Racial and Ethnic Variation in Health Inequalities in the U.S.

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Abstract

Using pooled data from the 2000-2006 National Health Interview Survey (N=147,039), we document how the relationship between education and a broad range of health measures varies by race/ethnicity and nativity. We find significant differences in the education 'gradient' by race/ethnicity across every outcome we consider. That is, education is a more powerful determinant of health behaviors and outcomes for some groups than for others. In addition, the education differentials for the foreign-born groups are typically more modest than those for the corresponding native-born populations. We also illustrate how the education-health relationship varies across Hispanic and Asian subgroups. Our findings suggest that a complex set of mechanisms, involving the immigration process and assimilation of immigrants into U.S. society, likely give rise to these patterns.

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Introduction

Interest in the relationship between SES and health is longstanding.[1] These studies demonstrate the existence of a social "gradient" in health; that is, a positive relationship between SES and health at all levels of the social hierarchy. This gradient has been identified in men and women, the young and the old, and a large number of countries.[2] Despite the pervasiveness of the social gradient in health, we hypothesize that the strength of the association between socioeconomic status and health varies by subpopulations in the United States. Such variations could result from both racial/ethnic disparities in power and resources and from the selection and assimilation of immigrants. Well-documented heterogeneity in health outcomes and behaviors by race/ethnicity and nativity status[3] may also generate variability in the strength of the association between SES and health across groups. For instance, the "Hispanic Paradox" refers to the finding that Hispanics, particularly the foreign-born, often fare better than expected, given their typically low levels of SES, on both morbidity and mortality outcomes.[4] Other work has shown that the foreign-born, regardless of race/ethnicity, tend to fare better on a wide variety of health outcomes compared to their U.S.-born counterparts.[5] This work has led to questions about the reasons for foreign-born health advantages, and to hypotheses about immigrant adaptation and the "healthy immigrant effect," which postulates that nativity health differentials are driven by higher migration rates among healthier people.[6]

Our paper unites work on racial, ethnic, and nativity disparities in health with that of scholars investigating differences in the SES and health relationship across race and ethnicity groups for specific health outcomes.[7] More comprehensive analyses for children[8] and adults[9] examine education gradients for several health outcomes and several race/ethnic groups, and find "flatter" gradients for Hispanics compared to other racial/ethnic groups. In other words, Hispanics exhibit a weaker relationship between education and health than other groups. Nativity and country of origin may also

play roles in distinguishing gradients, as foreign-born Hispanics generally have more modest associations between education and health than U.S.-born Hispanics,[10] and Mexicans and Central/South Americans may have weaker relationships between education and health than other Hispanics.[11]

This prior work provides the motivation for the current paper. In addition to describing the variation in the education-health association across groups, we address several questions that have emerged from the recent studies described above. First, we examine whether the expected SES and health gradient is evident for all racial/ethnic groups. Next, we determine whether the weaker gradients observed for Hispanics are unique, or if similar patterns characterize other racial/ethnic groups as well. Third, we investigate whether the weaker gradients observed for foreign-born Hispanics compared to the native born are indicative of a more widespread nativity differential. Fourth, to the extent that Hispanics and others show less pronounced stratification in health outcomes, we seek to understand the underlying dynamics. Are these shallower gradients the consequence of less-educated persons being healthier than their counterparts in other ethnic groups, the more-educated being less healthy, or some other pattern? Although we could have focused on occupation or income, we chose education as our measure of SES because many people work outside of the paid labor force, and education determines, to a large extent, occupational status and income.[12]

Our paper builds and improves upon the existing literature in several ways. First, we perform a comprehensive analysis of the education-health gradient across the four major race/ethnic groups in the U.S. (non-Hispanic whites, non-Hispanic blacks, Hispanics, and Asians) using nationally-representative data. We account for potential nonlinearities in the education-health relationship by incorporating education into our models as categories. We further examine the gradients by nativity status and then by subgroups for Hispanic and Asians, due to the extensive cultural, health, and

socioeconomic heterogeneity within these ethnic groups.[13] Additionally, we use self-reported health behaviors and outcomes as our health measures, which reduces the potential for health care access and utilization bias. This concern is particularly salient when studying immigrant and low-income groups.

Data, Methods, and Variables

We use pooled data on adults ages 25-64 from the 2000-2006 National Health Interview Survey (NHIS) for a total sample size of 147,039 including U.S.- and foreign-born whites, blacks, Hispanics, and Asians (see Exhibit 1). The NHIS, conducted continuously since 1957, is the principal source of information on the health of the civilian, noninstitutionalized population of the U.S. The sampling and weighting designs of the survey enable us to both combine seven years of data to increase our sample size and to present results representative of the U.S. population. We consider six dichotomous health outcomes and behaviors: current smoking (everyday or some days), heavy drinking (more than 5 drinks on at least one occasion in the past year), work limitations (physical, mental, or emotional problems limiting or preventing work), obesity (body mass index [BMI] exceeding 30.0), fair or poor self-reported health, and low physical activity (exercises vigorously less than once per week). The outcome variables have been constructed so that we consistently model the probability of an unhealthy behavior or outcome. These measures give a broad overview of the health of the respondents, but several of them - especially self-reported health and reported work limitations - have subjective components that may be affected by racial/ethnic and nativity differences in reporting. Nevertheless, results that are consistent for a variety of measures are likely to signify systematic health differences across groups.

The explanatory variables for the models include education, race/ethnicity and nativity, age, and sex. Race/ethnicity and nativity are self-reported. Our base model distinguishes eight groups,

namely U.S.-born and foreign-born whites, blacks, Hispanics, and Asians. We then look in more detail at Hispanics and Asians. For Hispanics we use eight subgroups (U.S.-born and foreign-born Puerto Ricans, Mexicans, and Central/South Americans; Cubans; and Other Hispanics). For Asians we use four categories (Asian Indians, Chinese, Filipinos, and Other Asians). We did not have sufficient numbers to allow for additional analyses by nativity within Asian national groups. Education is represented by four categories of schooling: less than a high school education, high school degree or GED, some college, and a college degree or more. The sample is restricted to ages 25-64, as schooling is more likely to be completed by age 25. To account for the potentially nonlinear relationship between age and the health outcomes, age was modeled using natural cubic splines, which provide a flexible functional form for the relationship between age and the outcome of interest.[14] Sex is represented as an indicator variable for male. To ascertain whether there are significant differences in the education-health associations across groups, we also include interaction terms between education and the various race/ethnicity/nativity designations. The models also include all other two-way interaction terms to account for the ways that age, sex, ethnicity and nativity, and education combine to influence health outcomes. It is especially important to allow for the interaction of age with the other measures because age profiles vary over the ethnicity and education groups, and initial analyses indicated that these interactions were statistically significant.

