Racial and Ethnic Disparities in Leisure-time Physical Activity in California: Patterns and Mechanisms

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Abstract

Evidence has shown that racial/ethnic minorities in the U.S. are less likely than whites to meet the recommended levels of leisure-time physical activity (LTPA), yet few studies to date have systematically comparing ethnic subgroups, and why LTPA prevalence varies by race/ethnicity is not clearly understood. This study uses cross-sectional data from 2007 California Health Interview Survey to examine racial/ethnic disparities in adults' participation of LTPA by taking into account the heterogeneity across major ethnic subgroups, and to investigate how the link between race/ethnicity and LTPA is explained by individual predictors of socioeconomic status (SES), acculturation, and perceived neighborhood environment. Results confirm that racial/ethnic minorities are in general less likely than whites to meet recommended level of LTPA, whereas heterogeneity is also evident across ethnic subgroups as no significant disparity is revealed for Japanese and Filipino. Acculturation largely explains group differences for South Asian and Vietnamese. The persisting lower odds of LTPA prevalence among blacks, Mexican, Chinese, and Korean compared to whites suggest that other factors may also have salient effect for these groups.

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Benefits of physical activity on a wide range of health outcomes are well recognized (U.S. Department of Health and Human Services 1996). Leisure-time physical activity (LTPA) is particularly seen as an important lifestyle measure distinct from other types of physical activity such as occupational and household activities. Promoting LTPA is increasingly considered a national health priority for many developed countries (Brownson, Boehmer, & Luke, 2005; Trost, Owen, Bauman, Sallis, & Brown, 2002). While recent years have witnessed increasing levels of LTPA in the US, minority groups have been persistently less engaged in LTPA than whites, largely uncommitted to meeting recommended levels of LTPA which is to engage in light to moderate leisure-time physical activity for at least 30 minutes five or more times per week, or engaging in vigorous leisure-time physical activity for at least 20 minutes three or more times per week (Center for Disease Control and Prevention, 2007). Mechanisms underlying these disparities are not well understood (LaVeist, 2005). And subgroup variations are typically not addressed.

Using 2007 California Health Interview Survey data, we systematically examine the prevalence of meeting the recommended levels of LTPA across white, blacks, Mexicans, and major Asian subgroups to detect nuanced patterns of racial/ethnic disparities in adults' participation in LTPA. We then explore whether the observed disparities are partly attributable to groups differences in socioeconomic status (SES), acculturation experience, and perceived neighborhood physical and social contexts. This study contributes to the LTPA literature by reporting subgroup patterns among Asians in California, and by exploring potential mechanisms underlying group

disparities. Presumably, an assessment of the distinct roles of SES, acculturation, and neighborhood environment should help enhance our understanding of sources of these disparities and in turn help design policy intervention to reduce them.

Racial and Ethnic Disparities in LTPA

Prevalence rates of LTPA participation across major racial/ethnic groups have been documented in the U.S. According to Center for Disease Control and Prevention (2007), about 52% of whites have met the recommended levels of physical activity, while only 40% of blacks and 42% of Hispanics have achieved this. In contrast, the percentages of persons who are physically inactive are nearly twice among Hispanics (21%) and blacks (20%) than whites (11%). Other empirical studies using various data sources also confirmed such patterns (Ahmed et al., 2005; August & Sorkin, 2011; Crespo, Smit, Andersen, Carter-Pokras, & Ainsworth, 2000; Marshall et al., 2007). Fewer studies have addressed LTPA patterns among Asian Americans; but limited evidence shows Asians are much less likely to meet recommended levels of LTPA than non-Asians (Kandula & Lauderdale 2005). Asians and Latinos are typically grouped together and analyzed as a whole with detailed within-group variations lost in the aggregation. Among limited subgroup analyses, a national study reported that all Hispanic subgroups were less active than were non-Hispanic whites, with Mexicans being the most active group among Hispanics and Cubans and Dominicans being the least active (Neighbors, Marquez, & Marcus, 2008). Another study of Asian/Pacific Islanders in Hawaii showed Native Hawaiians were more active than Japanese and Filipinos in both moderate and vigorous activities, but all three groups were less active than whites (Mampilly et al., 2005). Thus evidence seems to show that whites are more engaged in LTPA compared to nonwhites, while subgroup variations are existent but less known. Also less known is the causes of these group disparities. In theory,

racial/ethnic disparities in LTPA participation lie in group differences in socioeconomic, cultural and spatial-environmental factors.

