

# Examining Alternative Measures of Social Disadvantage Among Asian Americans: The Relevance of Economic Opportunity, Subjective Social Status, and Financial Strain for Health

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**Abstract** Socioeconomic position is often operationalized as education, occupation, and income. However, these measures may not fully capture the process of socioeconomic disadvantage that may be related to morbidity. Economic opportunity, subjective social status, and financial strain may also place individuals at risk for poor health outcomes. Data come from the Asian subsample of the 2003 National Latino and Asian American Study ( $n = 2095$ ). Regression models were used to examine the associations between economic opportunity, subjective social status, and financial strain and the outcomes of self-rated health, body mass index, and smoking status. Education, occupation, and income were also investigated as correlates of these outcomes. Low correlations were observed between all measures of socioeconomic status. Economic opportunity was robustly negatively associated with poor self-rated health, higher body mass index, and smoking, followed by financial strain, then subjective social status. Findings show that markers of socioeconomic position beyond education, occupation, and income are related to morbidity among Asian Americans. This suggests that potential contributions of social disadvantage to poor health may be understated if

only conventional measures are considered among immigrant and minority populations.

**Keywords** Asian Americans · Socioeconomic status · Economic opportunity · Subjective social status · Financial strain · Physical health · Body mass index · Smoking

## Introduction

Socioeconomic factors underlie much of the unequal distribution of health and illness in society. For example, research shows that lower education level and income are associated with increased risk of reporting poorer self-rated health (SRH) [1–3]. Other studies show that lower education level is associated with health risk markers, such as body mass index (BMI) [4–10]. Also, low education and income, as well as blue-collar occupations, are related to increased risk of health behaviors such as smoking [11–17].

Despite decades of research on education, occupation, and income, these factors capture only part of the latent disadvantages in society [18, 19]. For example, although studies often find that individuals with higher income are often healthier, income itself does not fully capture economic deprivation. For instance, persons living in cities such as Los Angeles may have higher incomes than individuals living elsewhere, but that income may actually provide fewer resources due to a higher cost of living. While these indicators of socioeconomic status are commonly studied, measures of socioeconomic position may not be uniform across populations [20, 21]. Some researchers argue for the merits of using specific socioeconomic attributes, such as education or income, while

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others utilize composite indices. Others find that specific socioeconomic characteristics vary in importance depending on the outcome of interest [22, 23]. For example, Daly et al. suggest that financial economic indicators (e.g., family income, wealth) may be more useful than education and occupation when considering mortality risk [24].

The importance of socioeconomic measures may also vary by ethnicity [25]. In community-based studies with large samples of Asian Americans, conventional indicators were not found to be consistently associated with negative physical and mental health outcomes. For example, the Filipino American Epidemiological Study (FACES) showed that education and income were not associated with chronic physical health conditions or psychological distress, while occupation was inconsistently associated [26–28]. Similarly, the Multi-Ethnic Study of Atherosclerosis (MESA), a longitudinal study of a general population sample, noted that low education was a risk for coronary calcification among Whites, but not among Chinese Americans [29].

These mixed findings suggest that education, occupation, and income capture some but not all facets of socioeconomic status among Asian Americans. A majority of Asian Americans are immigrants, and for many, their overseas education may not translate to commensurate occupational and economic gains in the U.S. [30–33]. Some experience downward drift into lower paying, lower prestige jobs after migration [34, 35]. Further, as a racial minority group, Asian Americans may encounter the so-called “bamboo ceiling” that inhibits occupational advancement and promotion [30, 36, 37]. Given these reasons, we investigate whether alternative socioeconomic characteristics that reflect other dimensions of socioeconomic position—namely, financial strain, subjective social status, and economic opportunity—have relevance for Asian Americans.

#### Financial Strain

Income and wealth may not necessarily convert into adequate financial resources. Difficulties in matching fiscal resources (e.g., income) to expenses and demands lead to financial strain, which can then erode self-esteem and personal control over life activities, restrict access to health promoting resources (e.g., fresh food, medication, health services), and contribute to chronic stress [38–40]. In turn, these burdens can lead to poor health. Previous reports point out the relationship between financial strain and risk for physical health problems such as cardiovascular disease, elevated blood pressure, and myocardial infarction [21, 41–43], increased cortisol levels [39, 43], and physical health symptoms such as stomach and neck pain, headaches, and tiredness [44]. Other studies have also noted associations between financial strain and mental health outcomes such as life satisfaction [45], post-traumatic stress disorder [46],

psychological distress [47], and depression [38, 48–51]. Though Asian Americans are often viewed as an economically successful minority, this population shows a bimodal distribution with high rates of poverty among some subgroups. For example, 38% of Hmong live in poverty, compared to 13% for Asian Americans overall and 12% for the general U.S. population [52]. Also, the sending of remittances overseas reduces the disposable income of many Asian Americans [53–56]. Therefore, income alone may overstate the actual resources available, resulting in financial strain and subsequent well-being.