We estimate a series of logistic regression models, adjusting for the clustered sampling design and stratification used in the NHIS and weighting the data appropriately. Separate models are estimated for each health outcome, with each model including the variables detailed above. We exclude respondents that are missing values on education (1% of the sample), those who did not report one of the major race/ethnic categories (2% of the sample) and those who were missing on the given outcome variable (ranging from <1% for asthma to approximately 6% for obesity). Thus, the effective

sample size for each model varies depending on the outcome being considered. Because of the complexity of the models and the large number of groups considered, we calculate predicted probabilities for each health outcome or behavior, and display the results in a series of figures. Our focus in this analysis is on comparing gradients across groups; we look at the differences in the likelihood of particular health outcomes and behaviors between those with a high school education and those with a college education. Statistically significant differences in gradients are identified for each outcome as follows. First we conduct a Wald test of the hypothesis that the gradient, defined here as the difference in predicted probabilities for high school and college graduates, evaluated at the median age, is the same for all ethnic/nativity groups. In cases where this hypothesis is rejected, we follow up with a series of pairwise Bonferroni t-tests to determine which groups differ from each other, testing that the gradient at the median age is the same for the two groups being compared. Of particular interest are comparisons of each group with native-born whites, and of each foreign-born group with its native-born counterpart. The full results from all analyses are available upon request from the authors, and more detailed tables and figures for the subgroup analyses are available online.

Results

Exhibit 1 [EXHIBIT 1 ABOUT HERE] provides weighted descriptive statistics for the entire sample, and for each major subgroup. An online supplement [LINK TO ONLINE APPENDIX TABLE 1 ABOUT HERE] shows similar statistics for the more detailed breakdowns of Hispanics and Asians. The proportion of each group with a college degree varies from a low of 10% for foreign-born Hispanics to a high of 59% for U.S.-born Asians. Fully 55% of foreign-born Hispanics have less than a high school education. For nearly every outcome and group, the foreign-born report better health or health behaviors than their U.S.-born counterparts. The only exception is for low physical activity, for

which foreign-born Whites, Hispanics, and Asians have higher frequencies than their U.S.-born counterparts.

Exhibits 2 through 7 [EXHIBITS 2-7 ABOUT HERE] present a series of graphs showing the gradient, or difference in predicted probabilities between high school and college graduates, for each outcome; the probabilies are evaluated at the median age of the sample (43). An online supplement shows the predicted probabilities for each education category as well as the gradients and the results of the significance tests [LINK TO ONLINE APPENDIX TABLE 2 ABOUT HERE]. Estimated probabilities for ages 34 and 52 (the lower and upper age quartiles of the sample) are similar to those at age 43 and are not shown here. These graphs provide information on the magnitude of the education differential for each health outcome and the prevalence of the outcome by levels of education. We present only the results for men, because the results are generally similar for women. Full results for women are available upon request from the authors.

For each outcome, the graphs consist of one bar for each race, ethnic and nativity group. The length of the bar represents the difference between the predicted proportion of unhealthy outcomes for men with a high school degree and the corresponding prediction for men with a college degree. This summary measure reflects the magnitude of the education differential, or "steepness" of the education gradient, for that group and that outcome. Although this is only one of many measures of the strength of the education-health association that we could have chosen, and the magnitude is likely to vary considerably across alternative measures,[15] it has the advantage of simplicity and enables us to present both mean levels and variability in graphical form. Because the scale of the x-axis varies across outcomes, comparisons based on the lengths of the bars are legitimate within but not across outcomes. The graphs summarize the information from our models and highlight the nativity patterns noted earlier: in comparison with the native-born, foreign-born groups generally have (1) lower probabilities

of negative health outcomes and behaviors (i.e., the bars are clustered at lower values) and (2) smaller differentials by education (i.e., the bars are shorter).

For each outcome, the educational gradient in health differs significantly across the eight race/ethnicity/nativity groups considered. Although we find that for nearly every group and every outcome, those with higher levels of education are healthiest, the online supplements show that these relationships are not necessarily monotonic. In addition, some groups have relatively small differentials (flat gradients), whereas others have considerably larger (or steeper) ones. The particular groups that differ vary by outcome, and no group consistently has the steepest or flattest gradient. For example, while Hispanics (both U.S.- and foreign-born) have smaller gradients than other U.S.-born and foreign-born groups for current smoking, this pattern does not characterize the other outcomes. Nevertheless, for the outcomes of smoking and work limitations, our results support the earlier finding that foreign-born Hispanics tend to have smaller gradients than their native-born counterparts. Our results also suggest that this nativity differential is not limited to Hispanics. In fact, we find large significant differences by nativity for smoking, fair/poor health, work limitations and binge drinking for most racial/ethnic groups. (Some nativity differences for Asians are large but are estimated imprecisely because of small sample sizes, particularly at the lower end of the educational distribution.)

The results also reveal that these smaller gradients for the foreign-born are largely attributable to relatively good outcomes among those with less education. At lower levels of education, the foreign-born generally exhibit more positive health outcomes and behaviors than their U.S.-born counterparts, but this is not observed at higher levels of education, thereby generating flatter education gradients in health. We also find differences in the size of gradients across outcomes. Smoking has

relatively large gradients across groups, while binge drinking and obesity have much smaller gradients, suggesting that the impact of schooling varies across health-related behaviors.

In the next stage of the analysis, we perform the same predictions for the detailed race/ethnicity subgroups (results available online). Foreign-born Mexicans have a flatter gradient for smoking compared to U.S.-born whites, and a flatter gradient in obesity compared to U.S.-born whites and U.S.-born Mexicans. Foreign-born Central and South Americans also have flatter gradients than U.S.-born whites for several outcomes. [LINK TO ONLINE APPENDIX TABLE 3 AND ONLINE APPENDIX FIGURE 1 HERE] The results for Asians suggest that there are differences in gradients between the subgroups for most of the outcomes considered (binge drinking and low activity levels being the two exceptions), but that the statistically significant differences seem to be between U.S.-born whites and the Asian subgroups, rather than among Asian subgroups. [LINK TO ONLINE APPENDIX TABLE 4 AND ONLINE APPENDIX FIGURE 2 HERE].

Discussion

For several decades, researchers have worked to document and explain the extent and causes of socioeconomic and racial inequalities in health outcomes. The research presented here builds upon the wide body of existing literature on this topic (and on the Hispanic health paradox in particular), and asks whether the flatter education gradients recently observed for Hispanics relative to whites, particularly for foreign-born Hispanics, characterize other groups as well. We find evidence to suggest that the nativity differential identified among Hispanics in previous research[16] also extends to other ethnic groups: Foreign-born groups generally have better health outcomes and flatter gradients than their native-born counterparts. The finding that the foreign-born fare better across race and ethnic groups for almost all of the health outcomes considered here confirms results from previous research that immigrants tend to have better morbidity and mortality outcomes than the native-born.[17] For all

outcomes except physical activity, our estimates also suggest that the smaller differences in health measures between the high and low education groups among the foreign-born are due to a substantial degree to groups at the lower end of the education distribution demonstrating relatively favorable outcomes. This is consistent with recent research suggesting that the mortality and birth weight advantages experienced by Hispanics are largely driven by Hispanic individuals at the lower end of the SES distribution faring better than expected, given their level of SES.[18]

We propose several explanations for the finding that lower-educated foreign-born individuals have better health outcomes than their U.S.-born counterparts. These are similar to arguments that have been put forward to explain the Hispanic paradox,[19] the health advantage of immigrants,[20] and differences in SES gradients between Hispanics and whites.[21]

Two explanations pertain to immigration patterns. One frequently evoked hypothesis relates to the "healthy migrant" effect, whereby persons who immigrate to the U.S. may be healthier than those who remain in their home countries. This selective migration process may be more prevalent among those of lower SES.[22] Unfortunately, the data available to test the healthy migrant effect are woefully inadequate and there has been no assessment of the extent to which this process varies by SES. A second migration-related explanation pertains to the presence of different or even reversed SES-health relationships in sending countries as compared with the U.S. For instance, although trends are changing, smoking has been more prevalent among the upper classes in Mexico and other Latin American countries,[23] and higher income individuals in Mexico have higher rates of obesity and excessive alcohol consumption.[24] Thus, poor immigrants from those countries are relatively unlikely to exhibit these health behaviors or related health problems at home and may be less likely to engage in them when they arrive in the U.S.