Mechanisms: SES, acculturation and neighborhood

The fundamental cause theory posits that SES affects health because it is positively associated with health-promoting resources and negatively with health-detrimental hazards, where healthy lifestyle is an emerging pathway (Link & Phelan, 1995; Phelan, Link, & Tehranifar, 2010). Like for many other health behaviors such as smoking and diet, there is a strong SES gradient associated with LTPA such that the higher SES the more LTPA participation (Pampel, Krueger, & Denney, 2010). Theoretical mechanisms explaining the link between SES and LTPA are primarily drawn from four perspectives. First, education increases efficacy and knowledge necessary for regular exercising because education improves effective agency for individuals. Active participation in LTPA requires both self-efficacy and sufficient knowledge (Kaiser & Baumann, 2010; Moore, Fulton, Kruger, & McDivitt, 2010; Sharpe et al., 2008), and well educated people have developed learned effectiveness that helps them maintain strong personal control and are more likely to coalesce unrelated habits and ways into a coherent lifestyle (Ross & Mirowsky, 2010). Second, higher SES groups have more economic and occupational resources that can be used individually or collectively on exercise. People with higher income are able to cover the rising cost of equipments and membership for certain leisure-time activities, and high status occupations may come with benefit packages that provide access to health facilities (Pampel et al., 2010). Third, the stress paradigm posits that exposure to stressors have its social origin based on social positions (Pearlin, 1989; Wilkinson, 1999), and the disadvantaged may avoid the challenges of regular exercise and take the form of inactivity as functions of pleasure, relaxation, or self-medication (Pampel et al., 2010). The psychosocial impact

of SES may further interact with race/ethnicity (Bennett et al., 2006), reshaping the effect of stressors on LTPA. Fourth, LTPA reflects a unique personal taste as well as class distinction that are in line with privileged social status. The sociological tradition that lifestyles as reproduction of social class traces back to Weber's observation that social strata were social carriers of particular ways of living and to Bourdieu's notion of "distance from necessity" (Cockerham, 2007). High status groups may adopt some activities setting themselves apart from low status groups. Following this paradigm, whites are more likely to engage in LTPA than nonwhites because of their higher levels of SES. In other words, because whites are socioeconomically advantaged than most minority groups, they enjoy higher levels of LTPA participation in general.

Evidence to date has consistently shown that SES measured by education and income is correlated with LTPA among adults (e.g. Ahmed et al., 2005; Cutler & Lleras-Muney, 2010; Droomers, Schrijvers, van de Mheen, & Mackenbach, 1998; Sternfeld, Ainsworth, & Quesenberry, 1999; Washburn, Kline, Lackland, & Wheeler, 1992). Research further examining potential correlates of LTPA, such as knowledge of guidelines and perceived barriers, also reveals the significance of SES (Masse & Anderson, 2003; Moore et al., 2010). However, race/ethnicity and SES are often examined separately (for exceptions, see He & Baker, 2005; Marshall et al., 2007; Masse & Anderson, 2003); therefore, it is unclear how SES mediates the link between race/ethnicity and LTPA.

In the US, substantial SES differentials exist between disadvantaged groups like blacks and Latinos and advantaged groups like whites and Asians (DeNavas-Walt, Proctor, & Smith, 2008; Kao & Thompson, 2003). Meanwhile, SES also varies within Latino and Asian subgroups at the individual-level (Ramirez & de la Cruz, 2002; Sakamoto, Goyette, & ChangHwan, 2009) as well as the neighborhood level (Wen,

Launderdale, & Kandula, 2009). It is thus plausible that SES is an important reason for the observed racial/ethnic disparities in LTPA.

