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## Social mobility and the educational choices of Asian Americans<sup>☆</sup>

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### Abstract

In this paper, we propose a synthetic framework, “strategic adaptation,” for understanding the social mobility process of Asian Americans. We argue that Asian Americans consciously choose occupations where they can effectively cope with potential discrimination and other disadvantages by achieving marketable credentials. Our empirical analyses are primarily based on data from the 1988–1994 *National Educational Longitudinal Survey*. There are four main findings from our study. First, Asian American youth tend to choose occupations with a high representation of Asian workers and high average earnings/education, relative to whites, even after controlling for socioeconomic background and academic performance. Second, Asians are more likely than whites to expect to enter college and to major in fields that have high financial payoffs. Third, a large fraction of this racial gap is attributable to occupational expectation. Finally, Asians are more likely than are whites to actually enroll in college and to pursue high-earning majors, and these racial differences are attributable to both educational expectation and occupational expectation.

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## 1. Introduction

According to the 2000 Census, more than 10 million Asian Americans live in the US, comprising 3.6% of the country's population (Table 1).<sup>1</sup> This figure is more than triple the size of the Asian American population in 1980. By comparison, the total US population increased by only 24% in the same period. It seems highly likely that the rapid growth of the Asian American population will continue in the near future, largely due to the constant influx of new immigrants from Asian countries (Passel and Edmonston, 1994). If their previously small population had justified Asian Americans' virtual exclusion from mainstream research on social mobility in American society (exceptions being Hirschman and Wong, 1984, 1986), this justification would no longer hold true.

Another reason for the lack of concern with Asian Americans among stratification researchers is the notion, more popularized by the general media than bolstered by rigorous social science research, that Asian Americans are an unproblematic "model minority" that has achieved equal social status with the white majority. Not only is the portrayal of Asian Americans as a "model minority" a simplistic and inaccurate description of this heterogeneous group (Goyette, 1999; Hurh and Kim, 1989; Suzuki, 1977), but it also obscures the complex nature of the social mobility processes experienced by Asian Americans.<sup>2</sup>

Indeed, the most intriguing question facing researchers studying Asian Americans is the paradox that Asian Americans appear to have suffered disadvantages as a minority but fare well by standard measures of socioeconomic status. On the one hand, historical and experiential accounts unambiguously document that Asian Americans have been a target of severe racial discrimination and prejudice (e.g., Chan, 1991; Cheng and Bonacich, 1984; Daniels, 1988; Hurh and Kim, 1989; Lee, 1991; Loewen, 1971; Lyman, 1974; Saxton, 1971; Suzuki, 1977; Takaki, 1989). For example, in the first half of this century, most Asian Americans were denied by law such fundamental civil rights as the right to join unions, obtain professional licenses, testify in court, own land, form families by marrying local women or bringing women from native

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<sup>1</sup> The figures are compiled from information posted on the web site of the US Census Bureau (<http://www.census.gov>). Note that the 2000 Census departed from earlier censuses in allowing a person to be identified with more than one racial category. Earlier research has shown that about half of multiracial children who are partly Asian are identified as Asian when forced to choose only one race (Harris and Sim, 2002; Xie and Goyette, 1997). To make the 2000 Census figures comparable to those from the earlier censuses, we use a simple 50% rule and designate half of the individuals reported as multiracial Asians in the 2000 Census as Asian.

<sup>2</sup> For example, not all Asian Americans are economically successful. The poverty rate is known to be high among some segments of the Asian American population (Barringer et al., 1993, Table 8.13; Endo, 1980, pp. 367–368; Kalish and Yuen, 1973; Kitano and Daniels, 1988, pp. 169–170; Lee, 1994). In addition, it has been suggested that the occupational "success" of a few Asian American groups such as Japanese, Chinese, and Asian Indians results mainly from "over-education" in the sense that they pay a higher price than whites for achieving the same social status (Barringer et al., 1993, Chapter 8; Hirschman and Wong, 1984, 1986; Suzuki, 1977; Wong, 1980). However, Sakamoto and Furuichi (1997, 2002) have recently challenged this conventional wisdom, showing that this earnings disadvantage is limited to foreign-born Asian Americans.

Table 1  
US population by major race/ethnicity: 1980 and 1990

Race/ethnicity	1980 Census		1990 Census		2000 Census	
	Number	Percent	Number	Percent	Number	Percent
Asian Americans	3,259,519	1.4	6,950,339	2.8	10,246,797	3.6
Japanese	700,974	0.3	847,562	0.3	824,469	0.3
Chinese	806,040	0.4	1,645,472	0.7	2,505,046	0.9
Korean	354,593	0.2	798,849	0.3	1,088,147	0.4
Filipino	774,652	0.3	1,406,770	0.6	1,879,220	0.7
Asian Indian	361,531	0.2	815,447	0.3	1,698,772	0.6
Vietnamese	261,729	0.1	614,547	0.2	1,146,100	0.4
Other	*	*	821,692	0.3	1,105,045	0.4
All persons	226,545,805		248,709,873		281,421,906	

Source: 1980, 1990, and 2000 US Censuses.

Note. \* Indicates a category not available in the 1980 Census. Figures for the 2000 Census assume that half of the individuals reported as multiracial Asians would be counted as Asian Americans by the old one-race-only method used in the 1980 and 1990 Censuses. See Footnote 1.

countries, or live outside ethnic ghettos. Such blatant discrimination against Asian Americans is no longer visible or tolerated, but Asian Americans still experience several disadvantages associated with being a minority: as newcomers they often find themselves lacking English skills, social networks, or cultural knowledge about mainstream American society. On the other hand, quantitative analyses show, using objective measures of socioeconomic well-being such as education, occupation, and income, that since World War II an increasingly significant proportion of Asian Americans have achieved equal and sometimes superior socioeconomic status to that of whites (Barringer et al., 1993; Hirschman and Wong, 1984, 1986; Kitano, 1969; Kitano and Daniels, 1988; Nee and Wong, 1985; Petersen, 1978; Sakamoto and Furuichi, 1997, 2002; Sakamoto et al., 2000).

In this paper, we propose to explore this paradox by borrowing and extending two classic status attainment models. In particular, we pay close attention to the role of the educational choices made by Asian Americans. We argue that Asian Americans consciously plan and pursue educational paths that yield high financial and social returns. This thesis is empirically tested with statistical analyses of Asian American youth's occupational expectation, educational expectation, and college enrollment. The data used for these analyses are drawn from the 1988–1994 *National Educational Longitudinal Survey* (NELS), the 5% *Public Use Microdata Sample* (PUMS) from the 1990 US Census, and the 1980–1992 *High School and Beyond* Sophomore Cohort.

## 2. Theoretical perspectives

What accounts for Asian Americans' high educational achievement and high socioeconomic status in the US? In this section, we first review three theoretical perspectives in the literature and then propose our own synthesis.

### 2.1. Culture

The most popular explanation for Asian Americans' high educational achievement and occupational concentration in technical fields and small businesses has been cultural. Kitano (1969, p. 3), for example, draws the analogy between Japanese culture and the Protestant Ethic, suggesting that similar values account for each group's success. Wong (1980, p. 517) argues that Chinese American children are pushed to higher education because "there is much respect for the scholar" in Chinese culture. Similarly, Barringer et al. (1993, p. 134) invoke Confucianism to account for Asian Americans' educational success.<sup>3</sup> While the "segmented assimilation" theory is a broad theory positing divergent assimilation paths for new immigrants depending on the macro environment they face in the US (Portes and Zhou, 1993; Zhou, 1997), it also highlights the importance of culture. This theory suggests that cultural forces, such as an "immigrant community's values and tight solidarity," protect immigrant children in unfavorable social contexts from downward assimilation into the underclass (Portes and Zhou, 1993, p. 82).

While important cultural differences exist between Asian societies and mainstream American society (e.g., Markus and Kitayama, 1991), the cultural explanation in its plain form has limited analytical value because it is a mere description: Asian Americans have done well in terms of educational attainment and scientific achievement because they value education and science. A more interesting question is why they value education and science so much. Is this purely a result of historical legacy, or in part due to interaction with American society at large (Sue and Okazaki, 1990; Zhou, 1997)? We should also remember that the influence of Confucianism is limited to East and Southeast Asia. If Confucianism is the explanation, how do we explain high educational and occupational achievement among Asian Indians in the US?

