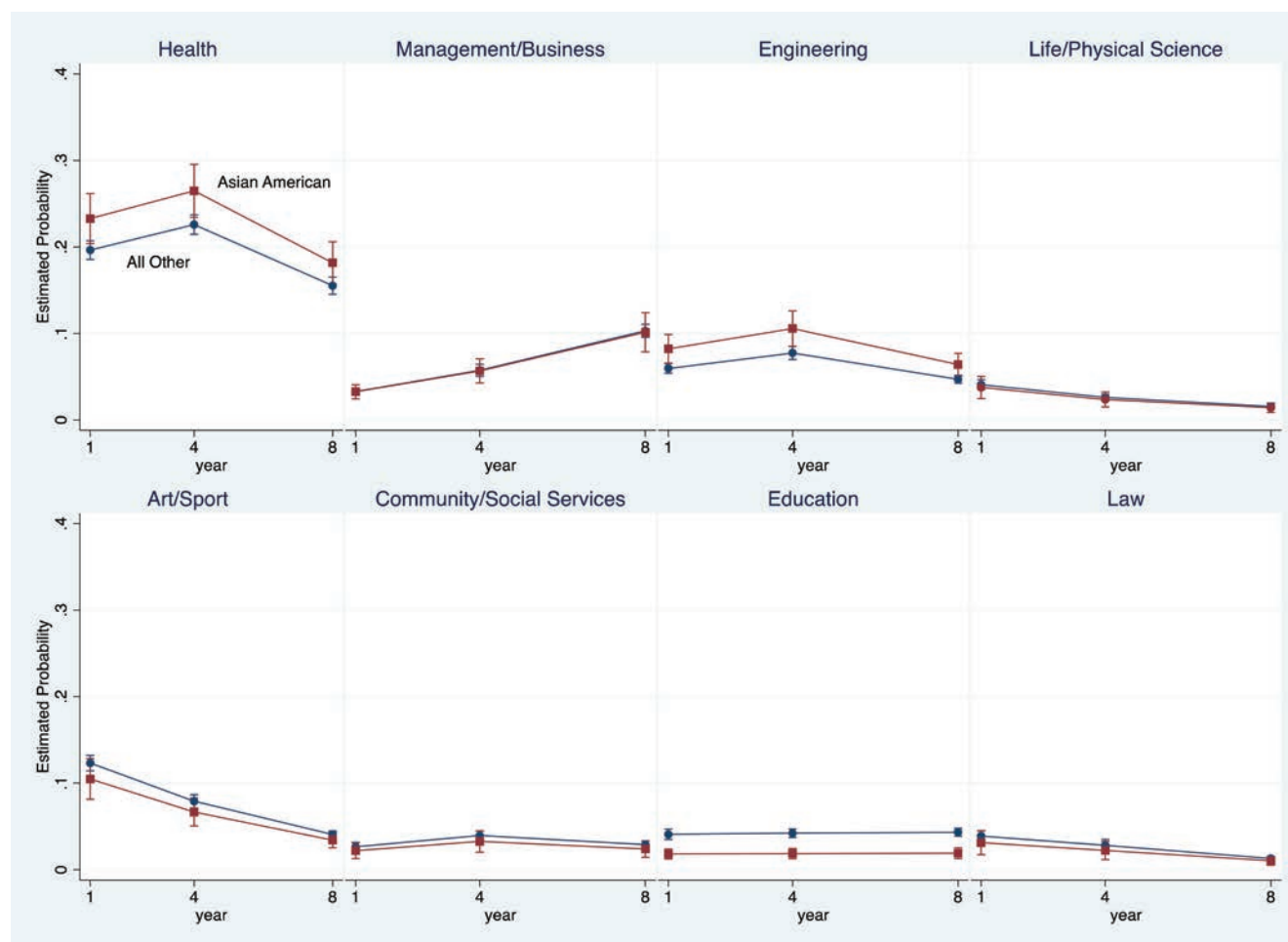
Academic Interest and Career Expectations

We next examined the relation between academic subject interest in high school and career expectation using multinomial logistic models that account for individual and parent contexts in Tables 2 and 3 (results appear in two tables but are from one model). The reference group for the multinomial outcome variable is occupational expectation in a health field. For example, the results show students with higher math test scores have greater odds of expectations in engineering (odds ratio, $OR = 1.48$, $p < .001$) and life science ($OR = 1.18$, $p < .05$) fields than in health, holding all else constant. Students with higher GPAs have greater odds of expectations in education ($OR = 1.31$, $p < .01$) but lower odds of expectations in arts and sports ($OR = .73$, $p < .001$) than health.