An alternative set of explanations relates to the assimilation or acculturation process that immigrants face when adapting to life in the U.S. Turra and Goldman[25] speculate that, with increasing duration in the U.S., stress and racism faced by immigrants – even those relatively well-off – may weaken some of the pathways that link higher SES to better health among native-born groups. In addition, if particular behaviors such as heavy drinking or smoking are uncommon in immigrants' sending countries, then the benefit that U.S.-born groups experience from higher levels of schooling in terms of reducing the prevalence of such behaviors is likely to be more modest among the foreign-born. In other words, there may be less "room for improvement" among foreign-born groups.

There are two important limitations of this analysis. One is our exclusive focus on education. Other measures of SES – most notably income, occupational status and wealth - are likely to account for some of the observed education differences in health and to have associations with education and health that vary by race, ethnicity, and nativity.[26] A second limitation pertains to variation in the significance of particular levels of schooling across groups. For example, highly educated immigrants may not achieve similar levels of social status as similarly-educated U.S.-born counterparts, due to barriers related to legal status and language. It is also unlikely that a college degree is comparable across countries of origin, either in terms of educational quality or in economic returns in the labor market.[27] Thus, future work on ethnic differences in social inequality should consider more complex measures of SES.

Understanding and addressing socioeconomic disparities in health is a topic of great concern to health researchers and policymakers. It is critical for these and other interested groups to recognize that education is a more powerful determinant of health status for some racial/ethnic and nativity groups than for others. Interventions targeted at particular groups may be more effective than those aimed at broader populations. For instance, U.S.-born children of immigrants, who tend to be more highly-

educated than their parents, nevertheless may be an important target group for interventions to halt the deterioration of health behaviors and outcomes that occurs between the first and second generations. Given the hetereogeneity of the U.S. immigrant population, however, any intervention must take into account racial/ethnic group as well as nativity status.

Research that seeks to understand the origins of SES and health gradients will be crucial to eliminating disparities and to predicting how disparities may shift in coming decades. Many lower SES immigrant groups in the U.S. today have generally positive health behaviors and outcomes, but as gradients shift in sending countries (e.g., smoking and obesity becoming relatively more prevalent among lower SES groups), health advantages for these immigrant groups are likely to erode. This would result in widening, not narrowing, disparities in the U.S., and it is essential for health researchers and policy makers to understand these potential trends in order for policies and interventions to achieve their intended results. The SES-health paradigm must become more flexible to incorporate differences in the way education influences health across race/ethnicity and nativity status, and it must be sensitive to the complex mechanisms that generate those differences. We believe that this more nuanced paradigm is necessary for understanding—and reacting to—the ways in which SES, health, and race/ethnicity and nativity are related, both now and in the future.

Notes

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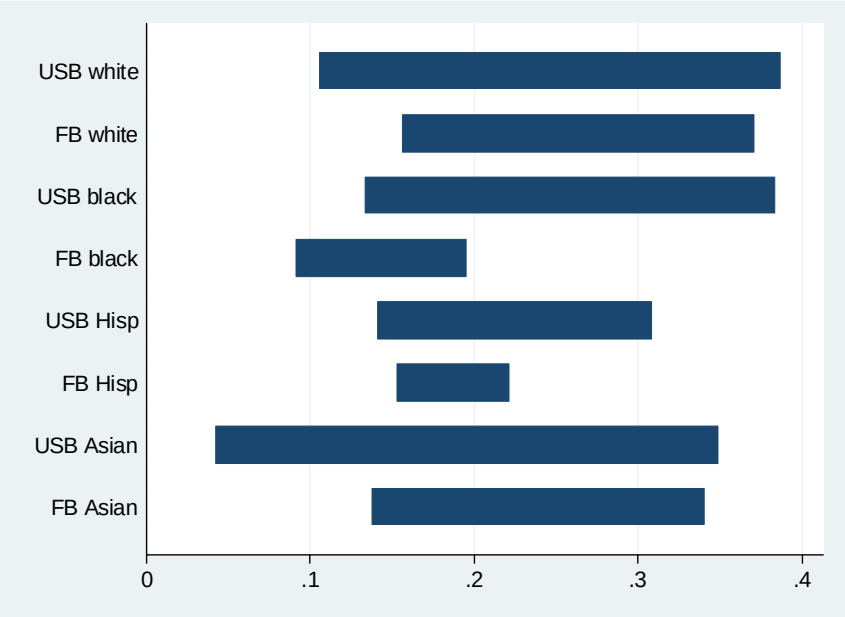
Exhibit 1: Weighted Descriptive Statistics for the 2000-2006 National Health Interview Survey

	Race/Ethnicity and Nativity Classifications								
	All	USB Whites	FB Whites	USB Blacks	FB Blacks	USB Hisp.	FB Hisp.	USB Asians	FB Asians
Male, %	49	49	50	44	49	48	53	54	49
Age (Years), Mean	43.7	44.6	43.6	42.8	41.5	40.8	40.2	41.7	41.8
Education									
Less than high school, %	14	9	9	18	13	21	55	3	10
H.S. degree or GED, %	29	30	23	33	26	32	20	11	17
Some College, %	29	30	24	32	32	32	15	27	18
College degree or more, %	28	31	44	17	29	15	10	59	55
Smoking, %	24	26	22	26	9	22	14	17	12
Heavy Drinking, %	21	23	18	13	7	24	17	20	7
Work Limitations, %	10	10	6	14	4	10	5	6	3
Obese, %	26	25	16	37	23	35	22	15	6
Low Activity, %	61	57	60	68	64	64	76	46	68
Fair/Poor Health, %	10	9	8	18	9	14	12	6	6
N	147,039	89,240	4,219	19,428	2,083	10,776	16,391	750	4,152

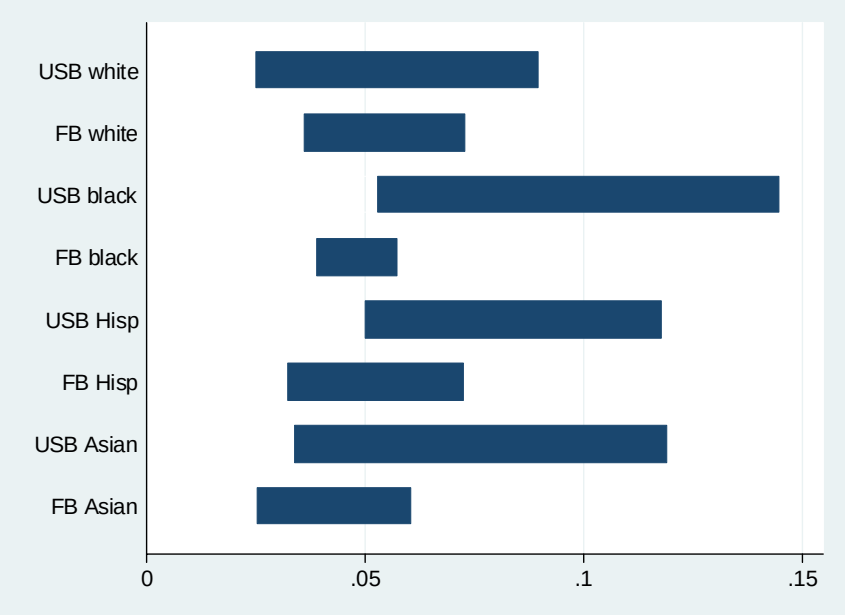
Note: "USB" denotes US-born; "FB" denotes foreign-born