### 2.2. Structure

The structural perspective views Asian Americans in terms of the social and economic needs of the larger US society. Historically, Asian immigrants have filled the need for low-wage labor. Before World War II, the demand for cheap labor to build the transportation, agricultural, and industrial infrastructure in the US was the driving force behind the recruitment of first Chinese, then Japanese after the 1882 Chinese Exclusion Act, and later Filipinos after Japanese became unavailable under the 1907–1908 Gentlemen's Agreement. Cheng and Bonacich (1984) give detailed accounts of such structural forces at work. However, after World War II, the sudden demand for scientific and technical personnel, in combination with changes in immigration law, resulted in the "brain drain" of well-trained professionals from Asia (for a review, see Nee and Wong, 1985). The selective immigration of Asians with posi-

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<sup>3</sup> An excellent historical account of the relationship between Confucianism and status attainment is given by Ho (1962), who clearly shows that education facilitated upward mobility for those from poor family origins in pre-modern China.

tive characteristics in recent years may well contribute to Asian American children's educational achievement (Barringer et al., 1993, p. 167), since, as we have learned from social stratification research (e.g., Blau and Duncan, 1967), children of educated parents tend to have better education themselves. The structural explanation, however, has certain limitations. One major limitation is that it does not apply to children of Southeast Asian refugees (Vietnamese, Laotians, and Cambodians) who came to this country after the Vietnam War with little economic or human capital. Neither can it explain why Chinese and Japanese had already closed gaps with whites in educational attainment by the 1930s, long *before* "brain drain" immigrants' arrival after 1965 (Hirschman and Wong, 1986).

### 2.3. Marginality

In their landmark study *The Polish Peasant in Europe and America*, Thomas and Znaniecki (1974) found evidence of a great cultural chasm that separated immigrant parents from their American-born children. The second generation was specifically characterized by what the Chicago sociologists termed "marginality," the experience of living in two worlds and not fully belonging to either. Marginality refers to a painful split, with accompanying feelings of insecurity, alienation, and ambivalence toward both the ethnic subculture and the dominant society.

The term "marginality" seems to characterize Asian American children in general (not just second-generation Asian Americans), as Asian Americans constantly search for their own identity in American society without being fully assimilated into the mainstream (Oyserman and Sakamoto, 1997; Sue and Sue, 1973). Indeed, marginality is one of the key characteristics shared by Asian Americans of all ethnic groups. For instance, past research (e.g., Matsumoto et al., 1973; Ting-Toomey, 1981) has shown that even third- and fourth-generation Chinese and Japanese still strongly identify with their ethnic cultures. This is in sharp contrast to earlier European immigrants, who after a generation or two would approach "amalgamation" (Park, 1950), or racial mixing. Currently, outmarriages are frequent but not predominant among Asian Americans; that is, most Asian Americans still marry members of their own ethnic groups (Barringer et al., 1993, p. 145; Kitano and Yeung, 1982; Sung, 1990). In addition, divorce rates are significantly higher for outmarriages than for inmarriages among Asian Americans (Sung, 1990).<sup>4</sup>

Scholars have linked Asian Americans' marginal status to their high educational attainment (e.g., Endo, 1980; Kao et al., 1996; Sue and Okazaki, 1990). Asian Americans achieve high levels of education because they may perceive that education is objectively measurable and valued in certain careers and that they may face disadvantages in pursuing careers that do not depend on educational achievement. This

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<sup>4</sup> However, for biracial children with an Asian American parent, assimilation into the American melting pot seems more complete. As Xie and Goyette (1997) show, whether Asian biracial children are identified as Asian or non-Asian is optional, and more than half of such children are indeed identified as non-Asian on the 1990 US Census.

explanation for Asian Americans' educational success is called "relative functionalism" by Sue and Okazaki (1990) and "blocked opportunities" by Kao et al. (1996).

#### *2.4. The strategic adaptation perspective: a synthesis*

While past research has typically focused on only one of the above factors, we wish to incorporate all three into a synthesis. We call our synthesis the "strategic adaptation perspective" and suggest that the impact of each of the three factors on Asian Americans' educational and socioeconomic success in the US is contingent on the other factors. This viewpoint is not new, as similar arguments have long been made by other scholars (e.g., Nakano Glenn, 1983; Sue and Okazaki, 1990; Zhou, 1997). However, few have subjected it to empirical tests. The empirical implications of the perspective are outlined in the following section.

While not rejecting culture outright as an explanation, we want to give more meaning to it, for cultures do not originate in a vacuum and cannot operate in a vacuum. As Swidler (1986) keenly points out, culture should be understood not as fixed values and orientations that push behavior in a consistent direction, but as a "tool kit" of symbols with which individuals formulate and refine strategies of action. Swidler's theoretical framework distinguishes between "settled lives" and "unsettled lives." For unsettled lives such as those of new immigrants to the US, there is a greater opportunity for new interpretations of cultural symbols according to ideologies, but social structure determines which among competing ideologies prevails in the long run. Applying Swidler's theory of culture to our case of Asian Americans, we link Asian Americans' marginal position as newcomers in American social structure to their strategies of social mobility. Facing the possibility of discrimination and lacking necessary political resources and social capital, Asian Americans who strive to achieve high status look for paths that present few barriers. In the market economy, where fair competition is at least held as a norm, upward mobility through channels of higher education, independent business, and science and engineering is preferred to that through, say, politics and management of large corporations, where subjective criteria predominate. It is in this context that some cultural symbols shared by Asian Americans, such as the honorific significance of children's educational achievement to the family, facilitate the mobility of Asian Americans.

Similarly, economic and social structures affect the social mobility of marginalized Asian Americans. For example, societal barriers to social mobility differ across occupations/industries and over time (Hout, 1988; Xie, 1989b, 1992; Yamaguchi, 1983). In the highly industrialized economy of the US, there is a large demand for technically trained personnel (Mare, 1995). As Xie (1989a, 1992) has argued elsewhere, science uses more objectively based criteria than many other comparably high status occupations. Thus, science and other technically based occupations provide a channel of upward mobility previously unavailable to Asian Americans prior to the rapid growth of the science/engineering labor force after World War II (Xie, 1989a). Similarly, Asian Americans can find refuge in other segments of the American economy (such as small-scale retail and restaurants) where discrimination against them is either less severe or less consequential than in other occupations.

According to our strategic adaptation perspective, it is the interaction of culture, structure, and marginality that promotes Asian Americans' reliance on educational channels of mobility. Given their marginal status, Asian Americans seek upward mobility through academic channels, as they may perceive other channels less accessible to them. In this context, Asian Americans bring their cultural "tool kits" and adapt them to American society, using family resources to facilitate their children's movement up educational ladders. That is, Asian American youth place a heavy emphasis on education not just because some of their parents have resources or value education, but also because they have been socialized to think that academic achievement is the surest way to upward mobility. As a Korean American student puts it, "We know we are a minority in this society, and we have to do better than other Americans. . . . That's the only way we'll get ahead" (quoted by Hsia, 1988, p. 92).<sup>5</sup>

While cognizant of the ethnic differences among Asian Americans (see Goyette and Xie, 1999), we contend that the strategic adaptation perspective is applicable to Asian Americans as a whole. We base this contention on Asian Americans' own awareness that they are perceived as a homogeneous group (Oyserman and Sakamoto, 1997). Further, regardless of ethnicity, Asian Americans all have marginal status and consequently may similarly perceive blocked opportunities. In choosing among alternative channels of mobility, they gravitate toward those through which other Asian Americans have been successful.

### **3. A revised model for status attainment**

#### *3.1. Two classic status attainment models*

Through a steady outpouring of exceptional scholarship in the last three decades (e.g., Blau and Duncan, 1967; Duncan et al., 1972; Featherman and Hauser, 1978; Grusky and Hauser, 1984; Hauser et al., 1983; Hout, 1988; Sewell et al., 1969; Sewell and Hauser, 1975), we now have a basic understanding of the process of social mobility and particularly the role of education in social mobility. The fundamental idea is represented by the status attainment model of Blau and Duncan (1967). In this model, education is assumed to mediate between family background on the one hand and adult occupational outcomes on the other. The functionalist explanation for this is that the efficiency needs of modern industrialization call for "universalism," i.e., social mobility through the principle of recruiting the most qualified personnel for the most important positions (Blau and Duncan, 1967, pp. 425–31; Lipset and Bendix, 1964, Chapter 2). Achieved characteristics are more important than ascribed characteristics in determining one's social status.

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<sup>5</sup> Oyserman and Sakamoto's (1997) study clearly documents that Asian Americans are keenly aware of the stereotype that they are perceived as academic overachievers. Some participants in their study expressed the concern that such stereotypes present barriers for Asian Americans.

However, the heightened prominence of education does not by itself make a society open, for differential access to educational attainment can serve to maintain social inequality. Thus, the role of education is understood to be two-fold. First, it transmits the advantages and disadvantages of parental status. Second, it provides opportunities for offspring from low status families to move upward. This dual role of education is succinctly summarized by Hauser (1971, p. 144):

On the one hand, the most important way in which families influence the adult achievement of their offspring is by their effect on their children's educational attainment. On the other hand, privileged birth is no guarantee of high educational attainment: the rewards of education go to those who are educated, and for many persons of lowly origin educational attainment is the high road to success.