Figure 2 displays occupational expectations based on whether Asian American high school students indicated their favorite class was in a STEM (math, science, computer) or non-STEM subject (all other). In health care, engineering, and the physical and life sciences, students tended to hold expectations in these fields if they reported STEM as a favorite subject in high school compared with those who did not. The gap is most apparent for engineering at each time point ($p < .01$). The positive effect of favorite academic subject is similar for non-STEM occupational expectations, although not statistically significant based on the confidence intervals. The exception is arts and sports where interest in non-STEM subjects in high school is related to career expectation ($p < .01$). In contrast, expectation in management and business appears unrelated to academic interest in high school. Together, these results complicate the role of academic interest in career expectations as the former appears to matter for some occupational

Figure 1

Comparison of Estimated Asian American Career Expectations by Occupation Over Time From Unconditional Multinomial Logistic Regression Model; Year 1 = Grade 9, Year 4 = Grade 11



Note. U.S. Department of Education, The High School Longitudinal Study of 2009 (HSLs:09), Restricted Dataset. See the online article for the color version of this figure.

fields but not for others. As the results did not show Asian American students with academic interest in non-STEM subjects selecting STEM occupations and vice versa, there is limited evidence of misalignment. Thus, although many factors are involved in career expectations and representation across fields, the analyses suggest Asian Americans' decision-making is not counter to their personal interest.

EL Status and Career Expectations

We disaggregate career expectations for Asian Americans by EL status during high school in Figure 3. Given that the estimates account for academic achievement and parent SES, the gap between ELs and non-ELs should be narrower. For seven of the eight career fields, Figure 3 shows no statistically significant difference between ELs and non-ELs among Asian Americans. The one exception is law, where

non-ELs are more likely to expect occupations in law than ELs at each time point ($p < .01$). In unadjusted models (available upon request), ELs are more likely to expect occupations in health care and engineering than non-ELs at each time point, and less likely in business, community and social services, and education. The results suggest that unadjusted gaps in occupational expectations between ELs and non-ELs are related to individual and parent background differences. Figure 3 challenges the view that, because of EL status, Asian Americans focus on careers where they have a greater comparative advantage (Rangel & Shi, 2019) or fields perceived as less racially biased (Louie, 2004).

Discussion

The overrepresentation of Asian Americans within STEM fields tends to overshadow other career trajectories

Table 2*Multinomial Logistic Regression Models Predicting Career Expectation (Reference = Health)*

Variables	Management/business	Engineering	Life/physical science	Social services
Time: Year 4 (ref = Year 1)	1.639 (0.186)***	1.163 (0.116)	0.643 (0.077)***	1.417 (0.243)*
Time: Year 8	4.611 (0.470)***	1.225 (0.111)*	0.640 (0.099)**	1.721 (0.302)**
Chinese (ref = all other)	1.880 (0.643)	0.680 (0.244)	2.200 (1.105)	0.368 (0.176)*
Filipino	0.392 (0.131)**	1.071 (0.492)	0.695 (0.347)	0.824 (0.506)
Southeast Asian	0.420 (0.163)*	0.565 (0.215)	0.535 (0.269)	0.767 (0.444)
South Asian	0.694 (0.201)	0.298 (0.107)***	0.385 (0.181)*	0.535 (0.271)
Other East Asian	0.784 (0.361)	0.966 (0.327)	2.114 (0.941)	1.730 (1.107)
Second generation (ref = first gen)	0.916 (0.228)	1.409 (0.417)	1.445 (0.668)	0.561 (0.299)
Third generation	0.943 (0.239)	1.181 (0.343)	1.628 (0.856)	0.762 (0.421)
English first language	1.051 (0.214)	0.923 (0.172)	1.179 (0.347)	1.012 (0.373)
English learner	1.061 (0.489)	1.185 (0.468)	1.448 (1.025)	0.753 (0.427)
Favorite subject: Always STEM	0.732 (0.095)*	1.161 (0.127)	1.072 (0.164)	0.894 (0.228)
Favorite subject: Never STEM	0.940 (0.106)	0.567 (0.064)***	0.672* (0.110)	1.558 (0.202)***
Math theta score (ninth grade)	1.011 (0.065)	1.482 (0.088)***	1.180 (0.097)*	1.051 (0.087)
GPA (ninth grade)	0.880 (0.074)	0.925 (0.072)	0.942 (0.105)	0.964 (0.110)
Female	0.223 (0.024)***	0.070 (0.007)***	0.535 (0.079)***	0.770 (0.141)
Parent SES	1.120 (0.111)	1.219 (0.127)	1.157 (0.160)	1.327 (0.211)
Parent career planning	0.987 (0.014)	0.993 (0.012)	0.968 (0.019)	0.973 (0.018)