Structural barriers aside, culture may play an important and distinct role in explaining LTPA disparities. Recent immigrants from Latin America and Asia constitute an increasing proportion of racial/ethnic minorities in the U.S. Most foreign-born immigrants inevitably go through a process of acculturation defined as "the process by which an individual raised in one culture enters the social structure and institutions of another, and internalize the prevailing attitudes and beliefs of the new culture" (Franzini, Ribble, & Keddie, 2001). Acculturation has been linked to higher levels of LTPA (Bungum, Thompson-Robinson, Moonie, & Lounsbery, 2011; Crespo, Smit, Carter-Pokras, & Andersen, 2001; Evenson, Sarmiento, & Ayala, 2004; Kandula & Lauderdale, 2005; Afable-Munsuz, Ponce, Rodriguez, & Perez-Stable, 2010; Lee, Sobal, & Frongillo, 2000), as opposed to for other health behaviors such as smoking and alcohol intake (Abraido-Lanza, Chao, & Florez, 2005).

In the process of acculturation in the US, a resourceful nation yet plagued by an obesity epidemic, self perceptions of body image may change, motivating individuals to engage more in LTPA (Pichon et al., 2007). Language proficiency, in particular, is a crucial factor for exposure and participation in the mainstream community and for a better understanding of the latent meanings in expressions of health (Thomson & Hoffman-Goetz, 2009). Acculturation has also been linked to "postmodernization" in advanced societies where there is a tendency for immigrants from less developed countries to reverse some of the perceived maladaptive features of classic modernization and to adopt the values, attitudes, and behaviors of "postmodernized" American society (Abraido-Lanza et al., 2005). Moreover, acculturation and assimilation often go hand in hand. As a newcomer gets more familiar with the

American mainstream culture, he or she is also more likely to get better educated, find a better job, have higher income, and be able to move to a better neighborhood. Presumably, these work and life improvements would help lessen immigrants' structural barriers to LTPA via providing, say, enhanced accessibility of fitness facilities and safe recreational areas (Crespo et al., 2001).

Beyond SES and acculturation at the individual-level, larger socio-ecological factors also play a salient role in shaping health practices and potentially mediate health disparities by race/ethnicity. Neighborhood streets are the most frequently used physical activity space (Giles-Corti & Donovan 2002). Neighborhood social and physical environments have been linked to individuals' LTPA participation net of individual factors (for a review, see Humpel, Owen, & Leslie, 2002; McNeill, Kreuter, & Subramanian, 2006). For example, evidence shows that better accessibility of exercise facilities, parks and open space is positively associated with higher LTPA (Huston, Evenson, Bors, & Gizlice 2003), so is neighborhood safety (Tucker-Seeley, Subramanian, Li, & Sorensen 2009; Velasquez, Holahan, & You 2009).

Neighborhood environments may systematically vary across racial/ethnic groups given the persistent racial/ethnic and spatial segregation in America and may thus contribute to racial/ethnic disparities in LTPA (McNeil et al. 2006a). Black- and Latino-concentrated neighborhoods are typically more deprived and less safe (Massey, D. S. 1996; Wen, Launderdale, & Kandula 2009; Peterson 2009). However, whether deprived neighborhoods have lower accessibility is debatable. An analysis of spatial distribution of walkable streets and parks in Phoenix shows that lower income and minority populations actually are more likely to live in walkable neighborhoods and have better walking access to neighborhood parks than other groups in Phoenix (Cutts, Darby, Boone, & Brewis 2009). Another study shows similar patterns that non-white

neighborhoods have better accessibility, although these neighborhoods were still perceived less safe and less pleasurable for outdoor physical activity (Franzini et al., 2010).Therefore, whether neighborhood accessibility and safety help mediate racial/ethnic disparities in LTPA remains an empirical question.