We contend that Asian Americans have, since the 1960s, taken this “high road to success.”

While the classic Blau–Duncan model descriptively depicts the process of status attainment and the importance of education therein, it leaves out mechanisms through which family background affects status attainment. To address the question of mechanisms, Sewell and his associates (Hauser et al., 1983; Sewell et al., 1969; Sewell and Hauser, 1975) turned to social–psychological factors in the “Wisconsin Model.” Besides adding mental ability, academic performance, and significant other's influence, the “Wisconsin Model” explicates the mediating roles of educational aspiration in determining educational attainment and of occupational aspiration in affecting occupational attainment. It is hypothesized that family background does not have direct effects on educational and occupational attainment beyond its indirect effects through these social–psychological factors.

### 3.2. *The revised model*

In our effort to understand the high educational and occupational attainments of Asian Americans, we propose a revised model of status attainment that incorporates both the classic Blau–Duncan model and the Wisconsin social–psychological model. Similar to the Blau–Duncan and Wisconsin models, our revised model allows family background and academic achievement to affect educational and occupational outcomes through social–psychological factors. However, our model differs from these other models in paying closer attention to the relationship between educational and occupational expectations. In our earlier discussion, we suggest that the high educational attainment of Asian Americans is in large part due to their desire to enter occupations in which competency is judged by demonstrable skills. That is, we hypothesize that education plays an instrumental role in Asian Americans' social mobility in such a way that occupational choice precedes educational attainment. Thus, it is in the intragenerational processes where our model differs from the traditional models. Our model is represented in Fig. 1.

There are several noteworthy features in the stylized model presented by Fig. 1. First, we measure the social–psychological concept of ambition by educational

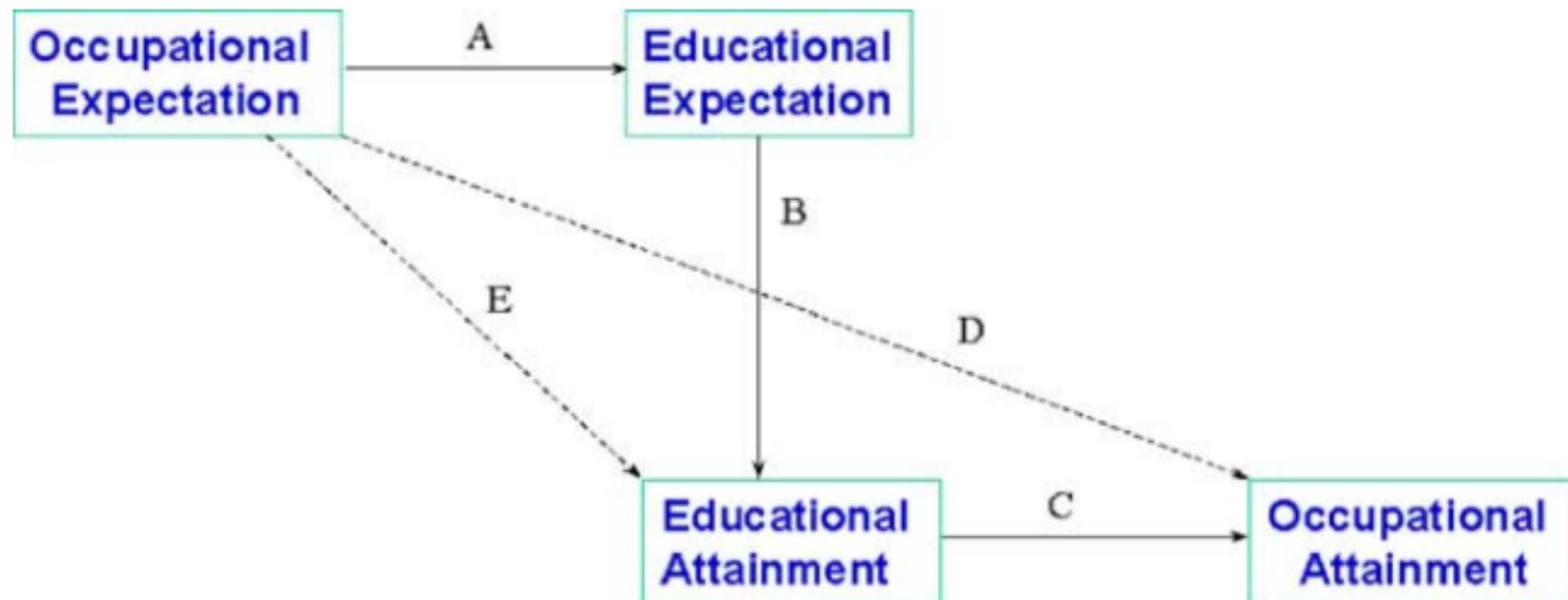


Fig. 1. A stylized model linking education and occupation.

occupational expectation on educational expectation dominates the effect in the other direction, our model is a reasonable approximation. In addition to examining levels of education, we also focus on expected major or field of study. At least for some majors (such as engineering and nursing), the content of study is closely tied to the desired occupation, and assessing the causal effect of expected occupation on expected college major is unproblematic.

Finally, we wish to emphasize that the main social process in our theoretical model is a simple causal chain (paths A, B, and C). We may observe some residual direct effects of occupational expectation on educational and occupational attainments, but these effects are secondary in importance (denoted by dotted lines D and E). In the following section, we provide some preliminary empirical results in support of our hypothesized model. In this research, we focus on the effects of occupational expectation on Asian Americans' educational choices. Since our data are limited to a cohort of youth who were roughly 20 years old the last time they were surveyed in 1994, the last component of our model is left for future empirical tests.

### *3.3. Measurement of occupational expectation*

Traditionally, stratification researchers have relied on Duncan's (1961) Socioeconomic Status Index (SEI) as a continuous measure of occupation in path analysis and structural equation models, as exemplified in Blau and Duncan (1967), Duncan et al. (1972), and Sewell and Hauser (1975). In these models, the typical concern is with "vertical mobility." Hence, particularities of individual occupations are disregarded if they have the same or similar SEI scores. This limitation of path analysis and structural equation models has spurred a renewed interest in the analysis of mobility tables in the framework of loglinear models (Duncan, 1979; Featherman and Hauser, 1978; Goodman, 1978, 1984; Hauser, 1979; Sobel et al., 1985). As Hauser (1978, p. 821) points out, loglinear models of mobility tables afford us the ability to examine movements into concrete occupations in the social structure.

For example, it has been found that the importance of education to social mobility varies across occupational groups (Xie, 1989b, 1992; Yamaguchi, 1983) and increases over time (Hout, 1988). As Hout (1988, p. 1381) puts it, "some occupations are almost certainly more universalistic in their recruitment criteria than are others." Given the varying importance of education across occupations, we hypothesize that Asian American youth are more likely to pursue occupations that are relatively universalistic (such as science and engineering), even after controlling for the fact that a large proportion of their parents are employed in such technical occupations. The secular trends of increasing universalism observed by Hout (1988) and increasing returns in earnings to education observed by Mare (1995) also mean that education has become a better and more practical channel of social mobility for Asian Americans than ever before.

Based on this insight, we extend traditional models of occupational attainment solely concerned with "vertical mobility" by recognizing that many occupations with roughly the same social prestige could have very different implications for Asian Americans. For example, "US Supreme Court justice," "state governor," "US

representative in Congress,” “nuclear physicist,” “scientist,” and “physician” were all rated as the most prestigious occupations in a 1963 survey (Hodge et al., 1964, Table 1). But to an ordinary Asian American adolescent planning for his/her future, the prospects for becoming a “nuclear physicist,” “scientist,” or “physician” would be far greater than for becoming a “US Supreme Court justice,” “state governor,” or “US representative in Congress.” Part of the reason, of course, is that the latter group is much smaller in size. In addition, Asian Americans’ lack of cultural capital and demographic bases makes it difficult for them to run for high political offices. In contrast, it has been argued that universalism is an accepted norm in science (Cole and Cole, 1973; Merton, 1973; Xie, 1992), where what matters is one’s performance rather than personal characteristics that are functionally irrelevant (such as race, religion, and social origins). Thus, it is plausible that Asian American youth might be attracted to, or pushed toward, such occupations as science and engineering in order to avoid potential discrimination and overcome other disadvantages faced as members of a recently immigrated minority group.<sup>8</sup>

In our study, occupational expectation is first measured discretely, subject to data limitation. This strategy allows us to ascertain which occupations Asian American youth tend to choose. We then quantitatively assess these occupations by borrowing information from the US Census. To quantitatively characterize occupations using Census information, we follow Hauser and Warren’s (1997) recommendation to use both education levels associated with occupations and occupational earnings, and we supplement them with Asian representation in each occupation. We measure Asian representation to test Xie and Shauman’s (1997) hypothesis that youth emulate young adult workers in the labor force with similar demographic characteristics.