Note. STEM = science, technology, engineering, and math; GPA = grade point average. All models control for parent occupation. Coefficients as odds ratios. Standard errors in parentheses. *Source:* U.S. Department of Education, The High School Longitudinal Study of 2,009 (HSL:09), Restricted Dataset. * $p < .05$. ** $p < .01$. *** $p < .001$.

and barriers in Asian American student experiences. In contrast to prior studies that focus primarily on Asian American college students, the present study examined the career expectations of a nationally representative sample of Asian Americans as they transitioned from high school to post-secondary life. We contribute to career development literature and research that uses SCCT by assessing career expectations over time in a range of occupations. Given concerns about external pressures in career selection and the high percentage of Asian American students identified as EL, we further examined the role of favorite academic subject and EL status in career expectations.

Invisible Career Trajectories

Our results show that Asian American high school students' occupational expectations were highest in the health care and engineering fields. This pattern is consistent with Asian Americans' entry into STEM fields later in college (NCES, 2017) and the workforce (Funk & Parker, 2018). One notable finding is that at Grade 9, Asian Americans hold high expectations to have occupations in arts and sports; the proportion is similar to Asian Americans' expectations to have occupations in engineering. Although Asian American representation in arts and sports receives

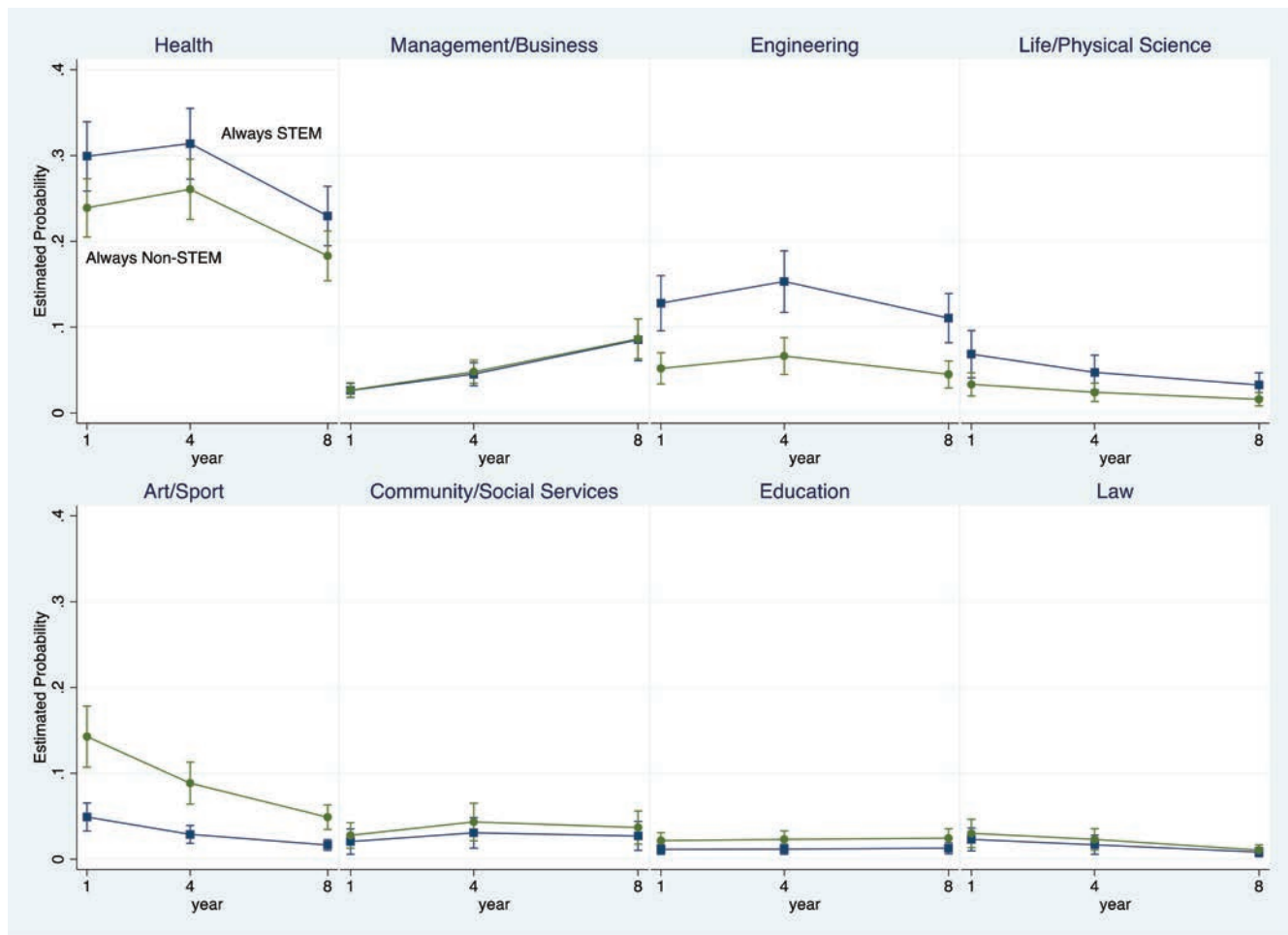
Table 3*Multinomial Logistic Regression Models Predicting Career Expectation (Reference = Health)*

Variables	Legal	Education	Arts/sports	Other
Time: Year 4 (ref = Year 1)	0.701 (0.108)*	0.967 (0.091)	0.552 (0.040)***	0.973 (0.068)
Time: Year 8	0.470 (0.083)***	1.487 (0.141)***	0.461 (0.043)***	1.709 (0.150)***
Chinese (ref = all other)	0.367 (0.176)*	0.587 (0.256)	1.220 (0.598)	0.891 (0.335)
Filipino	0.351 (0.271)	0.316 (0.149)*	0.649 (0.251)	0.840 (0.340)
Southeast Asian	0.204 (0.114)**	0.128 (0.103)*	0.346 (0.143)*	0.380 (0.153)*
South Asian	0.636 (0.376)	0.311 (0.165)*	0.278 (0.108)**	0.179 (0.068)***
Other East Asian	0.576 (0.299)	0.594 (0.353)	1.753 (0.678)	0.921 (0.348)
Second generation (ref = first gen)	0.530 (0.296)	0.930 (0.533)	1.552 (0.385)	1.533 (0.436)
Third generation	0.578 (0.317)	1.641 (0.932)	1.872 (0.644)	2.269 (0.685)**
English first language	0.895 (0.269)	0.784 (0.242)	0.737 (0.257)	0.975 (0.175)
English learner	0.098 (0.079)**	1.017 (0.546)	0.634 (0.243)	1.035 (0.422)
Favorite subject: Always STEM	1.193 (0.304)	0.775 (0.142)	0.646 (0.089)**	0.810 (0.088)
Favorite subject: Never STEM	1.938 (0.350)***	1.911 (0.244)***	2.467 (0.260)***	1.212 (0.110)*
Math theta score (ninth grade)	1.147 (0.111)	0.972 (0.081)	0.973 (0.058)	0.827 (0.043)***
GPA (ninth grade)	1.046 (0.144)	1.314 (0.139)**	0.733 (0.054)***	0.559 (0.036)***
Female	0.468 (0.083)***	0.911 (0.114)	0.318 (0.032)***	0.127 (0.011)***
Parent SES	0.846 (0.138)	0.983 (0.145)	1.083 (0.112)	0.839 (0.081)
Parent career planning	1.020 (0.026)	0.982 (0.014)	0.963 (0.013)**	0.978 (0.011)*