Hypotheses

Based on the literature reviewed, we hypothesize that (1) compared to whites, minority groups are less likely to meet the recommended level of LTPA, while the prevalence vary across racial/ethnic groups and subgroups; (2) persons with higher SES are more likely to meet the recommended level of LTPA, and SES is a mediator for white-black and white-Mexican differences, but not for white-Asian differences; (3) immigrants who are more acculturated are more likely to meet the recommended level of LTPA, and there are variations in the acculturation effects across Mexicans and Asian subgroups; (4) perceived neighborhood characteristics are associated with meeting the recommended level of LTPA.

Data and Methods

Data used for this study are from the California Health Interview Survey (CHIS) adult public files for the year 2007. As the nation's largest state health survey, CHIS is a population-based survey that applied multistage sample design with the consideration of high ethnic concentration to estimate the overall state population as well as major racial and ethnic groups and subgroups. To improve the estimate of ethnic residence, geographically targeted oversamples were conducted particularly for Korean and Vietnamese due to their high concentration of residence. Thus the CHIS data are uniquely suited to comparing racial/ethnic subgroups. We excluded persons of disability (have a condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying) or persons of

race/ethnicity other than non-Hispanic white, non-Hispanic black, Latino, or Asian. Since CHIS used a complex sample design, we conducted weighted analyses to ensure that estimates of the California population from the CHIS sample are unbiased.

Dependant Variable

LTPA is conceptualized as "physical activities or exercise you may do in your free time" in the original CHIS questionnaire, and is asked at both moderate and vigorous levels. Moderate LTPA refers to activities like walking, bicycling, swimming, dancing, or gardening, and the recommended level is five or more days per week for at least 30 min per day. Vigorous LTPA refers to activities like aerobics, running, soccer, fast bicycling, or fast swimming, and the recommended level is three or more days per week for at least 20 min per day. Our measure of LTPA is a binary variable that distinguishes respondents who have met the recommended LTPA levels of either moderate or vigorous activities from those who have not.

Independent variables

Race and ethnicity includes major racial/ethnic groups and Asian subgroups: non-Hispanic White, non-Hispanic Black, Mexican, Chinese, Japanese, Korean, Filipino, South Asian, Vietnamese, and other Asian. Other Asian includes persons who are of other Asian subgroups or who are two or more Asian types.

SES measures include income and education. *Poverty income ratio* is the ratio of the estimated household's total annual income (in dollars) from all sources before taxes in the year 2006 relative to the federal poverty level. *Educational attainment* is measured as an ordinal variable: high school or less, some college, and college degree or above.

Acculturation has two variables. *Percent of life in U.S.* is a relative measure of length of residence based on respondents' age, number of years they have lived in the

U.S., and the year they first came to live in this country. *English proficiency* is measured at three levels: do not speak English well/not at all, speak English very well/well, and only speak English. Respondent who reported not speaking English at home were asked their own opinion of how well they spoke English.

Neighborhood environment characteristics include perceived neighborhood safety and access to park, playground, or pen space. *Neighborhood safety* is measured by how respondents feel in their neighborhood, safe (all of the time or most of the time) or unsafe (some of the time or none of the time). *Access to park/playground/open space* is based on whether or not such recreational facilities are within walking distance of home.

Analytical Approach

After presenting the weighted descriptive statistics, we estimated a series of logistic regression models to test our hypotheses, predicting the odds of meeting LTPA recommendations as a function of race/ethnicity, SES, acculturation, and perceived neighborhood environment, controlling for demographic characteristics. Our baseline model includes all racial/ethnic groups to examine crude group differences in LTPA prevalence rates. We then successively added the sets of SES, acculturation, and neighborhood environment covariates to assess their mediating effects on the link between race/ethnicity and LTPA. In our final model we only included predictors that were statistically significant in previous models, along with all racial/ethnic groups. Results are all presented in the form of odds ratio.

To specify the mediating effects of predictors on LTPA prevalence across racial and ethnic groups, we also calculated predicted probabilities of meeting recommended LTPA level for racial/ethnic groups that were statistically significant in the final model, in comparison to whites (Liao, 1994). Increase in probability differentials with whites

means the effect of race/ethnicity gets stronger after a specific set of covariates are added to the model. If the differentials decrease, then it can be argued that the covariates have explained away part of the racial/ethnic effects. We also estimated the magnitude of the mediating effects by reporting the percentage changes in predicted probability differentials.