EXHIBIT 2
Current Smoking: Predicted Gradients for Race/Ethnicity and Nativity Categories, Men, Age 43



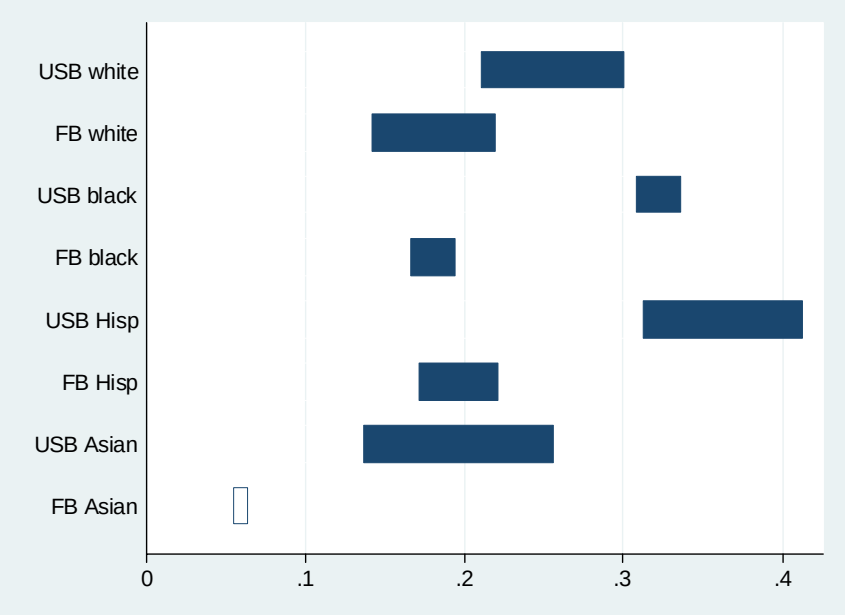
Source: Authors' Analysis of the National Health Interview Survey, 2000-2006.
Note: Each bar starts with the predicted probability for college graduates and ends with the corresponding prediction for high school graduates, so the width represents the estimated educational gradient or difference between high school and college.

EXHIBIT 3
Fair/Poor Health: Predicted Gradients for Race/Ethnicity and Nativity Categories, Men, Age 43



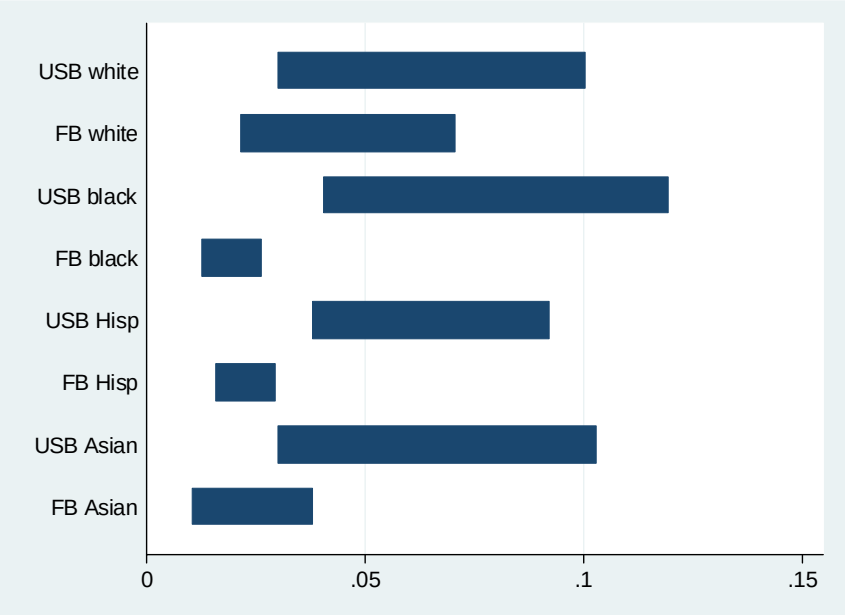
Source: Authors' Analysis of the National Health Interview Survey, 2000-2006.
Note: See the note for Exhibit 2.

EXHIBIT 4
Obese: Predicted Gradients for Race/Ethnicity and Nativity Categories, Men, Age 43



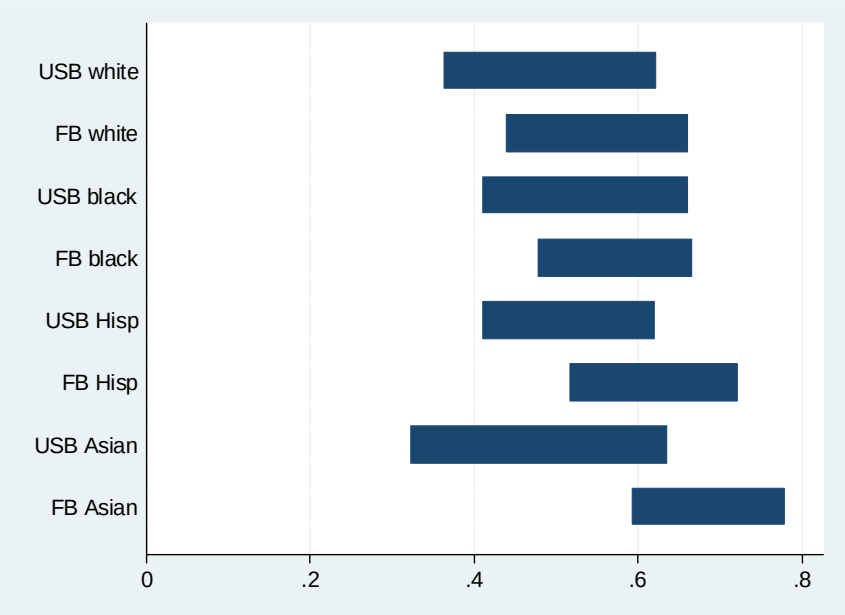
Source: Authors' Analysis of the National Health Interview Survey, 2000-2006.
Note: See the note for Exhibit 2. The hollow bar for foreign-born Asians corresponds to a negative gradient where the sample proportion obese is higher for college graduates than high school graduates.