#### Subjective Social Status

Subjective social status reflects one’s perceived position on the social hierarchy. Adler and colleagues suggested that low social standing is related to stress, which then promotes illness [18, 19, 57–59]. Singh-Manoux et al. argue that an individual’s subjective self-rating of social position accounts for personal life circumstances (including past and perceived future prospects) not fully captured by other single (e.g., education, income) or composite (e.g., employment grade) measures [18, 19]. For this reason, they contend that “subjective social status reflects an individual’s sociocultural circumstance more fully than any of the other objective measures of social class” (p. 1331) [18]. According to their formulation, subjective social status reflects not a single aspect of social position, but all of them. Given this rationale, one may expect that subjective social status will be related to health more consistently than any singular socioeconomic characteristic because subjective social status summarizes one’s total material deprivation, stress, education, and exposure to occupational hazards. Few studies have investigated subjective social status among Asian Americans, but findings suggest that it is a potentially important health risk factor. Ostrove et al. found that subjective social status was a better predictor of SRH for Chinese-American pregnant women than education and household income [60]. Leu et al. also reported that higher subjective social status was negatively associated with mood dysfunction among immigrant Asian Americans [61].

#### Economic Opportunity

Economic improvement fosters health [62–64]. For example, education enhances employment possibilities, and financial gain. Advancement along this trajectory translates to a better quality of life (e.g., occupational prestige, improved housing conditions, access to financial credit and loans) and better physical and psychological well-being. While actual economic gains are important, one’s subjective sense of economic opportunity may also be important. The quest to improve one’s economic

opportunity is a central theme for all persons, but particularly so for immigrants and minorities. For example, many Filipinos choose nursing as a career as a means for employability in response to the workforce shortage in the U.S. [65–71]. However, along with such an opportunity come stressors, such as societal and workplace cultural adjustment and meeting high expectations to remit earnings to family. Perception of economic opportunity may also reflect optimism, a potential risk factor for well-being and mortality [72].

## Methods

Data come from the 2002–2003 National Latino and Asian American Study (NLAAS). NLAAS utilized a multi-frame, stratified probability sampling scheme involving three components. First, participants were recruited with a multistage stratified area probability sampling design: (a) city or contiguous census blocks were sampled based on population density in each neighborhood; (b) dwelling units were sampled within each block; (c) one adult was sampled within each selected dwelling unit. Second, census blocks with at least 5% of Asian households were over-sampled. Third, to increase the sample size, a second respondent from a previously sampled household was recruited. Weighting corrections were constructed to take into account joint probabilities of selection. Additional details about the sampling and weights can be found elsewhere [73–75]. The overall response rate was 65.6%. We utilize data from the Asian American sample ( $n = 2095$ ) of NLAAS. Participants were non-institutionalized persons of Asian ancestry aged 18 years or older residing in any of the 50 states and Washington, DC.

Interviews were conducted by trained interviewers with linguistic and cultural backgrounds concordant with those of the target population, in the preferred language indicated by the respondent. Interviewers were recruited through newspaper advertisements and flyers posted in general public areas (e.g., community centers, libraries, and college campuses), as well as ethnic newspapers and ads posted in ethnic neighborhoods. Interviewer candidates had to pass spoken and written language fluency certification prior to being hired. A total of 275 individuals completed a week-long field interviewer training course held in Ann Arbor, MI. Briefly, training consisted of the following components: instruction on household eligibility and respondent selection procedures; questionnaire training; computer training and practice sessions; review of interview procedures and study materials; and, mock interviews. Various training formats were used, such as large and small group lectures, mock interviews, and one-on-one help sessions. Further details about interviewer training are reported elsewhere [74].

The entire battery of NLAAS survey instruments and items were professionally translated from English into Chinese, Filipino, and Vietnamese and then back translated. The translated versions were reviewed by a multinational bilingual committee and university professors who teach these languages to evaluate cultural relevance. Reviews were utilized by NLAAS principal investigators to make appropriate modifications to the survey. Detailed description of this process has been reported elsewhere [74, 76].

## Health Measures

Three measures were used as outcomes. *Self-rated physical health* (SRH) was one item asking “How would you rate your overall physical health?” (1 = poor, 5 = excellent). SRH has been shown to predict mortality and clinical morbidity in longitudinal studies across the world [77–79]. SRH was dichotomized (0 = poor, fair; 1 = good, very good, excellent) to be consistent with prior studies [80–82]. *Body mass index* (BMI) was calculated by dividing self-reported weight in kilograms by height in meters squared. *Smoking status* was categorized as current smoker or not per the Centers for Disease Control and Prevention criterion. Specifically, participants who reported being a “current smoker” and smoked more than 100 cigarettes over their lifetime were classified as current smokers [83]. Using these three outcomes of SRH, BMI, and smoking provides the opportunity to examine a multi-faceted view of health from a subjective, physiologic, and behavioral perspective, respectively.