Note. STEM = science, technology, engineering, and math; GPA = grade point average. All models control for parent occupation. Coefficients as odds ratios. Standard errors in parentheses. *Source:* U.S. Department of Education, The High School Longitudinal Study of 2,009 (HSL:09), Restricted Dataset. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 2

Comparison of Estimated Asian American Career Expectations by Favorite Academic Subject in High School, STEM (Science, Math, Computer) or Non-STEM (All Other), From Full Multinomial Logistic Regression Model; Year 1 = Grade 9, Year 4 = Grade 11



Note. U.S. Department of Education, The High School Longitudinal Study of 2009 (HSL:09), Restricted Dataset. STEM = science, technology, engineering, and math. See the online article for the color version of this figure.

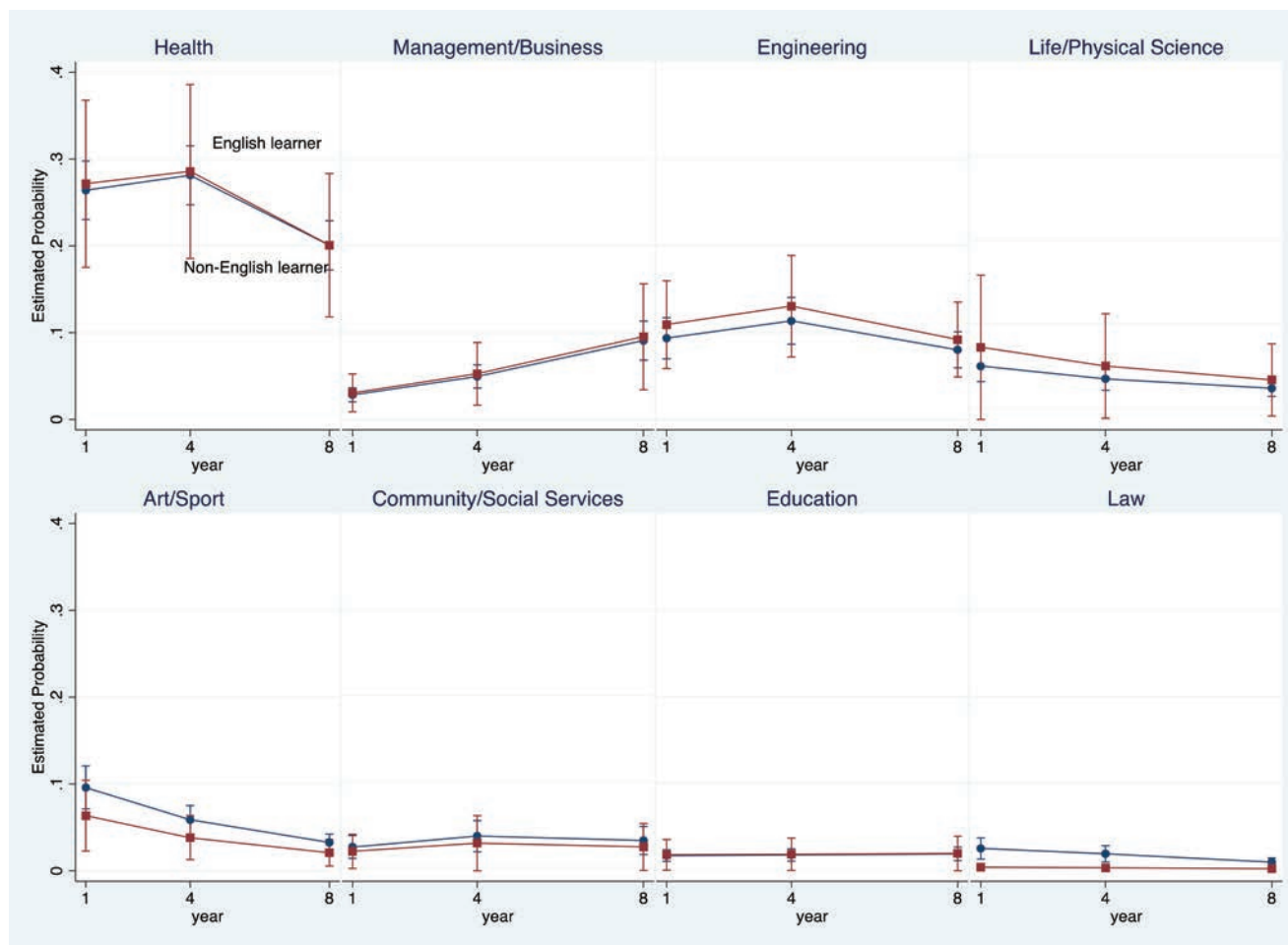
little attention, this finding contests a perception of Asian Americans as overly focused on STEM careers. This finding additionally challenges a view of career goals as rooted in culture—a view that perpetuates essentialist notions of culture, as well as of Asian Americans. Characterizing Asians as predisposed to be exceptional in STEM fields contributes to a racial narrative of Asian Americans as “smart but not capable of reason . . . Asians are technically proficient but lack creativity” (Shah, 2019, p. 673). Our study’s results show that a nontrivial proportion of Asian American youth expected occupations in arts and sports. This finding also points to potential pipeline issues and barriers in these fields.