Results

Table 2 presents the results of a series logistic regression analyses predicting LTPA participation. Our baseline model, Model 1, shows the crude disparities across racial/ethnic groups. As hypothesized, after controlling for age, gender, and marital status, odds ratios for most minority groups are less than 1 and are statistically significant at the 95% confidence level. Among them, the Chinese are the least likely to meet the recommended LTPA level with an odds ratio of 0.47, followed by Koreans, Vietnamese, Mexicans, blacks, and South Asians. Specifically, the Chinese are about 113% less likely than whites to meet the recommended LTPA level, and the corresponding results for other Asian subgroups are 82% for Koreans, 59% for Vietnamese, 54% for Mexicans, 43% for blacks, and 39% for South Asians. At the same time, Japanese and Filipino are not less engaged in LTPA than whites. These findings point to nuanced subgroup disparities, confirming the existence of heterogeneity within Asian populations in terms of LTPA participation.

(Table 2 about here)

In Model 2, we introduce two relevant SES predictors, poverty-income ratio and educational attainment. The main finding from Model 2 is that educational attainment is a significant factor and is positively associated with participation in LTPA. Specifically, persons with a college degree are more likely to meet the recommended LTPA level. At the same time, income is not significantly associated

with LTPA. In addition, SES seems to be an important mediator for blacks, Mexicans, and Vietnamese but not for other subgroups.

Similar with Model 2, the results from Model 3 show that one acculturation predictor, percent of life spent in the U.S., is a significant and positive factor while English proficiency is not. The higher proportion of lifetime one has spent in the U.S., the more likely he or she is to meet the recommended LTPA level. Compared with persons who have spent 20% or less of their life in the U.S., those who have spent 61% to 80% and more than 80% of their life are about 27% and 41% more likely to meet the recommended LTPA level, respectively. Moreover, acculturation, as captured by percent of life spent in the US, helps explain lower levels of LTPA participation for South Asian, Vietnamese, Mexicans, Chinese, and Koreans but not for other subgroups.

We further add neighborhood environment characteristics in Model 4, including perceived neighborhood safety and access to park, playground, or open space. While neighborhood safety is not a significant covariate, neighborhood accessibility is a positive factor associated with LTPA participation. Persons who have convenient access to park, playground, or open space are about 16% more likely to meet the recommended level of LTPA. However, there is almost no change in odds ratios of racial/ethnic groups from Model 3 to Model 4, except for Koreans, suggesting for the most part neighborhood context is not an important reason why ethnic minorities are less likely than whites to engage in LTPA.

Our final model is Model 5 that predicts LTPA as a function of all races/ethnicities and control variables, as well as educational attainment and percent of life spent in the U.S., the two statistically significant covariates in Model 2 and Model 3. As we can see, the racial/ethnic effects for four minority groups, blacks, Mexicans,

Chinese, and Koreans, have been statistically significant through Model 1 to Model 4, indicating gaps in LTPA prevalence between these groups and whites cannot be fully explained by the series of SES, acculturation, and neighborhood environment mediators. Moreover, the three key independent variables, educational attainment, percent of life in U.S., and access to park/playground/open space remain statistically significant in our final model. In other words, class, culture and neighborhood all matter to LTPA, although they are not necessarily mediators of LTPA disparities by race/ethnicity.