## Socioeconomic Measures/Characteristics

*Education* was based on number of years completed and categorized into four groups ( $\leq 11$  years, 12 years, 13–15 years, and 16+ years). *Occupation* was derived from participants’ self-report job titles and classified using the International Standard Classification of Occupations-88 code list [84]. The following categories were used: white collar, blue collar, service, other, unemployed, and non-workers (students, disabled, homemakers, and retirees). *Annual personal income* utilized four categories (0 to \$14,999; \$15,000 to \$34,999; \$35,000 to \$74,999; \$75,000+).

*Economic opportunity* was measured with one item asking “How do you feel about the economic opportunity you have had in the U.S.?” (1 = very dissatisfied, 5 = very satisfied). This item was derived from previous measures of perceived economic opportunity utilized in studies of health with immigrant Mexicans by Vega et al. [85] and Franzini and Fernandez-Esquer [86].

*Subjective social status* was measured with two items based on the subjective SES ladder developed by Adler

et al. [87]. The subjective SES ladder has been utilized extensively by the MacArthur SES and Health Network and found to be associated with various physiological and psychological health outcomes [57, 59–61, 87, 88]. The first item asked respondents to imagine a ladder with 10 rungs. The lowest rung represented those who are the worst off (make the least money, have the lowest education, and least respected jobs/no jobs) in the U.S. The top rung represents those who are the best off. The second ladder was identical to the first, except it asked individuals to imagine their social standing in their community. These two items were averaged to arrive at a score between 0 (low) and 10 (high).

*Financial strain* was also comprised of two items. First, respondents were asked, “In general, would you say that you have more money than you need (=1), just enough for your needs (=2), or not enough to meet your needs (=3)?” They were also asked, “How difficult is it for you to pay your monthly bills?” (1 = not at all difficult, 4 = very difficult). We created a financial strain score by averaging these two items which ranged from 1 (low strain) to 3.5 (high). Pearlin et al. developed the notion of economic strain and its role as a stressor related to depression [89]. Subsequent iterations of financial strain items were developed by Krause and colleagues to examine associations with psychological well-being [38, 50] and Takeuchi et al. for associations with emotional/behavioral problems [90]. Additionally, Aldana and Liljenquist assessed the validity and reliability of these financial strain items [91].

The entire battery of constructs and items relevant to the overall aims and framework of the NLAAS were operationalized and developed by an expert panel of researchers. A multiple stage review process considering numerous factors (i.e., cultural relevance, comprehension, face validity) was employed by the expert panel for the selection of items to be included in the NLAAS. Subsequent pre-testing and refinement of all items and measures was conducted before arriving at a final interview survey [76].

#### Covariates

Additional demographic characteristics served as control variables, including gender, ethnicity (Vietnamese, Filipino, Chinese, and other Asian), age, marital status (married, never married, separated/divorced/widowed); region of residence (Northeast, Midwest, South, and West); nativity (immigrant, U.S. born); and years in the U.S. for immigrants.

#### Analysis

Data analyses began by examining unweighted pairwise correlations between study measures. These include Pearson’s,

Spearman’s, tetrachoric, and polychoric correlations for continuous, ordinal, binary, and categorical measures, respectively. We then conducted ordinary least squares regression for BMI and logistic regression for smoking and self-rated health, employing sampling weights. (Supplemental analyses modeled SRH as an ordinal variable with ordered logistic regression, but we detected violations of the parallel regression assumption.)

For each outcome, we first ran models that included each socioeconomic characteristic individually, controlling for age and other demographic covariates. We subsequently evaluated models that included education, occupation, and income, plus one of the novel socioeconomic measures (e.g., financial strain). Models were compared with one another with Wald tests to determine if dummy variable blocks were statistically significant. We then ran a final model that included all measures simultaneously. All analyses used the *svy* suite of commands with the STATA version 10.0 software (STATA Corp LP, College Station, TX). Approval to conduct this study was granted by the University of Washington Human Subjects Division.