### *3.4. Measurement of educational expectation and attainment*

Past work on education in status attainment research has focused on either years of schooling completed (e.g., Blau and Duncan, 1967; Duncan et al., 1972; Hauser et al., 1983) or attainment of a college education (Mare, 1980; Sewell et al., 1969). Virtually no attention has been given to the choice of college majors. This neglect is problematic in and of itself, for economic analyses (Berger, 1988; Hecker, 1995) have shown that earnings returns to college education differ substantially by field of study. Thus, ignoring majors means overlooking an important source of social and economic inequality.

For our analysis, neglecting majors also means losing the opportunity to test our strategic adaptation perspective. Our strategic adaptation perspective overlaps with the cultural argument in that both posit that Asian Americans highly value education. However, the two perspectives differ on why Asian Americans value education. While the cultural position suggests that Asian Americans value education for its intrinsic value, the strategic adaptation perspective asserts that Asian Americans value

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<sup>8</sup> Blalock (1967, pp. 99, 100) similarly hypothesized that the overrepresentation of persons of Jewish background in US universities could be explained by the unusual degree of competition and thus the greater role of objective criteria in American academe.

education primarily for its instrumental value. That is, the strategic adaptation perspective predicts that Asian Americans consciously attain education as a way to achieve high status rather than because they value education for its own sake.

The cultural explanation implies that Asian Americans primarily value high levels of educational attainment with no obvious preferences for majors. After all, the culture perspective emphasizes the symbolic meaning of educational attainment as a virtue to oneself and an honor to one's family and community (Bourne, 1975; Endo, 1980; Hsia, 1988, p. 92; Sue, 1973). Thus, the more education the better, regardless of the subject. Further, perhaps surprising to many Americans and contemporary Chinese, traditional Confucianism does not encourage scientific and technical training. Rather, Confucianism extols virtue and morality to be fostered by a liberal arts education (Ho, 1962). Some historians of science have even claimed that Confucianism hampered the development of science, because "the politico-ideological entity in traditional China [i.e., Confucianism] officially discouraged, hence socially despised, inquiries about nature and intellectual interest in technologies" (Qian, 1985, p. 103). Hence, the cultural explanation in its original form cannot explain the overrepresentation of Asian Americans in science and engineering majors.

To explain Asian Americans' high concentration in technical fields, we turn to the strategic adaptation perspective. It argues that Asian Americans value education to the extent that it aids them in achieving high status, and that Asian Americans consciously choose certain majors to maximize the educational return to their future status. Given the economy and social structure in the post-war US, education in technical fields serves as a good channel of mobility for Asian Americans: racial discrimination is relatively easier to combat in technical occupations due to the availability of objective criteria for hiring and advancement, and technical occupations are high status positions. There is some qualitative evidence in the existing literature congruent with our reasoning. For example, a 30-year-old Korean American expresses his frustration with lack of career choices in this way:

I don't think that Asians prefer the sciences. Sometimes it is the only avenue open to them. In the sciences, empirical results matter more than in the esoteric discussion of humanities. So that at least as an engineer, you know how to put machines in, and you can be a useful bolt and nut. And I think the job opportunities for us lie in this field (quoted by Lee, 1991, p. 53).

For both educational expectation and educational attainment, we measure field of study as well as college enrollment. Much of our analysis is focused on explaining white-Asian differences in these two outcome measures.

## 4. Data and results

### 4.1. Occupational expectation

Our statistical analyses draw data primarily from the National Educational Longitudinal Study (NELS) 1988–1994, collected for the National Center for Education

Statistics (NCES) by the National Opinion Research Center. In 1988, a sample of 24,599 US eighth-graders were surveyed. The sample was re-interviewed in 1990, 1992, and again in 1994. NELS is appropriate for our research because it contains an over-sample of Asian American students.<sup>9</sup> Our analysis is restricted to Asian American and white students.

Unfortunately, the measurement of occupational expectation is crude in the NELS. Instead of collecting verbatim responses and then coding them into three-digit detailed occupational codes, the NELS only provided a limited list of occupations when asking respondents what occupation they would expect to hold at age 30. The measurement was repeated at every wave with slightly different categories. We chose to use occupational expectation measured at the second follow-up, when most of the respondents were in the 12th grade.<sup>10</sup> In Table 2, we present the descriptive results with 14 broad occupational categories confined by the NELS instrument. The detailed occupations that make up the 14 categories are given in Appendix A. The second column of Table 2 gives the percentage of Asian Americans among those who chose a particular occupation. For our analytical sample consisting only of whites and Asians, Asian American representation is 5.27%.<sup>11</sup> Thus, any percentage greater than 5.27% indicates an occupation that is more likely to be chosen by Asian Americans than the average. To make the comparison easier, we take a ratio between column 1 and 5.27, denoted as “Relative Asian” in column 3. It is shown, for example, that Asian Americans disproportionately choose five occupations: “manager or administrator,” “professional I,” “professional II” (higher status professionals like doctors, lawyers, scientists, etc.), “proprietor or owner,” and “technical.”

In columns 5–10, we present a few occupational characteristics calculated from the 5% PUMS from the 1990 US Census for the same occupational classification. We matched the three-digit occupational codes from the 1990 PUMS to the 1992 NELS classification as closely as possible (Appendix A).<sup>12</sup> To understand how youth choose occupations on the basis of the experience of their advanced peers (Xie and Shauman, 1997), we computed three occupational characteristics for young adult workers (aged 30–34) from the PUMS data. The first is the presence of Asian American workers, given in column 5. The second is the educational qualification for each occupation, given in column 7, operationalized as the percent of workers with at least a college degree. The third one is the average yearly earnings. Note that

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<sup>9</sup> NELS contains detailed information on Asian ethnicity and potentially enables cross-ethnic comparisons within the Asian American subpopulation. In another paper (Goyette and Xie, 1999), we have examined the consequences of ethnic differences in attributes. However, the sample size is still too small for us to detect interaction effects.

<sup>10</sup> We made this choice for several reasons. First, this practice is consistent with past research (Marini and Greenberger, 1978; Sewell et al., 1969; Xie and Shauman, 1997). Second, we believe that occupational expectation at the 12th grade is the most realistic of the pre-college years. Third, the second follow-up survey contained an important question not available in earlier waves about the respondent’s perceived educational requirement for his/her expected occupation, as shown in Table 5.

<sup>11</sup> We deleted cases for which information is missing for the variables being used in this analysis.

<sup>12</sup> However, perfect matching is not attainable. Detailed information for the matching is available upon request.

Table 2

Linking Asian American Youth's occupational expectations to occupational characteristics in the young adult (aged 30–34) labor force

Occupation (1)	NELS			1990 Census					
	Percent Asian (2)	Relative Asian (3)	Sample size (4)	Percent Asian (5)	Relative Asian (6)	Percent BA/BS+ (7)	Relative BA/BS+ (8)	Average earnings (9)	Relative earnings (10)
Clerical	4.78	0.91	(354)	2.91	0.94	13.14	0.40	16,789	0.66
Craftsman or operative	3.79	0.72	(443)	2.16	0.69	4.48	0.14	21,792	0.85
Farmer or laborer	3.22	0.61	(207)	1.43	0.46	5.21	0.16	16,289	0.64
Manager or administrator	7.53	1.43	(647)	2.82	0.91	40.68	1.25	32,820	1.29
Military	3.05	0.58	(280)	2.62	0.84	31.26	0.96	23,946	0.94
Professional I	5.74	1.09	(3436)	5.14	1.65	61.73	1.90	28,299	1.11
Professional II	7.96	1.51	(2532)	4.69	1.51	90.48	2.78	43,966	1.72
Proprietor or owner	6.90	1.31	(709)	3.36	1.08	55.19	1.69	32,629	1.28
Protective service	5.29	1.00	(448)	1.53	0.49	16.42	0.50	26,080	1.02
Sales	4.90	0.93	(204)	3.13	1.01	25.06	0.77	25,221	0.99
School teacher	2.25	0.43	(982)	1.46	0.47	60.14	1.85	15,570	0.61
Service	1.44	0.27	(266)	3.55	1.14	6.15	0.19	11,305	0.44
Technical	6.64	1.26	(610)	5.36	1.72	36.92	1.13	27,095	1.06
Not working, missing	4.08	0.77	(3305)	5.01	1.61	9.02	0.28	11,412	0.45
Total	5.27	1.00	(14,423)	3.23	1.00	32.56	1.00	25,513	1.00

*Note.* Columns (3), (6), (8), and (10) are ratios between the previous column and its last cell (labeled “total”). Earnings are annual earnings measured in 1989 dollars. NELS descriptive data are weighted, with unweighted sample sizes reported.