Figure 1 presents predicted probabilities of LTPA prevalence for the four racial/ethnic groups that remain statistically significant in Model 5, along with whites, holding all other covariates at their means. To estimate the mediating effects of SES, acculturation, and neighborhood environment, we look at changes in probabilities from Model 1 through Model 4. As we can see, the black-white difference decreases from 0.083 (.431-.348) to 0.072 after adjusting for SES covariates, indicating that SES can explain about 13% of the group difference. The Mexican-white gap drops from 0.103 to 0.075, indicating SES can explain more than 27% of the group difference. However, the mediating effect of SES is minimal for Chinese and Korean. Similarly, based on changes of group differences from Model 2 to Model 3, acculturation covariates explain more than 21% of LTPA disparity between Mexicans and whites, 17% for Chinese, and 24% for Koreans, whereas there is expectedly little mediating effect for blacks. Furthermore, adding neighborhood environment characteristics has little impact on LTPA prevalence across racial/ethnic groups, as their probabilities hold constant form Model 3 to Model 4, except for the white-Korean difference that had a 6% decrease. Such results echo in the results from the logistic regression analyses, and

are in accordance with our hypotheses that SES does not have mediating effects for Asians while acculturation does not have mediating effects for blacks.

Discussion

Using data from multiethnic California, we examined racial/ethnic disparities in meeting the recommended level of LTPA between whites and a large number of minority groups, and tested whether SES, acculturation, and perceived neighborhood environment play a mediating role in contributing to these disparities. Results are largely consistent with our hypotheses that racial/ethnic disparities in LTPA are remarkable, and within-Asian subgroup variations are also visible. Blacks, Mexicans, Chinese, Koreans, South Asians, and Vietnamese are significantly less likely than whites to meet the recommended LTPA level. At the same time, there is no significant difference between whites and two Asian groups, Japanese and Filipinos.

We also found that SES, acculturation, and neighborhood environment are positively associated with LTPA participation. These findings are consistent with our hypotheses as well as the literature. Moreover, as hypothesized, SES seems to be a mediator for blacks' and Latinos' lower LTPA levels, while acculturation partly explains Mexican-white and Asian-white disparities. Within Asian subgroups, acculturation seems to be crucial for South Asians and Vietnamese. Among all the groups examined in this study, blacks, Mexicans, Chinese, and Koreans exhibit the most remarkable disparities with whites. Yet it should be noted that neither SES nor acculturation plays a dominant role in explaining disparities for these groups, and much of mechanisms underlying these disparities remain unknown. Moreover, this study finds little evidence that perceived safety and access to facilities would contribute to group differences in LTPA participation.

Then what other factors may explain these observed group disparities in LTPA? Previous research that has examined the determinants and correlates of LTPA reveals social support from peers and families, attitudes towards exercise, lack of time, past exercise behavior to be notable findings (Trost et al., 2002), and this may help us speculate about other possible mediators. For example, Chinese and Koreans' lowest odds of meeting the recommended LTPA level may be explained by their cultural norms and attitudes that largely emphasize on work ethics and family duties for adults and academic achievement for children rather than recreational activities and self-improvement via exercise. Even among those second- and third- generation of Asian immigrants, such cultural influences remain strong. Based on this, it is also plausible to speculate that Asian adults' lack of enthusiasm on LTPA has stemmed from their childhood and youth experiences, and the influences of past behavior and attitude can be consistent throughout lifetime. For these two groups, a norm promoting LTPA and enhancing well-being via healthful lifestyles should be encouraged.

Some limitations need to be noted here. First, this study is cross-sectional in design, which disallows any inference in causal relationships between predictors and the dependent variable. A longitudinal approach could be applied using panel dataset to assess the process of acculturation, for example, within individuals and to see how it operates on LTPA and whether such changing patterns differ across racial/ethnic groups. In fact, some research showed that among middle-aged adults, English-proficient minorities engaged in less moderate physical activity compared to whites (August & Sorkin, 2011). Second, most variables are subjective self-rated measures in CHIS questionnaire. As different races/ethnicities hold various values, it is possible that their cognitive understandings of some subjective measures, such as LTPA and English proficiency, differentiate between each races/ethnicities, and this

can be an obstacle for a more objective comparison across groups. Third, since this study is based on a sample collected in Californian, findings reported here may not be applicable elsewhere.