#### Results

Table 1 displays characteristics of the sample. The median and skewness for SRH are 3.0 and  $-.27$ , respectively. Mean BMI for the sample is  $24.3 \text{ kg/m}^2$  and 13% are current smokers. The sample is gender balanced (53% female), 25–34 years of age (25%) on average, married (65%), and most reside in the West (68%). About 76% are immigrants with an average of 16.3 years in the U.S., and ethnicity is spread across Chinese (29%), Filipino (22%), Vietnamese (13%), and other Asian (37%). The majority of the sample has 16 or more years of education (43%), is employed in white collar jobs (34%), and has a personal income of 0 to \$14,999 (42%). The median and skewness for the alternative SES measures are as follows: economic opportunity (4.0,  $-.71$ ), subjective social status (6.0,  $-.50$ ), and financial strain (2.0,  $.32$ ).

Table 2 shows correlations, which are fairly low across all measures and in expected directions. SRH shows low correlations with all measures, with the highest correlation being with subjective social status ( $r = .27$ ). BMI exhibits even lower correlations, for example with income ( $r = .14$ ). Smoking has similarly low correlations, with the highest association occurring with blue collar workers ( $r = .34$ ).

Among the traditional and alternative socioeconomic measures, correlations are in expected directions. The strongest correlations are between income and white collar ( $r = .59$ ) and non-workers ( $r = -.73$ ). Financial strain is negatively correlated with income ( $r = -.26$ ), sense of economic opportunity ( $r = -.26$ ) and subjective social

**Table 1** Sample weighted characteristics of Asian respondents (*n* = 2095)

Gender (%)	Male	47.45
Ethnicity (%)	Vietnamese	12.93
	Filipino	21.59
	Chinese	28.69
	Other Asian	36.79
Age category (%)	18–24	14.57
	25–34	24.89
	35–44	22.65
	45–54	18.66
	55–64	8.94
	65 and older	10.30
Marital status (%)	Married	64.98
	Never married	25.60
	Separated/divorced/widowed	9.42
Region of residence (%)	West	67.94
	Northeast	15.59
	Midwest	8.61
	South	7.86
Immigrant (%)		76.28
Years in U.S. (immigrants only) (mean; SE)		16.31; .61
Education (%)	≤11 years	14.31
	12 years	17.86
	13–15 years	25.19
	16 or more years	42.64
	Occupational classification (%)	White collar
Blue collar		6.87
Service		3.46
Other		19.61
Unemployed		6.35
Non-worker		30.06
Annual personal income (%)		0 to \$14,999
	\$15,000 to \$34,999	25.23
	\$35,000 to \$74,999	24.45
	\$75,000 and higher	8.15
		Median; skewness <sup>a</sup>
Satisfaction with economic opportunity in U.S.? (1 = very dissatisfied, 5 = very satisfied)		4.00; −.71
Subjective social status; combined (0 = low, 10 = high)		6.00; −.50
Subjective social status; U.S. (0 = low, 10 = high)		6.00; −.42
Subjective social status; community (0 = low, 10 = high)		6.00; −.47
Financial strain (1 = low, 3.5 = high)		2.00; .32
Enough money to meet your needs (1 = more than enough, 3 = not enough)		2.00; −.03
Difficulty paying monthly bills? (1 = not at all difficult, 4 = very difficult)		3.00; .58
Self-rated health (SRH) (1 = poor, 5 = excellent)		3.00; −.27
Body mass index (BMI) (mean; SE)		24.26; .18
Current smoker (%)		13.20

<sup>a</sup> Unweighted

**Table 2** Correlations between health outcomes and socioeconomic measures

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 SRH	1.00													
2 BMI	.07	1.00												
3 Current smoker	-.03	.05	1.00											
4 Education	.15	.04	-.17	1.00										
5 White collar	.12	.10	-.15	.46	1.00									
6 Blue collar	.003	.06	.34	-.35	-	1.00								
7 Service	.05	.05	.02	.28	-	-	1.00							
8 Other occupation	-.02	-.01	.13	-.13	-	-	-	1.00						
9 Unemployed	.004	-.08	.09	-.09	-	-	-	-	1.00					
10 Non-worker	-.13	-.10	-.21	-.15	-	-	-	-	-	1.00				
11 Income	.17	.14	.05	.33	.59	.08	-.13	.15	-.27	-.73	1.00			
12 Economic opportunity	.17	.04	-.08	.08	.13	-.02	.02	-.04	-.10	-.04	.22	1.00		
13 Subjective social status	.27	.09	-.08	.34	.21	-.11	-.002	-.06	-.09	-.05	.24	.34	1.00	
14 Financial strain	-.17	.03	.10	-.20	-.19	.06	.03	.04	.15	.04	-.26	-.26	-.31	1.00

status ( $r = -.31$ ). Similarly, subjective social status is positively associated with income ( $r = .24$ ) and economic opportunity ( $r = .34$ ), while economic opportunity is associated with increased income ( $r = .22$ ). The relatively low correlations among socioeconomic measures provide initial evidence that they tap into related, but possibly distinct constructs.