*Data sources:* 1992 NELS and 5% 1990 US Census PUMS.

occupational education and occupational earnings are two alternative measures of occupational status (Hauser and Warren, 1997). Like column 2, columns (6), (8), and (10) are relative to marginal totals so that a number greater than 1 denotes a value higher than average, and a number lower than 1 denotes a value lower than average.

We find congruence between occupations likely chosen by Asian American youth (shown in columns 2 and 3) and occupations in which Asian Americans' presence is conspicuous (shown in columns 5 and 6). For example, both “professional II” and “technical” are highly preferred by Asian American youth and occupied by Asian American workers. There are, however, deviations from this pattern. For instance, the occupation of “manager or administrator” is highly preferred by Asian American youth (with relative Asian at 1.43), but it is not one in which there is an overrepresentation of Asian American workers (with relative Asian at 0.91). Another deviant example is the “service” occupation, which is occupied by a high percentage of Asian Americans in the labor force (with relative Asian at 1.14) but is clearly

avoided by Asian American youth (with relative Asian at 0.27). To understand the deviant cases, we note that an overwhelming majority of Asian workers in the labor force (89% in our data) is immigrants. New immigrants from Asia often lack the adequate language skills, experience, and social capital to be managers and administrators but may find work in niche segments of the service sector (such as ethnic restaurants). In addition, we observe that “manager or administrator” has high occupational education (with relative BA/BS+ at 1.25) and occupational earnings (with relative earnings at 1.29). In contrast, “service” is ranked low both by occupational education (with relative BA/BS+ at 0.19) and occupational earnings (with relative earnings at 0.44). Our descriptive results thus suggest that Asian American youth do not simply model their careers on their advanced peers but aspire to other occupations with high education requirements and high earnings.

In brief, the descriptive results from Table 2 support two explanations for Asian Americans’ occupational expectations: race-linked modeling and preferences for occupations with high levels of education and correspondingly high earnings. One fruitful way to evaluate the relative plausibility of the two explanations is to conduct a multivariate loglinear analysis. Due to the relatively high correlation between occupational education and occupational earnings (at 0.74) and the small number of categories, we choose only occupational earnings as an explanatory variable measuring occupational status in our multivariate analysis.<sup>13</sup> The results from such an exercise are presented in Table 3.

In Table 3, four loglinear models are presented. Model 1 is the baseline model of independence, with parameters representing the marginal distributions of race (Asian Americans versus whites) and expected occupations. According to the likelihood-ratio  $\chi^2$  statistic  $L^2$  (174.9 for 13 degrees of freedom), Model 1 does not fit the observed data. However, the  $L^2$  statistic may be too conservative, given the large sample size for the table ( $n = 14,423$ ). To account for the large sample size, we use Raftery’s (1986, 1995) BIC:  $BIC = L^2 - (DF) \log(n)$ . Measuring the proportion of cases that are not predicted by each model, the index of dissimilarity is also reported. By the BIC statistic, the saturated model is still preferred over the independence model ( $BIC = 50.41$ ). In the second model, we add the interaction between Asian American status and Asian representation in occupation (operationalized as the logit transformation of the percent of Asian Americans in the labor force). This interaction tests the hypothesis that the presence of Asian American workers in an occupation attracts Asian American youth to that occupation, called the “Reflection Effect” by Xie and Shauman (1997).<sup>14</sup> By the difference in  $L_2$  (54.20 for 1 degree of freedom) as well as BIC (5.78 instead of 50.41), Model 2 is preferred to Model 1.

In the third model, we replace the reflection effect by the interaction between Asian and occupational earnings (in logarithm) to examine the attraction of Asian Americans to high-earning occupations. This model significantly improves upon

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<sup>13</sup> When we include both occupational earnings and occupational education, the coefficient of occupational education is no longer statistically significant. Results using occupational education only and both occupational education and occupational earnings are available upon request.

<sup>14</sup> See Xie and Shauman (1997) for more technical details concerning this type of model.

Table 3

Loglinear models for Asian  $\times$  (Occupational Expectation) Association: goodness-of-fit statistics and selected coefficients

	Model 1	Model 2	Model 3	Model 4
$L^2$	174.90	120.70	57.36	19.31
DF	13	12	12	11
BIC	50.41	5.78	-57.56	-86.04
Index of dissimilarity (%)	2.499	2.163	1.344	0.888
Coefficient for Asian $\times$ (Asian Representation) interaction		0.556 (0.080)		0.490 (0.083)
Coefficient for Asian $\times$ (Occupational Earnings) interaction			0.684 (0.065)	0.624 (0.064)

*Note.* The sample size ( $n$ ) is 14,423.  $L^2$  denotes the likelihood-ratio  $\chi^2$  statistic for deviance with degrees of freedom reported in row DF.  $BIC = L^2 - DF \log(n)$ . In parentheses are asymptotic standard errors for estimated loglinear coefficients. Asian representation is measured by the logit transformation of percent Asian in each occupation. Occupational earnings is measured by the logarithm transformation of the mean earnings in each occupation.

*Data source:* Table 2.

Model 1. The  $L^2$  statistic is greatly reduced by 117.54 from Model 1 for 1 degree of freedom. In fact, the overall residual  $L^2$  for Model 3 is relatively small (57.36 for 12 degrees of freedom). According to BIC (-57.56), Model 3 is preferred over the two preceding models as well as the saturated model. In Model 4, we add both interactions and achieve a further improvement in goodness-of-fit (BIC = -86.04). From the goodness-of-fit statistics for this set of models, we conclude that both racial composition and occupational earnings explain white-Asian differences in occupational expectations, but occupational earnings seem to hold greater explanatory power.

We present the key estimated coefficients of the interactions in the last two rows of Table 3. The coefficients are in the expected direction, and interpretation of them is straightforward. Let us use the coefficients for the last model as an illustration. The estimated coefficients mean that: (1) a 1.0 logit increase of Asian representation in an occupation would result in half a logit increase in an Asian youth's expectation to enter the occupation; (2) a 10% increase of earnings in an occupation would result in an increase of 0.06 logit in an Asian youth's expectation to enter the occupation.

The loglinear models reported in Table 3 are limited to only occupational characteristics. As such, these models are not useful for answering the question of whether or not Asians prefer higher status occupations than whites because they have more favorable family backgrounds and/or higher academic achievement. In order to answer this question, we need to conduct a multivariate analysis. To incorporate individual-level variables, we use McFadden's (1974) conditional logit model, which is a generalization of the usual multinomial logit model (Powers and Xie, 2000, chapter 7). One major difference between the conditional logit model and the usual multinomial logit model is that the former is broader in its ability to model the effects of attributes associated with alternatives. Appendix B provides a more detailed explanation of the model. As in the case of loglinear models, our attention should be paid to the coefficients of the interactions between individuals' attributes and

the attributes of outcome categories. There are no interpretable coefficients for fixed individual attributes or outcome categories.

In Table 4, we report four conditional logit models with expected occupation as the outcome. Like the loglinear models reported in Table 3, Models 1–3 in Table 4 include only occupational characteristics. As shown by Breen (1994) and Xie and Shauman (1997), these models are equivalent to Models 2–4 of Table 3, and we essentially observe the same results as before.<sup>15</sup> In Model 4, we add the interaction effects between sex and occupational earnings, between SES and occupational earnings, and between academic achievement and occupational earnings. Sex is coded 1 if female and 0 if male. SES is a composite measure of family socioeconomic background constructed by NCES, with a mean of 0 and standard deviation of 1 for the whole sample. Academic achievement is the sum of standardized scores (with mean of 50, and standard deviation of 10) on mathematics, reading, and science tests.

The addition of the three individual-level variables, sex, SES, and academic achievement, significantly improves the model. The model  $\chi^2$  statistic jumps from 9649.94 to 10,956.02 for 3 degrees of freedom. As expected, the estimated coefficients for Model 4 show that both SES and academic achievement strongly and positively predict occupational earnings. In addition, women are likely to expect occupations with lower earnings than those chosen by men. What is most significant for this research, however, is that the inclusion of sex, SES, and academic achievement does not reduce the strong effects of the Asian  $\times$  (Asian Representation) interaction and the Asian  $\times$  (Occupational Earnings) interaction. That is, our earlier conclusions from the loglinear analysis hold true even after we control for relevant individual-level variables.