Prior SCCT research on Asian American career paths tends to capture only one time point in college and provides limited insight into how early career goals may develop or change. The present study’s longitudinal analysis reveals

several new findings. First, with the exception of the decline in arts and sports between Grade 9 and Grade 11, occupational expectation in most other fields is stable in high school but tends to decrease soon after. This pattern may reflect Asian Americans modifying their expectations based on college course work or early exposure to the workforce. Second, occupational expectation in business and management is low in Grade 9, but it is also the only area that tends to increase over time. One possible explanation for this trajectory is that students are less likely to gain exposure to business careers in high school courses, in contrast to required courses in math and science or electives in the arts. College may be the first opportunity for many students to enroll in economics and business classes. Students who enter the workforce after high school may also gain business-related experiences that shape their later career interests in the field—a pattern that is probably less likely

Figure 3

Comparison of Estimated Asian American Career Expectations by English Learner and Non-English Learner, From Full Multinomial Logistic Regression Model; Year 1 = Grade 9, Year 4 = Grade 11



Note. U.S. Department of Education, The High School Longitudinal Study of 2009 (HSLs:09), Restricted Dataset. See the online article for the color version of this figure.

in STEM because of the specialized content, prerequisites, and training. Third, the longitudinal trends during and after high school reveal that focusing only on college or college-aged individuals would have falsely suggested Asian Americans are not interested in arts and sports careers or that Asian Americans consistently hold high career expectations in business and management.

When compared with similar-aged peers, we found trends that suggest common developmental trajectories or shared interest in popular fields. For instance, health care was the most common career expectation across all racial and ethnic groups. This pattern may reflect a public push among government officials and educators to prioritize STEM and improve U.S. competitive advantage in the global economy. The decline over time in health care interest after high school is also consistent for other students and points to postsecondary preparation

challenges. The high career expectation in arts and sports in Grade 9, often the second highest, is similar for other students as well. As research on Asian American career trajectories tends to sample only Asian American college students (i.e., Hui & Lent, 2018; Kantamneni et al., 2018; Shen et al., 2014), our study's results contribute to the broader SCCT literature by complicating the perception that some groups are inherently over or underrepresented in certain occupations. Instead, as career expectations for young people are more alike than different, greater attention is needed on maintaining these career interests and reducing disparities in occupational attainment.

Academic Interest and Career Alignment

Our study contributes to the mixed SCCT literature on the role of individual interest in career trajectories of Asian

Americans. Whereas studies using SCCT tend to focus on STEM course-taking and trajectories of young people (Falco, 2017), we defined individual interest as based on students' favorite academic subjects in high school. Students' favorite subject may better capture individual interest than overall course taking, which is often affected by numerous school or external factors. We also measured career expectations in eight specific fields. The results show favorite academic subject is associated with some career expectations (i.e., STEM and arts) but not others (i.e., business and law). One possible explanation is that the content of some academic subjects are more easily matched to certain career fields; some subject areas may also inspire or provide greater insight into specific industries. The limited relation between favorite academic subject during high school and expected careers in business, law, and education has implications for how educators engage with Asian American students, especially if they have limited exposure or struggle to see how their classes apply to these fields. Early career counseling and introduction to career role models may be helpful.