Table 3 shows results of multivariate logistic regression analyses for SRH. Models 1–3 show the associations between SRH and education, occupation, and income, respectively, while controlling for demographic characteristics. Higher odds of “good health” (good/very good/excellent) were observed for education levels of 13–15 years (OR = 1.73; 95% CI: 1.09, 2.74;  $P < .05$ ) and 16 or more years (OR = 2.97; 95% CI: 1.73, 5.12;  $P < .01$ ) (model 1), and, for income levels of \$35,000 to \$74,999 (OR = 2.30; 95% CI: 1.70, 3.10;  $P < .01$ ) and \$75,000 and higher (OR = 2.94; 95% CI: 1.30, 6.64;  $P < .05$ ) (model 3). Lower odds were observed for those unemployed (OR = .47; 95% CI: .23, .95;  $P < .05$ ) and non-workers (OR = .17; 95% CI: .05, .58;  $P < .01$ ) (model 2).

Table 3 also indicates that all three alternative measures of socioeconomic status (economic opportunity, subjective social status, and financial strain) are significantly associated with SRH across all models. These associations hold when included separately with only demographic covariates (models 4–6) and in the presence of education, occupation, and income (models 8–10); as well as in the full model (model 11). Economic opportunity is positively associated with SRH when adjusting for demographic characteristics (model 4: OR = 1.52; 95% CI: 1.29, 1.79;  $P < .01$ ), education, occupation, and income (model 8: OR = 1.42; 95% CI: 1.21, 1.67;  $P < .01$ ), and, when also adjusting for subjective social status and financial strain

(model 11: OR = 1.27; 95% CI: 1.06, 1.52;  $P < .05$ ). Similarly, positive associations between subjective social status and SRH are significant across the partially and fully adjusted models (models 5, 9, and 11) as are negative associations for financial strain (models 6, 10, and 11).

Table 4 shows similar relationships such that economic opportunity and financial strain are significantly associated with BMI. Higher BMI is negatively associated with economic opportunity across all models (models 4, 8, and 11), though positively associated with financial strain (models 6, 10, and 11). Subjective social status is not associated with BMI across all models (models 5, 9, and 11). No other significant associations are observed. Notably, education, occupation, and income are not associated with BMI.

Associations for smoking (Table 5) are similar to those for SRH, but generally attenuated. The major difference is that subjective social status and financial strain are not significantly associated with smoking after adjusting for education, occupation, and income (models 9–11). However, economic opportunity remains a significant correlate when adjusting for traditional and alternative socioeconomic measures. For example, increased economic opportunity is associated with a .64 lower odds (95% CI: .48, .84;  $P < .01$ ) of smoking, controlling for all other socioeconomic and demographic measures (model 11).

## Discussion

This study examines how well-established socioeconomic characteristics of education, occupation, and income, and relatively novel factors of economic opportunity, subjective social status, and financial strain are related to health problems among Asian Americans. We find that

**Table 3** Multiple logistic regression models for self-rated physical health (0 = poor/fair; 1 = good/very good/excellent)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
<b>Education</b>											
≤11 years	REF						REF	REF	REF	REF	REF
12 years	1.33 [.78, 2.26]						1.00 [.59, 1.72]	1.06 [.62, 1.83]	.95 [.57, 1.59]	1.08 [.63, 1.83]	.99 [.58, 1.69]
13–15 years	1.73* [1.09, 2.74]						1.31 [.77, 2.23]	1.38 [.81, 2.35]	1.16 [.68, 1.97]	1.37 [.81, 2.33]	1.23 [.71, 2.13]
16 or more years	2.97** [1.73, 5.12]						2.04* [1.18, 3.53]	2.17** [1.28, 3.70]	1.55 [.92, 2.63]	1.97* [1.11, 3.50]	1.59 [.92, 2.76]
<b>Occupation</b>											
White collar		REF					REF	REF	REF	REF	REF
Blue collar		1.01 [.49, 2.07]					1.62 [.73, 3.61]	1.71 [.75, 3.85]	1.64 [.74, 3.64]	1.67 [.72, 3.84]	1.71 [.75, 3.90]
Service		1.05 [.47, 2.33]					1.73 [.80, 3.74]	1.65 [.77, 3.52]	1.84 [.79, 4.25]	1.66 [.71, 3.91]	1.86 [.74, 4.65]
Other occupation		.50** [.32, .78]					.68 [.42, 1.10]	.69 [.42, 1.12]	.69 [.42, 1.13]	.75 [.47, 1.21]	.74 [.45, 1.20]
Unemployed		.47* [.23, .95]					.67 [.33, 1.37]	.73 [.35, 1.55]	.70 [.36, 1.38]	.94 [.46, 1.91]	.93 [.46, 1.86]
Non-worker		.17** [.05, .58]					.30 [.08, 1.11]	.36 [.10, 1.24]	.35 [.10, 1.22]	.35 [.10, 1.23]	.41 [.12, 1.33]
<b>Income</b>											
\$0 to \$14,999			REF				REF	REF	REF	REF	REF
\$15,000 to \$34,999			1.22 [.80, 1.86]				1.06 [.65, 1.73]	1.03 [.64, 1.66]	1.06 [.63, 1.80]	.98 [.60, 1.58]	.98 [.59, 1.63]
\$35,000 to \$74,999			2.30** [1.70, 3.10]				1.82** [1.33, 2.50]	1.67** [1.22, 2.29]	1.60* [1.12, 2.30]	1.47* [1.01, 2.16]	1.33 [.91, 1.95]
\$75,000 and higher			2.94* [1.30, 6.64]				2.07 [.87, 4.91]	1.76 [.74, 4.17]	1.51 [.61, 3.75]	1.31 [.55, 3.12]	1.06 [.44, 2.54]
Economic opportunity				1.52** [1.29, 1.79]				1.42** [1.21, 1.67]			1.27* [1.06, 1.52]
Subjective social status					1.37** [1.23, 1.51]				1.30** [1.17, 1.46]		1.22** [1.09, 1.37]
Financial strain						0.44** [.35, .54]				.47** [.37, .61]	.59** [.46, .75]**