#### 4.2. Educational expectation

In our stylized model presented in Fig. 1, we hypothesized that occupational expectation predetermines educational expectation. We recognize that in reality causality runs in both ways. Unfortunately, the NELS does not contain appropriate instrumental variables that would allow us to disentangle the reciprocal causality. One useful measure implemented in the second follow-up survey of NELS is a question, following the occupational expectation item, asking respondents “How much education do you think you need to get the job you expect or plan to have when you are 30 years old?” We refer to responses to this question as “perceived educational requirement” for expected occupation. In the same questionnaire, NELS asks “As things stand now, how far in school do you think you will get?” We refer to responses to this question as expected educational level.

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<sup>15</sup> The numerical differences in coefficients are due to a difference in sample size. For conditional models reported in Table 4, we further restrict the sample size to cases with valid information on SES and academic achievement.

Table 4  
Conditional logit models for occupational expectation: goodness-of-fit statistics and selected coefficients

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Occupation dummies	(13 coefficients)		(13 coefficients)		(13 coefficients)		(13 coefficients)	
Asian × (Asian Representation)	0.663	0.094			0.554	0.099	0.547	0.099
Asian × (Occupational Earnings)			0.779	0.080	0.678	0.080	0.705	0.084
Sex × (Occupational Earnings)							-0.201	0.044
SES × (Occupational Earnings)							0.344	0.032
(Academic Achievement) × (Occupational Earnings)							0.024	0.001
Model $\chi^2$	9571.05		9615.27		9649.94		10,956.02	
DF	14		14		15		18	

Note. Sex is coded 1 if female, 0 if male. The number of cases is 10,883.  $\chi^2$  denotes the likelihood-ratio  $\chi^2$  statistic contrasting the current model to the model with no coefficients, with degrees of freedom reported in row DF. Asian representation is measured by the logit transformation of percent Asian in each occupation. Occupational earnings is measured by the logarithm transformation of the mean earnings in each occupation. Academic achievement is the sum of standardized scores (with mean of 50 and standard deviation of 10) on mathematics, reading, and science tests. Asian representation is measured by the logit transformation of percent Asian in each occupation.

Data sources: 1992 NELS and 5% 1990 US Census PUMS.

If students should plan their future education independently of their occupational expectations, their perceived educational requirement for expected occupation would be unrelated to their expected educational level. This is not the case. In Table 5, we present the cross-classification between the two. It is evident that there is a strong association between perceived educational requirement and expected educational level. About three-fourths of the students expect to attain the same level of education as they think necessary for their chosen occupation. These students fall on the main diagonal cells in Table 5. Even students whose expected educational level does not agree with the perceived educational requirement for their expected occupation, that is, those falling in off-diagonal cells, tend to cluster in cells close to the diagonal,

Table 5  
Association between perceived educational requirement for expected occupation and expected education

Perceived educational requirement	Expected education				Total (n)
	High school or less	Vocational school	College	Advanced degree	
High school or less	56.77	28.20	10.34	4.70	100 (532)
Vocational school	8.19	77.43	10.98	3.40	100 (2650)
College	0.90	10.45	70.58	18.07	100 (4555)
Advanced degree	0.57	1.89	15.20	82.33	100 (4012)

Note. Entries are row-percents.

Data source: 1992 NELS.

showing only small discrepancies. Only in less than 3% of cases do the two measures of education differ by more than one level. Considering measurement error, we find the evidence consistent with our hypothesis that students make their educational plans based on their occupational expectations. If a student expects an occupation that demands a college education, it is highly likely that the student plans to complete a college education.

We now tentatively accept the proposition that occupational expectation affects educational expectation and proceed to examine the extent to which differences in occupational expectation between whites and Asians explain their differences in educational expectation. Recall that we wish to operationalize the measurement of educational expectation with expected field of study in college as well as levels of expected education. Therefore, we use information about both college attendance and field of study to create a categorical variable for educational expectation with the categories corresponding to expected college majors plus a special category for not expecting to attend college. The categories are given in the first column of Table 6.

Table 6 displays some informative descriptive statistics. The second and third columns show the white-Asian differences in educational expectation. We observe, for example, that Asians are less likely to expect no college (with relative Asian at 0.73) and more likely to expect to major in physical science, engineering, pre-professional fields, computer science, and business. This pattern constitutes the dependent variable to be explained by the following analysis. Columns (4) and (5) will be the focus of the analysis for the next subsection.

Our theoretical reason for including fields of study as part of the dependent variable is to differentiate between the culture perspective and the strategic adaptation perspective. Both perspectives predict that Asians are more likely than whites to pursue college education. While the culture perspective is silent on the subject of field choice, the strategic adaptation perspective predicts that Asians consciously choose certain fields to maximize the financial and social reward of a college education. To test these two perspectives empirically, we estimated the differences in earnings returns to a college education across fields, using data from the *High School and Beyond* Sophomore Cohort. The results are presented in columns (6) and (7) of Table 6.<sup>16</sup> Comparison of columns (3) and (7) reveals that the fields of study attractive to Asians are the ones with higher-than-average earnings returns, such as physical science, engineering, pre-professional fields, computer science, and business. With a low concentration of Asians and relatively high average earnings, social science is an exception. One possible explanation for this exception is that some social science majors were effectively pre-professional students who went on to have careers in law and business.

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<sup>16</sup> We make note of two special features of these estimates. First, the estimated earnings were measured at a relatively young age (roughly 28) in 1992, an age by which not all respondents had completed their education. Second, the results are reduced-form estimates for returns to college education, ignoring whether or not a person has attained advanced education. While the first feature is a limitation of the *High School and Beyond* data, the second is dictated by our need to capture returns to college majors. Since the focus is on relative earnings, there is no need to adjust for inflation.

Table 6  
Racial representation and estimated earnings by expected and actual fields of study

Field of study (1)	Expected field of study in 1992		Actual field of study in 1994		Estimated earnings by College field	
	Percent Asian (2)	Relative Asian (3)	Percent Asian (4)	Relative Asian (5)	Estimated Earnings (6)	Relative Earnings (7)
No college	4.25	0.73	4.34	0.85	11,251.45	0.93
Physical science	7.20	1.24	9.24	1.80	16,028.33	1.33
Math science	4.12	0.71	7.34	1.43	13,908.19	1.15
Biological science	6.21	1.07	11.24	2.19	12,300.61	1.02
Engineering	10.64	1.84	10.36	2.02	16,834.21	1.40
Pre-professional	10.17	1.76	4.48	0.87	17,219.35	1.43
Computer science	10.70	1.85	8.11	1.58	16,294.54	1.35
Business	8.86	1.53	8.09	1.58	14,512.11	1.20
Social science	4.46	0.77	6.89	1.34	15,080.91	1.25
Humanities	2.37	0.41	3.78	0.74	11,848.33	0.98
Art and music	5.24	0.91	4.68	0.91	13,304.66	1.10
Education	2.70	0.47	2.29	0.45	9609.51	0.80
Communications	5.52	0.95	5.99	1.17	12,668.33	1.05
Agriculture	0.91	0.16	1.54	0.30	14,464.02	1.20
Other	5.54	0.96	6.34	1.24	12,827.97	1.06
Total	5.79	1.00	5.13	1.00	12,049.22	1.00

*Note.* Columns (3), (5), and (7) are ratios between the previous column and its last cell (labeled “total”). Earnings are annual earnings for workers approximately 28 years old with positive earnings in 1992. The statistics are weighted.

*Data sources:* 1992–1994 NELS and 1980–1992 *High School and Beyond* Sophomore Cohort.

Given that Asian Americans are likely to be concentrated in fields with high earnings returns, can Asians’ higher propensity to attend college be attributed to Asians’ desire for higher earnings in general? To what extent can Asians’ stronger attraction to a field’s earnings potential be explained by SES and academic achievement? To what extent can Asians’ stronger attraction to a field’s earnings potential be explained by their occupational expectation?

To answer these questions, we ran a series of conditional logit models with educational expectation as the outcome variable. The results are presented in Table 7.

Essentially a binary logit model, Model 1 in Table 7 compares differences in the expectation of college attendance between whites and Asians. From this model, we see that Asians are significantly more likely to expect a college education. The estimated coefficient of 0.552 for the Asian  $\times$  College interaction is in the log-odds scale, meaning that the odds of an Asian student expecting to attend college is 1.737 (i.e.,  $\exp(0.552)$ ) times that of a white student. In Model 2, we include the Asian  $\times$  (Estimated Earnings) interaction and find it to be significantly different from zero (asymptotic  $z$  at 8.624). Note that in Model 2 the Asian  $\times$  College interaction becomes insignificantly negative, suggesting that Asian Americans’ high likelihood of expecting a college education can be attributed to Asians’ strong desire for high earnings in general. A necessary assumption underlying this interpretation, of course, is that the Asian  $\times$  (Estimated Earnings) association across majors holds true for the college and no-college comparison.