One motivation for this study was to understand potential misalignment between individual interests and career expectations for Asian Americans. Disparities in representation within certain occupations may be less problematic if they are reflected in similar levels of self-reported career goal. A related concern is if Asian American students with academic interest in non-STEM subjects held greater expectations in STEM occupations and vice versa as this would suggest strong pressures to select certain careers. Although our full model results found little misalignment on average for Asian Americans, this is not to suggest that Asian Americans are not guided sometimes toward particular careers. It is possible for Asian Americans to favor certain high school academic subjects and feel pressure to enter related careers. Rather than focusing only on alignment, one implication of the findings is that supporting Asian Americans' career development may mean fostering and sustaining interest in a range of academic subjects.

Beyond EL Status

We originally hypothesized that EL status relates to whether Asian Americans expected to enter careers that may be perceived as less language intensive. SCCT studies of career development have tended to focus on self-efficacy in terms of career tasks or skills. One contribution of this study is more insight into the potential role of EL status in the career expectations of Asian American students, especially as more than 20% are identified as ELs in K–12 schools. On the one hand, separate unadjusted results show differences in career expectations between EL and non-EL students; however, this gap is mostly attenuated after accounting for individual and parent background characteristics. The finding supports research on how contextual

factors related to EL status may influence individual decisions to prioritize or specialize in certain skills, and how one may view the environment and demands of some occupations (Louie, 2004; Rangel & Shi, 2019). For example, Asian Americans may self-select career paths that are math-intensive because of exclusion from fields considered less technical (Kodama & Huynh, 2017; Sue & Okazaki, 1990).

One field where this self-selection may occur is education. Asian Americans who self-report greater levels of English proficiency are more likely to become K–12 teachers than those who reported low levels (Cooc & Kim, *in press*). Whether Asian Americans self-select out of specific career trajectories early on, or certain fields push away Asian Americans based on factors related to language, race, or a combination of language and race is difficult to disentangle. However, the consequence is still lower representation and missed opportunities for particular fields to include Asian Americans.

The results imply that EL classification is likely to be associated with career expectations in direct and indirect ways not fully captured in this study. Educators can support students classified as EL to explore diverse occupational fields and help to dispel views of race or ethnicity as predictive of English ability and professional credibility (Nguyen, 2012). More multilingualism and variations of English can importantly enhance all fields (Kim, 2020). To ensure greater representation in careers, equalizing opportunities between ELs and non-ELs must be a priority in schools.

Limitations and Implications for Future Research and Practice

This study's contributions should be considered in relation to several limitations. First, the findings should not be interpreted as causal. The longitudinal models were designed to examine trends over time, and associations with career expectations for Asian Americans. Many contextual factors not measured by the survey, and beyond our study's focus on favorite academic subject and EL status, can influence young people's career expectations. Second, similar to other studies examining early career trajectories, our measures focused on career expectation rather than actual choices in the labor market. Future research should consider extending longitudinal studies to capture early school experiences and career changes in later adulthood. Third, while our study accounted for common measures of acculturation, such as birthplace, immigration status, language, and parent SES, the HSLs:09 dataset lacked information on specific cultural values (Kim & Hong, 2004) that some Asian Americans may hold and consider in their career choices. Fourth, our measure of parents' influence consisted of mainly their occupation and involvement in their child's career planning, as opposed to direct questions about parental support and expectation in specific occupations. Fifth, our measure of

EL status does not capture attitudes, values, and beliefs regarding one's English language skills and in relation to entering specific occupations. Lastly, although research suggests Asian Americans may view some occupations as more racially exclusive or biased, our study lacked such measures.