Notes: \*  $P < .05$ ; \*\*  $P < .01$ . Estimates are weighted. REF indicates the reference category for dummy variables. Models 1–11 control for gender, age, marital status, region, nativity, ethnicity, and years in U.S. Higher values for economic opportunity indicate greater satisfaction with economic opportunity in the U.S. Higher values for subjective social status denote higher rungs on social status ladder. Higher values for financial strain indicate greater financial strain. OR [95% CI]

**Table 4** Multiple linear regression models for BMI

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
<b>Education</b>											
≤11 years	REF						REF	REF	REF	REF	REF
12 years	.50 [-.32, 1.31]						.77 [-.18, 1.72]	.72 [-.25, 1.69]	.89 [-.09, 1.86]	.66 [-.31, 1.64]	.75 [-.26, 1.75]
13–15 years	.23 [-.62, 1.09]						.47 [-.47, 1.41]	.44 [-.53, 1.41]	.50 [-.53, 1.52]	.34 [-.64, 1.32]	.34 [-.76, 1.43]
16 or more years	-.07 [-.68, .55]						.14 [-.61, .89]	.11 [-.66, .88]	.19 [-.70, 1.08]	.15 [-.60, .91]	.13 [-.77, 1.04]
<b>Occupation</b>											
White collar		REF					REF	REF	REF	REF	REF
Blue collar		.25 [-.65, 1.15]					.03 [-.92, .97]	0 [-.94, .94]	.12 [-.084, 1.07]	0 [-.95, .96]	.05 [-.90, 1.01]
Service		-.32 [-1.65, 1.01]					-.48 [-1.96, 1.00]	-.44 [-1.87, .98]	-.35 [-1.99, 1.29]	-.48 [-1.86, .91]	-.39 [-1.90, 1.12]
Other occupation		-.17 [-.85, .52]					-.28 [-1.02, .47]	-.28 [-1.02, .46]	-.26 [-1.04, .52]	-.34 [-1.09, .42]	-.35 [-1.11, .42]
Unemployed		-.04 [-.81, .73]					-.14 [-.93, .65]	-.24 [-1.02, .55]	-.17 [-.95, .61]	-.35 [-1.09, .38]	-.47 [-1.19, .24]
Non-worker		.26 [-.85, 1.38]					.70 [-.70, 2.09]	.59 [-.87, 2.05]	.77 [-.65, 2.18]	.61 [-.87, 2.10]	.57 [-1.01, 2.15]
<b>Income</b>											
\$0 to \$14,999			REF				REF	REF	REF	REF	REF
\$15,000 to \$34,999			.31 [-.56, 1.18]				.31 [-.60, 1.23]	.32 [-.60, 1.23]	.28 [-.64, 1.19]	.49 [-.46, 1.45]	.46 [-.48, 1.39]
\$35,000 to \$74,999			.07 [-.38, .52]				.08 [-.45, .61]	.16 [-.32, .64]	.03 [-.50, .56]	.37 [-.19, .94]	.34 [-.17, .85]
\$75,000 and higher			-.06 [-.78, .67]				.04 [-.74, .81]	.19 [-.55, .94]	-.05 [-.88, .79]	.36 [-.43, 1.14]	.32 [-.43, 1.06]
<b>Economic opportunity</b>											
Subjective social status											
Financial strain											
Constant	21.52** [20.47, 22.57]	21.48** [20.08, 22.87]	21.60** [20.57, 22.62]	22.99** [21.43, 24.55]	21.36** [19.98, 22.75]	20.36** [19.21, 21.51]	20.98** [19.15, 22.82]	22.40** [19.73, 25.07]	20.52** [18.42, 22.62]	19.77** [17.65, 21.88]	20.21** [16.94, 23.49]
				-.36** [-.61, -.12]	.03 [-.15, .21]	.62** [.35, .90]		-.35* [-.63, -.08]	.05 [-.17, .26]	.67** [.40, .94]	-.30* [-.57, -.03]
											.12 [-.12, .36]