Table 7

Conditional logit models for educational expectation: goodness-of-fit statistics and selected coefficients

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Field dummies	(14 coefficients)		(14 coefficients)		(14 coefficients)		(14 coefficients)	
Asian × College	0.552	0.085	−0.048	0.114	0.131	0.124	0.197	0.131
Asian × (Estimated Earnings)			2.527	0.293	2.645	0.300	1.950	0.342
Sex × College					1.180	0.063	0.887	0.070
Sex × (Estimated Earnings)					−2.658	0.174	−2.374	0.207
SES × College					0.836	0.047	0.753	0.051
SES × (Estimated Earnings)					0.200	0.124	0.141	0.149
(Academic Achievement) × College					0.025	0.001	0.022	0.002
(Academic Achievement) × (Estimated Earnings)					0.037	0.004	0.031	0.005
(Expected Occupation) × College							(13 coefficients)	
(Expected Occupation) × (Estimated Earnings)							(13 coefficients)	
Model $\chi^2$	8947.57		9029.89		11,863.32		14,562.91	
DF	15		16		22		48	

Note. Sex is coded 1 if female, 0 if male. The number of cases is 9183.  $\chi^2$  denotes the likelihood-ratio  $\chi^2$  statistic contrasting the current model to the model with no coefficients, with degrees of freedom reported in row DF. Earnings is estimated from the 1992 wave of the *High School and Beyond* data for each college major, shown in Table 6. Academic achievement is the sum of standardized scores (with mean of 50 and standard deviation of 10) on mathematics, reading, and science tests. Expected occupation is measured categorically.

Data sources: 1992 NELS and 1980–1992 *High School and Beyond* Sophomore Cohort.

In Model 3, we add the explanatory variables sex, SES, and academic achievement. For each of the explanatory variables, we include its interactions with the dichotomized outcome of expecting college and with estimated earnings. This is a conservative approach, for it allows those not expecting a college education to differ from those expecting a college education. The intent is to examine the extent to which the white-Asian differences in attraction to potential earnings observed in Model 2 are due to differences in background characteristics. These additional variables are powerful predictors of educational expectation, as they significantly improve the model  $\chi^2$  statistic from 9029.89 to 11,863.32 for only 6 degrees of freedom. However, the coefficient of Asian × (Estimated Earnings), the coefficient of primary interest, remains almost unchanged at 2.645 in Model 3, leading us to conclude that Asian Americans' higher propensity than whites to be attracted to fields of study with high earnings potential cannot be explained by white-Asian differences in family background and academic performance. The coefficient of Asian × College becomes insignificantly positive.

In Model 4, we further introduce expected occupation. The goodness-of-fit, as indexed by the model  $\chi^2$ , drastically improves to 14,562.91 for 26 additional degrees of freedom. The very large difference in model  $\chi^2$  between Models 3 and 4 attests to the

significance of expected occupation in explaining expected education. We observe that the coefficient of Asian $\times$ (Estimated Earnings) interaction declines from 2.645 to 1.950, while the coefficient of Asian  $\times$  College remains statistically insignificant from zero. This result is consistent with our theoretical expectation that differences in occupational expectation between whites and Asian Americans contribute to their differences in educational expectation. Indeed, the above analysis shows that a significant portion (about 26%) of the observed difference in educational expectations between Asian Americans and whites can be explained by racial differences in occupational expectation but not in socioeconomic and background characteristics.

### 4.3. Analysis of college enrollment

We now turn to the analysis of college enrollment. The data come from the second follow-up survey of NELS in 1994, two years after most of the NELS respondents graduated from high school. The outcome measure is whether a NELS respondent was enrolled in a four-year, post-secondary institution and, if yes, the field of study. For our sample of whites and Asian Americans, 59.8% were enrolled in four-year colleges and universities. As shown in column 5 of Table 6, Asian Americans are underrepresented among those who were not enrolled (with the relative Asian index at 0.85). White-Asian differences by field of study among those who were enrolled are also shown in the same column.

The pattern of racial differences in the actual field of study closely mirrors that of the expected field of study. For example, Asian Americans tend to be in physical science, biological science, engineering, computer science, and business. Discrepancies are found for mathematical science, pre-professional fields, and social science. Whereas in mathematical science and social science Asians are underrepresented in expected education but overrepresented in actual enrollment, the reverse is true for pre-professional fields. One possibility is that in some colleges and universities students planning professional careers are actually enrolled in mathematical and social science majors rather than pre-professional majors. That is, the definition of the actual field of study may differ from that of the expected field of study. As before, we see a close resemblance between Asian representation (column 5) and relative estimated earnings by field (column 7).

To assess the differences in educational outcomes between Asian Americans and whites and their sources, we estimate another series of conditional logit models. As before, the outcome variable is a categorical variable mapping the distribution of the NELS respondents in 1994 onto the categories listed in column 1 of Table 6, i.e., whether enrolled in college and, if yes, the field of study. We report goodness-of-fit statistics and key estimated coefficients for the models in Table 8.

Model 1 of Table 8 is analogous to Model 2 of Table 7, in which we include both Asian  $\times$  College and Asian  $\times$  (Estimated Earnings) interactions. However, the results are different from those in Table 7 in that the Asian  $\times$  College interaction is significantly positive in the presence of the Asian  $\times$  (Estimated Earnings) interaction. This shows that, without additional controls, Asians are more likely to enroll in college, above and beyond their rational planning for high-earning careers. In Model 2, we

Table 8

Conditional logit models for college enrollment and major choice: goodness-of-fit statistics and selected coefficients

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Field dummies	(14 coefficients)		(14 coefficients)		(14 coefficients)		(14 Coefficients)	
Asian × College	0.311	0.101	0.241	0.113	0.169	0.118	0.085	0.124
Asian × (Estimated Earnings)	1.425	0.343	1.372	0.349	1.077	0.366	0.600	0.386
Sex × College			0.769	0.067	0.468	0.072	0.219	0.078
Sex × (Estimated Earnings)			-2.734	0.231	-2.226	0.246	-1.256	0.263
SES × College			0.858	0.049	0.751	0.051	0.516	0.055
SES × (Estimated Earnings)			0.099	0.164	0.166	0.172	0.294	0.184
(Academic Achievement) × College			0.033	0.001	0.028	0.002	0.021	0.002
Ability × (Estimated Earnings)			0.028	0.005	0.027	0.005	0.018	0.006
(Expected Occupation) × College					(13 coefficients)		(13 coefficients)	
(Expected Occupation) × (Estimated Earnings)					(13 coefficients)		(13 coefficients)	
(Expected Education) × College							(15 Coefficients)	
(Expected Education) × (Estimated Earnings)							(15 coefficients)	
Model $\chi^2$	15,039.14		17,816.60		18,591.43		20,029.05	
DF	16		22		48		78	

Note. Sex is coded 1 if female, 0 if male. The number of cases is 7895.  $\chi^2$  denotes the likelihood-ratio  $\chi^2$  statistic contrasting the current model to the model with no coefficients, with degrees of freedom reported in row DF. Earnings is estimated from the 1992 wave of the *High School and Beyond* data for each college major, shown in Table 6. Ability is the sum of standardized scores (with mean of 50 and standard deviation of 10) on mathematics, reading, and science tests. Both expected occupation and expected education are measured categorically.

Data sources: 1994 NELS and 1980–1992 *High School and Beyond* Sophomore Cohort.

include the standard controls of sex, SES, and academic achievement. The additional variables greatly increase explanatory power, as the model  $\chi^2$  statistic jumps from 15,039.14 in Model 1 to 17,816.60 in Model 2 for 6 degrees of freedom. Note that both the coefficient of the Asian × College interaction and the coefficient of the Asian × (Estimated Earnings) interaction are attenuated with the addition of the control variables. This attenuation indicates that some of Asian Americans' advantage in attending college and concentrating in fields that yield high earnings is attributable to their more favorable family SES and higher academic achievement.<sup>17</sup> While the reduction of the coefficient for college enrollment is fairly large (from 0.311 to

<sup>17</sup> Sex is unrelated to race and thus cannot explain the racial differences.

0.241), the reduction of the coefficient for expected earnings is very small (from 1.425 to 1.372).

We add expected occupation as an explanatory variable to Model 3, which further improves upon Model 2 in goodness-of-fit, with model  $\chi^2$  increased by 774.83 for 26 more degrees of freedom. We observe noticeable reductions in the two main coefficients of interest: the coefficient of Asian  $\times$  College is reduced to 0.169, and the coefficient of Asian  $\times$  (Estimated Earnings) is reduced to 1.077. In fact, the coefficient of Asian  $\times$  College is no longer statistically significant from zero in Model 3. These results show that occupational expectation plays an important role in explaining white-Asian differences in actual college enrollment.