EXHIBIT 5
Work Limitations: Predicted Gradients for Race/Ethnicity and Nativity Categories, Men, Age 43



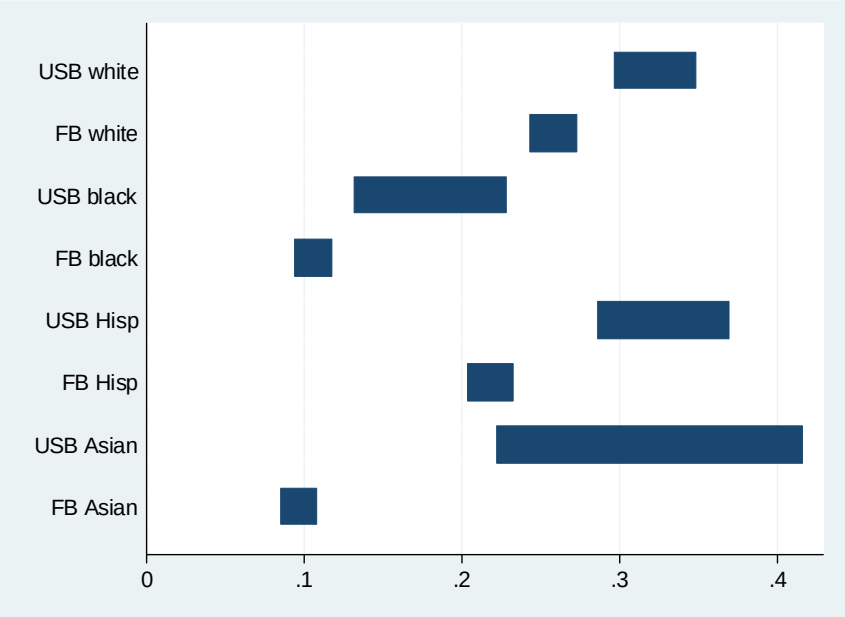
Source: Authors' Analysis of the National Health Interview Survey, 2000-2006.
Note: See the note for Exhibit 2.

EXHIBIT 6
Low Physical Activity: Predicted Gradients for Race/Ethnicity and Nativity Categories, Men, Age 43



Source: Authors' Analysis of the National Health Interview Survey, 2000-2006.
Note: See the note for Exhibit 2.

EXHIBIT 7
Binge Drinking: Predicted Gradients for Race/Ethnicity and Nativity Categories, Men, Age 43



Source: Authors' Analysis of the National Health Interview Survey, 2000-2006
Note: See the note for Exhibit 2.

Appendix Table 1: Weighted Descriptive Statistics for the 2000-2006 National Health Interview Survey: Detailed Race/Ethnicity and Nativity Classifications for Hispanics and Asians

Hispanics

	USB Puerto Ric.	FB Puerto Ric.	USB Mex.	FB Mex.	USB Cen/South	FB Cen/South	Cubans	Other Hisp.
Male, %	47	43	48	55	48	51	52	45
Age (Years), Mean	41.5	45.2	40.7	39.1	36.0	40.7	44.5	42.7
Education								
Less than high school, %	26	40	22	68	8	35	25	24
H.S. degree or GED, %	31	29	34	17	16	24	23	27
Some College, %	27	21	32	10	37	22	28	31
College degree or more, %	16	10	13	5	39	19	24	18
Smoking, %	27	18	20	14	17	13	21	20
Heavy Drinking, %	19	11	26	20	21	13	10	21
Work Limitations, %	14	16	9	4	6	3	7	11
Obese, %	35	26	38	24	23	19	22	23
Low Activity, %	69	77	63	77	52	71	77	69
Fair/Poor Health, %	18	23	14	12	8	10	12	15
N	2,212	469	6,880	10,070	333	3,870	1,320	2,013

Note: "USB" denotes US-born; "FB" denotes foreign-born

Asians

	Asian Indians	Chinese	Filipino	Other Asian
Male, %	55	51	47	50
Age (Years), Mean	39.6	42.7	43	41.8
Education				
Less than high school, %	7	9	5	12
H.S. degree or GED, %	11	14	15	21
Some College, %	12	12	29	23
College degree or more, %	70	65	51	44
Smoking, %	8	9	14	17
Heavy Drinking, %	6	5	13	11
Work Limitations, %	2	2	6	4
Obese, %	6	4	12	6
Low Activity, %	65	63	65	66
Fair/Poor Health, %	4	5	7	8
N	1,005	1,043	961	1,880

Appendix Table 2: Predicted Probabilities of Health Outcomes by Level of Education at Age 43, National Health Interview Survey (2000-2006)

Current Smoking (N=145,907)	Men (Wald F=30.12***)[1]								Women (Wald F=143.04***)							
	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian
				a, b	a	a, b				a, b	a	a, b	a	b		a, b
<HS	0.56	0.38	0.50	0.19	0.41	0.24	0.32	0.33	0.53	0.26	0.42	0.05	0.30	0.10	0.37	0.06
HS	0.39	0.37	0.38	0.20	0.31	0.22	0.35	0.34	0.36	0.26	0.31	0.05	0.22	0.09	0.40	0.07
Some Coll	0.28	0.31	0.29	0.16	0.24	0.23	0.21	0.29	0.26	0.21	0.23	0.04	0.17	0.09	0.25	0.05
Coll+	0.11	0.16	0.13	0.09	0.14	0.15	0.04	0.14	0.10	0.10	0.11	0.02	0.10	0.06	0.06	0.02
Difference, HS-Coll+	*0.28*	*0.21*	*0.25*	*0.10*	*0.17*	*0.07*	*0.31*	*0.20*	*0.26*	*0.15*	*0.21*	*0.03*	*0.12*	*0.03*	*0.35*	*0.04*
Fair/Poor Health (N=146,940)	Men (Wald F=7.21***)								Women (Wald F=6.45***)							
	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian
			a	a, b		a					a	b				
<HS	0.22	0.10	0.27	0.08	0.23	0.12	0.19	0.09	0.28	0.12	0.38	0.12	0.30	0.20	0.22	0.14
HS	0.09	0.07	0.14	0.06	0.12	0.07	0.12	0.06	0.11	0.09	0.20	0.08	0.15	0.11	0.12	0.09
Some Coll	0.07	0.07	0.11	0.05	0.10	0.08	0.09	0.05	0.08	0.08	0.14	0.07	0.12	0.11	0.09	0.07
Coll+	0.03	0.04	0.05	0.04	0.05	0.03	0.03	0.03	0.03	0.04	0.08	0.06	0.07	0.05	0.04	0.04
Difference, HS-Coll+	*0.06*	*0.04*	*0.09*	*0.02*	*0.07*	*0.04*	*0.09*	*0.04*	*0.08*	*0.04*	*0.12*	*0.02*	*0.08*	*0.06*	*0.09*	*0.05*
Obese (N=139,049)	Men (Wald F=11.43***)								Women (Wald F=12.49***)							
	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian
			a					a								a
<HS	0.31	0.24	0.35	0.20	0.45	0.25	0.17	0.06	0.32	0.24	0.50	0.41	0.46	0.32	0.14	0.08
HS	0.30	0.22	0.34	0.19	0.41	0.22	0.26	0.06	0.27	0.19	0.43	0.35	0.38	0.25	0.19	0.06
Some Coll	0.30	0.21	0.35	0.19	0.39	0.23	0.29	0.08	0.25	0.17	0.43	0.33	0.34	0.25	0.20	0.08
Coll+	0.21	0.14	0.31	0.17	0.31	0.17	0.14	0.06	0.15	0.10	0.35	0.26	0.24	0.16	0.08	0.05
Difference, HS-Coll+	*0.09*	*0.08*	*0.03*	*0.03*	*0.10*	*0.05*	*0.12*	*-0.01*	*0.11*	*0.09*	*0.08*	*0.09*	*0.14*	*0.09*	*0.11*	*0.00*
Work Limitations (N=146,875)	Men (Wald F=22.28***)								Women (Wald F=11.15***)							
	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian
				a, b		a, b		a				a, b		a		a
<HS	0.22	0.12	0.24	0.04	0.19	0.04	0.31	0.04	0.25	0.12	0.27	0.07	0.21	0.05	0.31	0.05
HS	0.10	0.07	0.12	0.03	0.09	0.03	0.10	0.04	0.11	0.07	0.13	0.05	0.10	0.04	0.10	0.05
Some Coll	0.08	0.07	0.10	0.02	0.08	0.04	0.08	0.03	0.10	0.07	0.11	0.05	0.09	0.06	0.08	0.04
Coll+	0.03	0.02	0.04	0.01	0.04	0.02	0.03	0.01	0.04	0.03	0.06	0.03	0.05	0.03	0.04	0.02
Difference, HS-Coll+	*0.07*	*0.05*	*0.08*	*0.01*	*0.05*	*0.01*	*0.07*	*0.03*	*0.07*	*0.04*	*0.07*	*0.02*	*0.05*	*0.01*	*0.06*	*0.03*
Low Activity (N=144,925)	Men (Wald F=3.93***)								Women (Wald F=8.80***)							
	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian
								a				a	a	a		a
<HS	0.74	0.77	0.77	0.73	0.74	0.79	0.84	0.80	0.79	0.82	0.87	0.85	0.84	0.87	0.90	0.85
HS	0.62	0.66	0.66	0.67	0.62	0.72	0.64	0.78	0.69	0.72	0.79	0.81	0.74	0.81	0.75	0.83
Some Coll	0.52	0.60	0.55	0.54	0.51	0.64	0.47	0.65	0.59	0.66	0.70	0.70	0.65	0.74	0.60	0.71
Coll+	0.36	0.44	0.41	0.48	0.41	0.52	0.32	0.59	0.47	0.54	0.60	0.69	0.58	0.67	0.48	0.69
Difference, HS-Coll+	*0.26*	*0.22*	*0.25*	*0.19*	*0.21*	*0.21*	*0.31*	*0.18*	*0.23*	*0.18*	*0.19*	*0.12*	*0.16*	*0.14*	*0.27*	*0.14*
Binge Drinking (N=145,058)	Men (Wald F=2.90**)								Women (Wald F=4.74***)							
	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian	USB White	FB White	USB Black	FB Black	USB Hisp	FB Hisp	USB Asian	FB Asian
<HS	0.34	0.21	0.30	0.12	0.39	0.29	0.16	0.14	0.14	0.08	0.10	0.02	0.13	0.04	0.04	0.03
HS	0.35	0.27	0.23	0.12	0.37	0.23	0.42	0.11	0.15	0.12	0.07	0.02	0.14	0.03	0.15	0.02
Some Coll	0.35	0.25	0.20	0.10	0.35	0.24	0.26	0.17	0.15	0.11	0.06	0.01	0.12	0.03	0.08	0.03
Coll+	0.30	0.24	0.13	0.09	0.29	0.20	0.22	0.09	0.13	0.11	0.04	0.02	0.10	0.03	0.07	0.02
Difference, HS-Coll+	*0.05*	*0.03*	*0.10*	*0.02*	*0.08*	*0.03*	*0.19*	*0.02*	*0.02*	*0.01*	*0.03*	*0.00*	*0.03*	*0.00*	*0.08*	*0.00*