Notes: \*  $P < .05$ ; \*\*  $P < .01$ . Estimates are weighted. REF indicates the reference category for dummy variables. Models 1–11 control for gender, age, marital status, region, nativity, ethnicity, and years in U.S. Higher values for economic opportunity indicate greater satisfaction with economic opportunity in the U.S. Higher values for subjective social status denote higher rungs on social status ladder. Higher values for financial strain indicate greater financial strain. b [95% CI]



**Table 5** Multiple logistic regression models for smoking

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
<b>Education</b>											
≤11 years	REF						REF	REF	REF	REF	REF
12 years	1.22 [-.46, 3.20]						.98 [.40, 2.38]	.94 [1.37, 2.42]	1.00 [.41, 2.49]	.96 [1.39, 2.37]	.97 [.38, 2.50]
13–15 years	.66 [.33, 1.33]						.67 [.32, 1.39]	.65 [.31, 1.36]	.68 [.32, 1.42]	.64 [.31, 1.31]	.62 [.29, 1.33]
16 or more years	.41* [-.18, .95]						.48 [-.17, 1.34]	.45 [-.15, 1.36]	.53 [-.19, 1.48]	.47 [-.17, 1.32]	.47 [-.15, 1.45]
<b>Occupation</b>											
White collar		REF					REF	REF	REF	REF	REF
Blue collar		3.59*** [1.86, 6.94]					2.50* [1.20, 5.19]	2.38* [1.09, 5.23]	2.42* [1.10, 5.32]	2.48* [1.19, 5.17]	2.36* [1.03, 5.37]
Service		1.95 [.87, 4.41]					1.40 [.60, 3.29]	1.44 [.63, 3.29]	1.68 [.72, 3.91]	1.42 [.61, 3.28]	1.72 [.77, 3.85]
Other occupation		1.90* [1.07, 3.39]					1.57 [.80, 3.08]	1.57 [.84, 2.94]	1.52 [.75, 3.09]	1.5 [.75, 3.01]	1.52 [.79, 2.92]
Unemployed		2.26* [1.11, 4.62]					1.81 [.94, 3.49]	1.56 [.82, 2.95]	1.74 [.89, 3.43]	1.69 [.89, 3.19]	1.47 [.80, 2.69]
Non-worker		1.12 [.47, 2.70]					.74 [.33, 1.66]	.54 [-.21, 1.37]	.72 [-.31, 1.70]	.71 [-.31, 1.63]	.58 [-.23, 1.49]
<b>Income</b>											
\$0 to \$14,999			REF				REF	REF	REF	REF	REF
\$15,000 to \$34,999			1.22 [.62, 2.42]				1.03 [.54, 1.98]	1.05 [-.55, 2.00]	1.04 [.52, 2.07]	1.12 [.56, 2.26]	1.11 [.54, 2.28]
\$35,000 to \$74,999			.52* [.32, .87]				.59* [.37, .93]	.67 [.41, 1.09]	.63* [.40, 1.00]	.69 [.42, 1.14]	.76 [.46, 1.27]
\$75,000 and higher			.90 [.39, 2.06]				1.30 [.57, 2.99]	1.71 [.74, 3.97]	1.50 [.65, 3.47]	1.66 [.67, 4.16]	2.14 [.88, 5.25]
Economic opportunity				.63*** [-.48, .81]				.62** [-.47, .82]			.64** [-.48, .84]
Subjective social status					.86* [.77, .97]				.90 [.80, 1.01]		.94 [.83, 1.08]
Financial strain						1.37* [1.01, 1.87]				1.27 [.92, 1.74]	1.12 [.78, 1.59]

Notes: \*  $P < .05$ ; \*\*  $P < .01$ . Estimates are weighted. REF indicates the reference category for dummy variables. Models 1–11 control for gender, age, marital status, region, nativity, ethnicity, and years in U.S. Higher values for economic opportunity indicate greater satisfaction with economic opportunity in the U.S. Higher values for subjective social status denote higher rungs on social status ladder. Higher values for financial strain indicate greater financial strain. OR [95% CI]

these characteristics are only modestly correlated with one another among this population and further, that these characteristics have independent associations with SRH, BMI, and smoking. Our data further suggest that economic opportunity and financial strain are particularly robust correlates of health, even after accounting for traditional socioeconomic characteristics and other factors such as age, gender, and nativity.