The stylized recursive model in Fig. 1 calls for the estimation of the effect of educational expectation on educational attainment (path B). Given that the NELS respondents were too young to have completed college education in 1994, we model the influence of educational expectation on college enrollment in Model 4, Table 8. Here, educational expectation is coded as categorical, with 14 major fields of study distinguished (shown in Table 6) and a separate category for missing values. Comparing Models 3 and 4, we again observe a significant improvement in goodness-of-fit (model  $\chi^2$  increased by 1,437.62 for 30 degrees of freedom). The two primary coefficients of interest, those of Asian  $\times$  College and Asian  $\times$  (Estimated Earnings), are both reduced substantially. Indeed, neither is statistically significant from zero. Thus, we conclude that most of the observed differences between whites and Asian Americans in actual college attendance and field choice can be explained by background characteristics, occupational expectation, and educational expectation.

## 5. Discussion and conclusion

Numerous scholars have observed that Asian Americans have, on average, better academic performance, higher educational ambitions, and more years of formal schooling than their white counterparts (Barringer et al., 1990; Caplan et al., 1991; Endo, 1980; Fejgin, 1995; Goyette and Xie, 1999; Hirschman and Wong, 1986; Hsia, 1988; Kao, 1995; Nee and Sanders, 1985; Nee and Wong, 1985; Zhou and Bankston III, 1994). However, no research to date has yet attempted to systematically theorize the causal processes through which Asian Americans achieve high educational and occupational status.

In this paper, we advocate a synthetic perspective for understanding the social mobility process of Asian Americans, called the “strategic adaptation perspective.” We argue that Asian Americans consciously choose certain high status occupations where they can avert disadvantages as newcomers and succeed with marketable credentials. In other words, Asian Americans mobilize their cultural and material resources in planning and pursuing particular educational paths in response to existing social and economic structures. In sharp contrast to the purely cultural explanation, our perspective places a premium on the instrumental value, rather than the intrinsic value, of formal education to Asian Americans. It is our thesis that, being marginal racially, culturally, and politically, Asian Americans favor formal

education, particularly formal education in fields of high demand in the economy, as their preferred channel of mobility.

Extending the classic Wisconsin model of status attainment, we also identify social–psychological factors as the core of the process of mobility among Asian Americans. Similar to the Wisconsin model, our model gives an important role to educational expectation in bridging family background and motivation to later achievement. Differing from the Wisconsin model, though, we place premium importance on occupational expectation and hypothesize that a respondent's occupational expectation is causally prior to his or her educational expectation. We further specify the causal effects of occupational expectation and educational expectation on college attendance. For both educational expectation and college attendance, we analyze both the level of education and the intended and actual fields of study of students who expect to and actually enroll in college.

In this paper, we examined the relationship between Asian Americans' pattern of occupational choice and occupational characteristics derived from Census data on the young adult labor force. We found that Asian American youth indeed tend to choose occupations with high average earnings and with a large proportion of incumbents who hold at least a bachelor's degree. We also observed an association between occupations chosen by Asian American youth and the proportion of Asian American workers in the labor force, although this latter association is slightly weaker than the former. Further, our analysis revealed that Asian American youth plan to pursue college education in fields that reward them with high financial gains. A sizeable proportion (about 26%) of this association is explained by white-Asian differences in expected occupation. Finally, we showed that, behaviorally, Asians are indeed more likely than whites to enroll in college and to major in fields that have high financial payoffs, and these racial differences are attributable to both educational expectation and occupational expectation.

Our empirical work is preliminary and limited. The implications of our theoretical framework regarding completed schooling and occupational attainment remain to be tested in future work. The research reported in this paper is only a small step toward understanding how and why Asian Americans, as a minority, are able to achieve equal and sometimes superior social status to that of whites.

Understanding the social mobility process of Asian Americans will also help us gain deeper insights into broader racial/ethnic inequalities in the US. In particular, why do African Americans, American Indians, and Hispanics continue to fall behind whites in socioeconomic status long after the lifting of legal barriers to their advancement in society? Obviously, this is a grand question that is worthy of the attention of a whole generation of social scientists. From our limited work on Asian Americans, we can only suggest that it would be naive to think that the experiences of Asian Americans can be easily transported to other minority groups. Let us invoke two unique features of Asian Americans. First, most Asian Americans are recent voluntary immigrants who are selectively ambitious in seeking economic opportunities in the US, and this feature sets them apart from caste-like/involuntary minorities (Ogbu, 1978). Second, although many Asian American immigrants began their lives in the US at the very bottom of the socioeconomic ladder, there are still many more Asian

American immigrants who came to the US with physical, human, or social capital typically unavailable among the native minority underclass and recent immigrants from Latin America. Furthermore, it is possible that the earlier success of some Asian Americans in certain areas, such as technical fields and small businesses, breeds more success, becoming a powerful psychological stimulus for later generations of Asian Americans (immigrants and native-born alike), who emulate their predecessors’ success by following similar paths. In conclusion, we do not think that there is one simple explanation for Asian Americans’ success, and thus we see no single easy solution to overcoming the obstacles to mobility faced by other minorities in the US.

**Appendix A. Occupation categories**

Occupation variable	NELS categories	1990 Census categories
Clerical (1)	Office worker	Clerical workers, office machine operators Bookkeepers Secretaries Clerical workers, general
Craftsman, operative (2)	Tradesperson	Metal craftsmen, except mechanics
	Machine operator	General mechanics and repairmen Carpenters Electricians Automobile mechanics and repairmen Other construction trades Other craftsmen Textile machine operators Metalworking operators Transportation equipment operatives Operators, except textile, metalworking, and transportation
Farmer, laborer (3)	Farmer Laborer	Farmers, except horticultural Horticultural specialty farmers Managers, farms, except horticultural Farmers and farm laborers Managers, horticultural specialty farms Forestry and fishing occupations Laborers, except farm
Manager, administrator (4)	Manager	Managers and administrators, public  Managers and administrators

**Appendix A** (continued)

Occupation variable	NELS categories	1990 Census categories
Military (5)	Military	Military occupations
Professional I (6)	Professional (e.g., accountant)	Accountant Engineer Architect Writers, artists, and entertainers Librarians, archivists and curators Social and recreation workers
Professional II (7)	Professional (e.g., doctor)	Religious workers Life scientists Physical scientists Social Scientists Mathematicians Physicians, dentists, and related practitioners Lawyers and judges
Proprietor or owner(8)	Small business owner	If a manager and self-employed
Protective service (9)	Protective service	Protective service workers
Sales (10)	Sales	Sales workers, retail Sales workers
School teacher (11)	School teacher	Elementary and preschool teachers Secondary, vocational, and adult education teachers
Service (12)	Service worker	Cleaning service workers, food service workers Health service workers Personal service workers Barbers, hairdressers, and cosmetologists
Technical (13)	Technical worker	Science and engineering technicians Health technologists and technicians Technicians, except health, engineering, and science Computer specialists

**Appendix A** (continued)

Occupation variable	NELS categories	1990 Census categories
Not working, missing (14)	Full-time homemaker No plans to work Will be in school Other	Last worked in 1984 or earlier

**Appendix B. The conditional logit model**

Let  $U_{ij}$  denote the potential propensity that the  $i$ th student chooses alternative  $j, j \in J$ , where  $J$  is the choice set. We further decompose  $U_{ij}$  into two components

$$U_{ij} = V_{ij} + \varepsilon_{ij}, \tag{B.1}$$

where  $V_{ij}$  is a systematic component and  $\varepsilon_{ij}$  is a random disturbance. The decision rule is

$$P_{ij} = \Pr(U_{ij} > U_{ih}) \text{ for all } h \neq j \text{ in } J. \tag{B.2}$$

This model is logistic if the random component  $\varepsilon_{ij}$  in (B.2) is specified as type I extreme value distribution (McFadden, 1974). We have

$$P(y_i = j) = \exp(V_{ij}) / [\sum \exp(V_{ih})]. \tag{B.3}$$

For the usual multinomial logit model,

$$V_{ij} = \underline{x}'_i \beta_j, \tag{B.4}$$

where  $\underline{x}_i$  is a vector of predictors for the  $i$ th person, and  $\beta_j$  is the parameter vector of  $\underline{x}_i$  specific for the  $j$ th choice. From (B.4), it is evident that, for usual multinomial logit models, predictors are fixed over all alternatives. The conditional logit model differs from the usual multinomial logit model on how to specify:  $V_{ij}$

$$V_{ij} = \underline{z}'_{ij} \alpha. \tag{B.5}$$

That is, predictors vary as a function of both  $i$  and  $j$ , and the coefficient vector  $\alpha$  is invariant with  $j$ . As shown in Breen (1994) and Xie and Shauman (1997), the conditional logit model can be written as a loglinear model with categorical covariates. As shown in this paper, the conditional logit model is well suited to studying the effects of attributes associated with alternatives.

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