# p<.10;*p<.05; **p<.01; ***p<.001

Note: 'a' denotes education gradient significantly different from the gradient for US-born Whites; 'b' denotes education gradient significantly different for the group's US-born counterpart, using pairwise t-tests with the Bonferroni adjustment for multiple comparisons.

[1]Results of Wald test for whether the gradient is the same across all groups. These are adjusted F statistics with 7 and 333 d.f.

Appendix Table 3: Predicted Probabilities of Health Outcomes, Men, Age 43, National Health Interview Survey (NHIS) 2000-2006, Detailed Hispanic Origin

Current Smoking				Detailed Hispanic Origin (Wald F=21.76***)[1]					
	USB White	U.S.-born Puerto Rican	Foreign-born Puerto Rican	U.S.-born Mexican a	Foreign-born Mexican a	U.S.-born Cen./ South Amer.	Foreign-born Cen./ South Amer. a	Cuban a	Other Hispanic a
<HS	0.56	0.44	0.29	0.40	0.23	0.53	0.22	0.33	0.24
HS	0.39	0.38	0.20	0.29	0.22	0.25	0.19	0.30	0.25
Some Coll	0.28	0.30	0.20	0.23	0.23	0.22	0.19	0.23	0.23
Coll+	0.11	0.17	0.11	0.13	0.15	0.08	0.16	0.16	0.09
Difference, HS-Coll+	*0.28*	*0.21*	*0.09*	*0.16*	*0.07*	*0.17*	*0.03*	*0.13*	*0.16*
Fair/Poor Health				Detailed Hispanic Origin (Wald F=2.50*)					
	USB White	U.S.-born Puerto Rican	Foreign-born Puerto Rican	U.S.-born Mexican	Foreign-born Mexican	U.S.-born Cen./ South Amer.	Foreign-born Cen./ South Amer. a	Cuban	Other Hispanic
<HS	0.22	0.26	0.18	0.22	0.13	0.08	0.09	0.17	0.19
HS	0.09	0.16	0.11	0.10	0.08	0.07	0.05	0.11	0.10
Some Coll	0.07	0.14	0.19	0.09	0.08	0.03	0.05	0.10	0.08
Coll+	0.03	0.08	0.07	0.04	0.04	0.04	0.02	0.04	0.04
Difference, HS-Coll+	*0.06*	*0.08*	*0.04*	*0.06*	*0.03*	*0.04*	*0.03*	*0.07*	*0.07*
Obese				Detailed Hispanic Origin (Wald F=2.73**)					
	USB White	U.S.-born Puerto Rican	Foreign-born Puerto Rican	U.S.-born Mexican	Foreign-born Mexican a, b	U.S.-born Cen./ South Amer. a	Foreign-born Cen./ South Amer. a	Cuban	Other Hispanic
<HS	0.31	0.45	0.30	0.45	0.26	0.46	0.24	0.21	0.24
HS	0.30	0.40	0.24	0.42	0.24	0.25	0.20	0.28	0.29
Some Coll	0.30	0.38	0.17	0.41	0.27	0.21	0.20	0.30	0.31
Coll+	0.21	0.43	0.27	0.29	0.21	0.31	0.14	0.17	0.22
Difference, HS-Coll+	*0.09*	*-0.03*	*-0.04*	*0.13*	*0.02*	*-0.06*	*0.06*	*0.11*	*0.07*
Work Limitations				Detailed Hispanic Origin (Wald F=13.78***)					
	USB White	U.S.-born Puerto Rican	Foreign-born Puerto Rican	U.S.-born Mexican	Foreign-born Mexican	U.S.-born Cen./ South Amer.	Foreign-born Cen./ South Amer.	Cuban	Other Hispanic
<HS	0.22	0.23	0.15	0.19	0.03	0.06	0.04	0.10	0.11
HS	0.10	0.12	0.09	0.08	0.03	0.03	0.02	0.07	0.07
Some Coll	0.08	0.11	0.15	0.07	0.05	0.02	0.02	0.05	0.06
Coll+	0.03	0.07	0.04	0.03	0.03	0.01	0.01	0.02	0.03
Difference, HS-Coll+	*0.07*	*0.05*	*0.06*	*0.05*	*0.00*	*0.02*	*0.02*	*0.04*	*0.04*
Low Activity				Detailed Hispanic Origin (Wald F=1.81#)					
	USB White	U.S.-born Puerto Rican	Foreign-born Puerto Rican	U.S.-born Mexican	Foreign-born Mexican	U.S.-born Cen./ South Amer.	Foreign-born Cen./ South Amer.	Cuban	Other Hispanic
<HS	0.74	0.75	0.72	0.75	0.80	0.61	0.75	0.81	0.82
HS	0.62	0.63	0.75	0.62	0.71	0.53	0.70	0.78	0.69
Some Coll	0.52	0.55	0.50	0.50	0.63	0.44	0.61	0.72	0.57
Coll+	0.36	0.47	0.33	0.39	0.49	0.31	0.51	0.55	0.46
Difference, HS-Coll+	*0.26*	*0.16*	*0.42*	*0.23*	*0.22*	*0.22*	*0.19*	*0.22*	*0.23*
Binge Drinking				Detailed Hispanic Origin (Wald F=12.40)					
	USB White	U.S.-born Puerto Rican	Foreign-born Puerto Rican	U.S.-born Mexican	Foreign-born Mexican	U.S.-born Cen./ South Amer.	Foreign-born Cen./ South Amer.	Cuban	Other Hispanic
<HS	0.34	0.30	0.22	0.41	0.33	0.06	0.20	0.13	0.30
HS	0.35	0.27	0.17	0.40	0.27	0.21	0.17	0.25	0.33
Some Coll	0.35	0.25	0.11	0.38	0.33	0.20	0.17	0.13	0.38
Coll+	0.30	0.24	0.16	0.31	0.20	0.24	0.21	0.15	0.26
Difference, HS-Coll+	*0.05*	*0.03*	*0.00*	*0.09*	*0.07*	*-0.02*	*-0.04*	*0.10*	*0.08*