Our main results provide broader avenues for future research around career trajectories for Asian Americans. Although our study detected clear longitudinal patterns in career interests, such as an increase in business and management interest over time and decrease in arts and sports, qualitative studies should explore why these patterns emerged. For instance, to what extent are these patterns because of changes in individual preference, age-related milestones in life, or influences from different social contexts as young people transition out of high school? Deeper insight into why interest in business increases over time has implications for supporting high school students with this early interest, such as through school curriculum and other types of exposure to this field. A related question is how parent and cultural influence may change over time and affect career choices. In career fields where expectations decreased over time, new studies could explore why and whether structural barriers play a role.

Future research should further explore the role of English in career decisions for Asian Americans. Studies could examine how self-perceptions related to standardized English skills may interact with beliefs about English's role within certain occupations to influence career expectations. Greater distinction between perceptions of English proficiency and racialized views of English can be helpful in understanding not only career choices, but also interest in academic subjects. A different issue for further study is how the label of EL may impact students' course-taking opportunities in high school and long-term career expectations. Measures of how EL status and labeling affect students' self-esteem and self-image should be analyzed in relation to careers as well. Speaking nonstandard English (e.g., with an accent) is also not captured in standardized measures of English proficiency (e.g., the EL label). ELs may avoid certain fields for fear of being treated unfairly by potential employers because of bias against nonstandard English that is interpreted as limited English proficiency. Future studies should include measures of whether Asian American youth perceive their future career opportunities as related to their race or ethnicity and spoken English.

A large literature in education continues to show that minoritized racial groups benefit from having teachers of the same race (e.g., Redding, 2019). Missing from this research is the effect of same-race teachers and, more broadly, other role models in the career trajectories of Asian American students. Future research should consider the extent to which supportive role models or experiences of bias and discrimination from adult figures may affect perceptions of what fields are feasible. As teachers may have high academic

expectations of Asian Americans because of the model minority stereotype, one question is whether teachers may assume certain careers for Asian American youth. Measures of their internalized career expectations because of the overrepresentation or underrepresentation of Asian Americans in different fields may also better capture how Asian American students' early career interests are formed.

Our full model results additionally provide areas of future research on how intersecting identities may shape career expectations for Asian Americans. For example, our results show large gender differences in career expectations (online Supplemental Materials Figure 1). Asian American females are more likely to hold career expectations in health fields, while Asian American males are more likely to hold career expectations in engineering. As the models account for socioeconomic background and academic achievement, future research should examine how gender norms and socialization may affect Asian American career expectations in these fields. The ethnic diversity among Asian Americans also warrants more attention as our covariate-adjusted results show disparities in career expectations by Asian ethnic subgroup in the health, engineering, and arts and sports fields without clear patterns (online Supplemental Materials Figure 2).

This study's findings have several practical implications for teachers and school career counselors. Characterizations of Asian Americans as highly capable only in STEM fields are based in and perpetuate harmful racial stereotypes (Shah, 2019) that can affect the ways Asian Americans are perceived by others. Our study indicates that Asian Americans' career expectations are more complex and varied than allowed by such characterizations. As Asian Americans' career expectations in arts and sports in Grade 9 were similar to engineering but decreased thereafter, educators can support these early interests with greater extracurricular opportunities in these domains and access to appropriate role models throughout high school. The finding that career expectation in business and management increases over time suggests a need for support through courses and educational activities. Counselors, in particular, can play an important role in connecting Asian American students to local businesses that provide opportunities for students to see the operation and management side of companies. Although Asian American youth express strong career expectation in STEM, the findings also reveal other career expectations that receive less attention. Counselors working with Asian American parents can discuss these non-STEM careers as potential pathways as well.

Conclusion

Our study revealed Asian American career expectation in fields that are overshadowed by the national focus on STEM and greater emphasis on college experiences. The

results also provide new information on Asian Americans' early career expectations by showing that favorite academic subject in high school is linked to career expectations in some occupations but not others. EL students hold different career expectations than non-EL students, but this is mostly attenuated when accounting for individual and parent backgrounds. By highlighting Asian American students' early career expectations in a range of occupations that change over time, often similar to their peers, this study challenges the limiting model minority characterization of Asian Americans as predisposed for and uniformly focused on STEM fields. It also reveals ways to support Asian Americans pursuing "nontraditional" career paths. The goal is not to critique Asian American representation within STEM, but to increase Asian American visibility in other fields and identify potential barriers to those fields that receive less attention.

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