Not surprisingly, persons with greater income have better SRH and are less likely to smoke compared to those with lower education and income. There are also differences between occupational groups, with white collar workers generally faring better than others, but these contrasts vary by outcome and group. For example, blue collar workers are much more likely to smoke than white collar workers, but blue and white collar workers do not appear to differ with regard to SRH or BMI. These inconsistent results likely reflect the crude nature of occupational title and may be improved by measuring workplace hazards and stressors more directly.

While traditional socioeconomic characteristics are associated with health, our analyses buttress critiques that such measures are not comprehensive. In fact, more novel measures of economic opportunity, subjective social status, and financial strain are also significant correlates of physical health outcomes. These measures appear to be related, although independent, as correlations between them are low. These observations support conceptual arguments that these measures represent different dimensions of socioeconomic disadvantage.

Financial strain is often considered to be a chronic stressor that results when one's economic resources are insufficient to meet ongoing needs [38, 50]. We find that financial strain is related to worse SRH, increased BMI, and greater odds of smoking. Similar results have been reported in studies of American youth and older adults, as well as among Japanese older adults [38, 92]. We also discovered that the relationship between income and SRH is attenuated when financial strain is included in the model, suggesting that strain may potentially mediate income. As this relation is observed only for SRH, however, this finding remains preliminary and deserves further investigation.

Subjective social status is less consistently associated with health than financial strain. When controlling for baseline demographic characteristics (e.g., age), subjective social status is related to SRH and smoking. However, after accounting for education, occupation, and income, subjective social status remains associated with SRH, but not with smoking. Subjective social status was not associated with BMI in any model. Use of subjective social status among Asian Americans is limited. Ostrove et al. reported that subjective social status is related to poorer SRH among

pregnant Chinese-American women, and further, that education and income are no longer significant predictors after inclusion of socioeconomic status [60]. They argued that "Among groups with higher overall incomes, issues of social ordering may become relatively more powerful" (p. 616). Further, though, Singh-Manoux et al. note that subjective social status may not fully mark the "cognitive averaging" (p. 1331) of socioeconomic measures as previously argued [18].

Of all the measures considered, economic opportunity is the most robustly associated with health. In fully adjusted models, greater satisfaction with one's economic opportunity was related to higher odds of good SRH, lower BMI, and lower odds of smoking. The mechanisms that underlie these associations remain for future research. These mechanisms may include optimism or other resiliency factors. Moreover, sense of opportunity may reflect a concept more specific than global optimism, but perhaps reflect one's anticipated economic trajectory. For those who are both advantaged and disadvantaged, this sense of opportunity may reflect their plans and potentially new resources (e.g., a new job that will soon begin, a loan, or a promotion) to help improve their situation. This idea mirrors growing research showing that trajectories of educational and other advantages can influence health above and beyond that of static socioeconomic position [93, 94]. Alternatively, economic opportunity may also tap into goal-striving stress, which has found that for African Americans, the discrepancy between one's hard work and achievements may result in morbidity [95, 96]. Although we do not directly measure this discrepancy, future research should investigate whether economic opportunity is related to goal-striving. Accordingly, our findings for economic opportunity should be seen as preliminary, but promising.

Our findings should be considered in light of several caveats. First, our data are cross-sectional and do not permit the evaluation of causal relationships. However, this study represents an important first step, as we are aware of no longitudinal studies that include large samples of Asian Americans and which contain the types of socioeconomic characteristics studied presently. An important extension would be to evaluate these study questions in prospective studies. Second, all of our measures are based on self-report. Hence, potential biases related to self-reported data (e.g., recall) may influence our estimates. However, an important feature of our study is that it was conducted in multiple Asian languages, tempering biases that result from studies that are conducted solely in English. Third, we do not purport to measure all socioeconomic characteristics that may be of interest. For example, we do not directly assess wealth. Our research, however, does add value by showing that previous findings of null associations between

education, occupation, and income and health among Asian Americans should not be interpreted as meaning that socioeconomic characteristics do not matter.

## Conclusions

This study demonstrates that multiple types of socioeconomic characteristics are related to health problems among Asian Americans. A major finding is that measures of socioeconomic status beyond education, occupation, and income are related to illness. This suggests that potential contributions of social disadvantage on health may be understated if researchers only consider these traditional measures, particularly among minority and immigrant populations.

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