# p<.10;*p<.05; **p<.01; ***p<.001

Note: 'a' denotes education gradient significantly different from the gradient for US-born Whites; 'b' denotes education gradient significantly different for the group's US-born counterpart, using pairwise t-tests with the Bonferroni adjustment for multiple comparisons.

[1]Results of Wald test for whether the gradient is the same across all groups. These are adjusted F statistics with 8 and 332 d.f.

Appendix Table 4: Predicted Probabilities of Health Outcomes, Men, Age 43, National Health Interview Survey (NHIS) 2000-2006, Detailed Asian Ethnicity

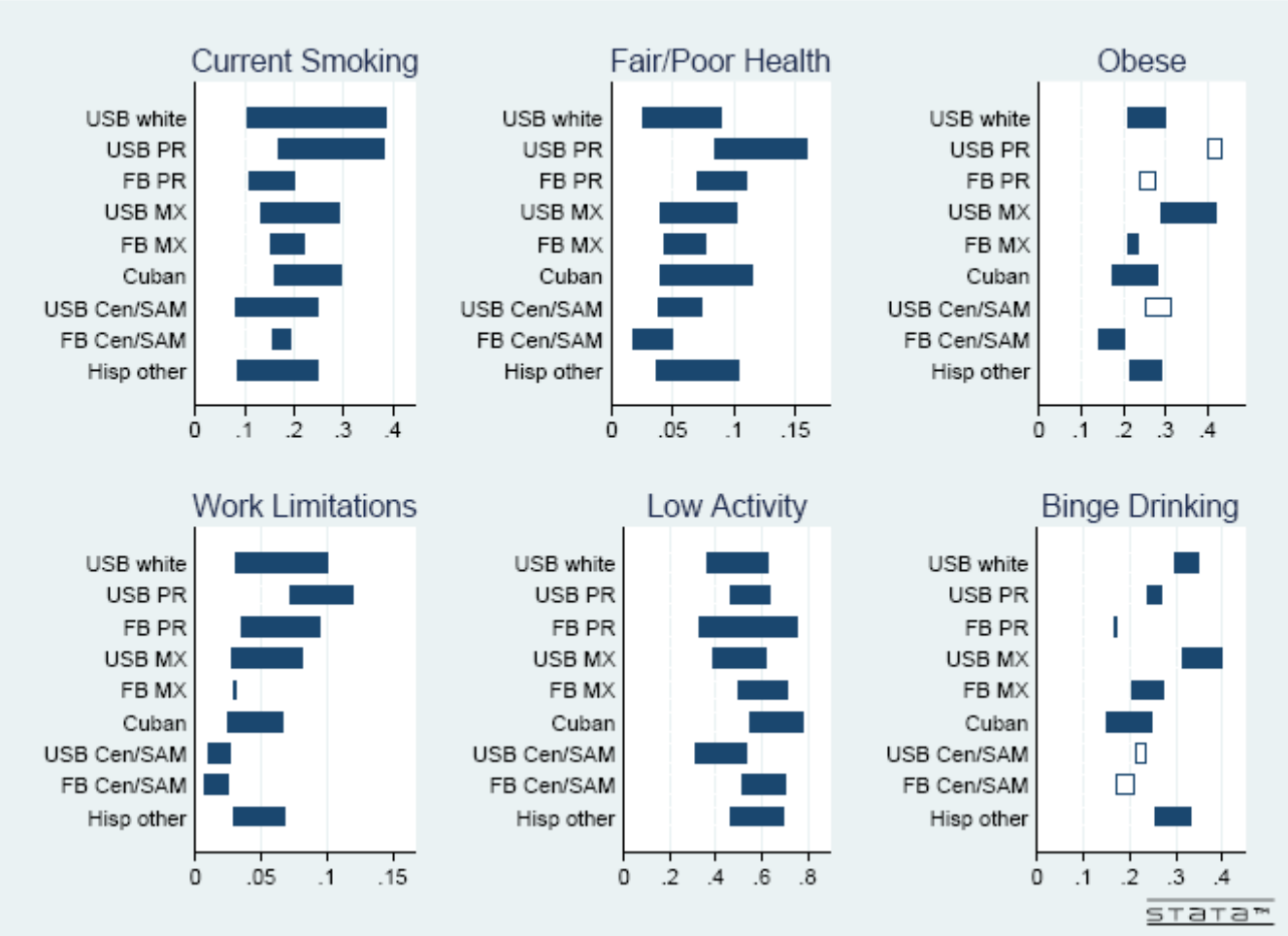
Current Smoking	Detailed Asian Origin (Wald F=3.39**)[1]				
	USB White	Asian Indian	Chinese	Filipino	Other Asian
<HS	0.56	0.23	0.36	0.38	0.31
HS	0.39	0.26	0.36	0.28	0.36
Some Coll	0.28	0.16	0.37	0.24	0.29
Coll+	0.11	0.07	0.09	0.09	0.20
Difference, HS-Coll+	***0.28***	***0.19***	***0.27***	***0.19***	***0.16***
Fair/Poor Health	Detailed Asian Origin (Wald F=5.67***)				
	USB White	Asian Indian	Chinese	Filipino	Other Asian
			a		
<HS	0.22	0.09	0.05	0.09	0.12
HS	0.09	0.05	0.03	0.09	0.08
Some Coll	0.07	0.08	0.02	0.04	0.07
Coll+	0.03	0.04	0.01	0.03	0.03
Difference, HS-Coll+	***0.06***	***0.01***	***0.02***	***0.06***	***0.05***
Obese	Detailed Asian Origin (Wald F=13.62***)				
	USB White	Asian Indian	Chinese	Filipino	Other Asian
		a	a		a
<HS	0.31	0.04	0.09	0.11	0.07
HS	0.30	0.04	0.04	0.16	0.07
Some Coll	0.30	0.04	0.07	0.21	0.11
Coll+	0.21	0.05	0.07	0.11	0.08
Difference, HS-Coll+	***0.09***	***-0.01***	***-0.03***	***0.05***	***-0.01***
Work Limitations	Detailed Asian Origin (Wald F=34.89***)				
	USB White	Asian Indian	Chinese	Filipino	Other Asian
		a	a		a
<HS	0.22	0.01	0.05	0.07	0.05
HS	0.10	0.01	0.02	0.16	0.03
Some Coll	0.08	0.02	0.04	0.07	0.02
Coll+	0.03	0.01	0.02	0.02	0.01
Difference, HS-Coll+	***0.07***	***0.00***	***0.00***	***0.14***	***0.02***
Low Activity	Detailed Asian Origin (Wald F=1.30)				
	USB White	Asian Indian	Chinese	Filipino	Other Asian
<HS	0.74	0.80	0.84	0.79	0.81
HS	0.62	0.80	0.75	0.74	0.77
Some Coll	0.52	0.64	0.72	0.55	0.62
Coll+	0.36	0.60	0.53	0.52	0.56
Difference, HS-Coll+	***0.26***	***0.20***	***0.22***	***0.22***	***0.21***
Binge Drinking	Detailed Asian Origin (Wald F=1.97#)				
	USB White	Asian Indian	Chinese	Filipino	Other Asian
<HS	0.34	0.24	0.12	0.09	0.14
HS	0.35	0.17	0.08	0.16	0.12
Some Coll	0.35	0.20	0.09	0.26	0.15
Coll+	0.30	0.08	0.06	0.15	0.14
Difference, HS-Coll+	***0.05***	***0.09***	***0.02***	***0.02***	***-0.02***

# p<.10;*p<.05; **p<.01; ***p<.001

Note: 'a' denotes education gradient significantly different from the gradient for US-born Whites, using pairwise t-tests with the Bonferroni adjustment for multiple comparisons.

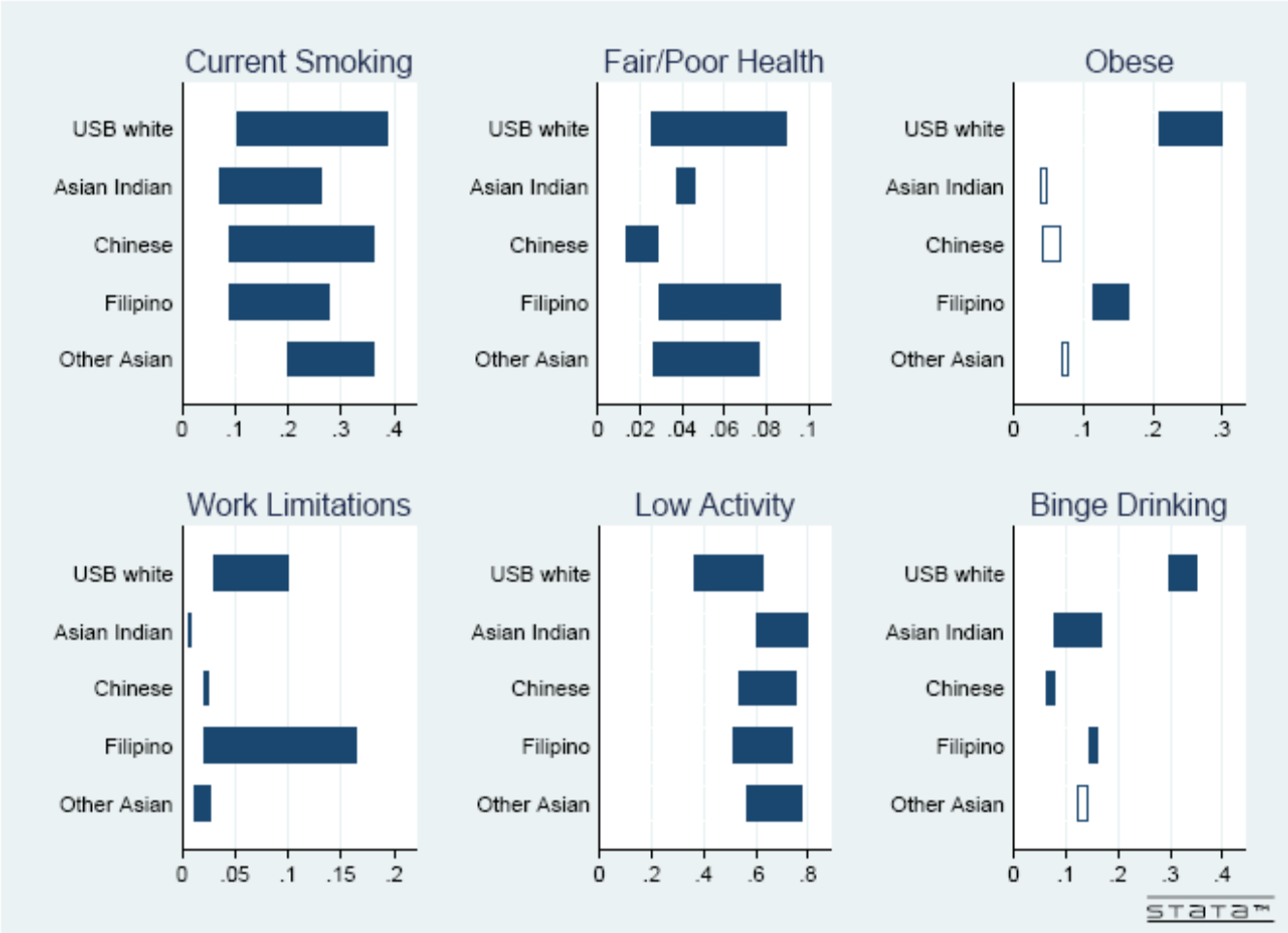
[1]Results of Wald test for whether the gradient is the same across all groups. These are adjusted F statistics with 4 and 336 d.f.

Appendix Figure 1: Predicted Gradients for U.S.-Born Whites and Detailed Hispanic Ethnicity Categories: Men, Age 43



Source: Authors' analysis of the National Health Interview Survey, 2000-2006.
Note: Each solid bar starts with the predicted probability for college graduates and ends with the corresponding prediction for high school graduates, so the width represents the estimated educational gradient or difference between high school and college. The occasional hollow bar corresponds to a negative gradient where college graduates have higher predicted probabilities than high school graduates.

Appendix Figure 2: Predicted Gradients for U.S.-Born Whites and Detailed Asian Categories: Men, Age 43



Source: Authors' analysis of the National Health Interview Survey, 2000-2006.
Note: Each solid bar starts with the predicted probability for college graduates and ends with the corresponding prediction for high school graduates, so the width represents the estimated educational gradient or difference between high school and college. The occasional hollow bar corresponds to a negative gradient where college graduates have higher predicted probabilities than high school graduates.