In light of the preceding discussion, it is warranted to assert that racial and ethnic disparities in LTPA continue to exist and ethnic minorities, especially immigrants, are in general much less likely than whites to meet the recommended levels of LTPA. Our results also highlight the heterogeneity visible across Asian subgroups, and such heterogeneity exhibits distinct pathways underlying disparities across ethnic subgroups. These findings may have implications for policy designers, educators, and relevant physicians to implement targeted health promotion intervention programs, and such interventions should be educationally and culturally appropriate. Moreover, as the underlying mechanisms have not been fully revealed, future research may need to look beyond individual-level pathways as well as interactions within different contextual effects to advance our understanding of the link between race/ethnicity and LTPA.

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Table 1. Descriptive Statistics

Dependent Variable		Percent or Mean	Sample Size	Range
LTPA	No/Some Activity	61.87%	37183	[0, 1]
	Regular Activity	38.13%	37183	[0, 1]
Independent Variables				
Age		43.06	37183	[18, 85]
Gender	Male	49.78%	37183	[0, 1]
	Female	50.22%	37183	[0, 1]
Marital Status	Not Married	43.37%	37183	[0, 1]
	Married	56.63%	37183	[0, 1]
Race and Ethnicity	White	51.18%	37164	[1, 10]
	Black	6.09%	37164	[1, 10]
	Mexican	27.00%	37164	[1, 10]
	Chinese	4.6%	37164	[1, 10]
	Japanese	1.28%	37164	[1, 10]
	Korean	1.52%	37164	[1, 10]
	Filipino	3.73%	37164	[1, 10]
	South Asian	1.76%	37164	[1, 10]
	Vietnamese	1.70%	37164	[1, 10]
	Other Asian	1.15%	37164	[1, 10]
Poverty Income Ratio	0-99% FPL	12.15%	37183	[1,4]
	100-199% FPL	15.18%	37183	[1,4]
	199-200% FPL	13.29%	37183	[1,4]
	300% FPL and Above	59.38%	37183	[1,4]
Educational Attainment	High School or Less	40.75%	37183	[1, 3]
	Some College	23.57%	37183	[1, 3]
	College Degree or Above	35.68%	37183	[1, 3]
Percent Life in US (%)	0-20	5.67%	37183	[1, 5]
	21-40	7.92%	37183	[1, 5]
	41-60	9.75%	37183	[1, 5]
	61-80	5.39%	37183	[1, 5]
	81+	71.27%	37183	[1, 5]
English Proficiency	Not Well/ Not at All	13.73%	37183	[0, 1]
	Well/ Speak Only English	86.28%	37183	[0, 1]
Neighborhood Safety	None/Some of the Time	6.83%	37183	[0, 1]
	Most/All of the Time	93.17%	37183	[0, 1]
Access to Open Space	No	17.12%	37183	[0, 1]
	Yes	82.88%	37183	[0, 1]

Note: all data are weighted to reflect the complex sampling design of CHIS and all estimates are obtained using the SVY commands in STATA 11.2.

Table 2. Logistic Regression Odds Ratio for Leisure-time Physical Activity

	Model 1	Model 2	Model 3	Model 4	Model 5
Age	0.998†	0.998	0.998	0.999	
	(0.996-1.000)	(0.996-1.001)	(0.996-1.001)	(0.996-1.001)	
Male	1.169***	1.163***	1.165***	1.159***	1.166***
	(1.080-1.265)	(1.074-1.259)	(1.077-1.261)	(1.071-1.253)	(1.077-1.262)
Married	0.851***	0.825***	0.850***	0.846***	0.845***
	(0.791-0.916)	(0.764-0.892)	(0.786-0.920)	(0.782-0.915)	(0.787-0.908)
Black	0.705***	0.739***	0.737***	0.739***	0.728***
	(0.601-0.827)	(0.632-0.864)	(0.631-0.862)	(0.632-0.865)	(0.621-0.852)
Mexican	0.646***	0.728***	0.779***	0.781***	0.773***
	(0.581-0.719)	(0.651-0.815)	(0.695-0.874)	(0.696-0.876)	(0.693-0.862)
Chinese	0.472***	0.486***	0.554***	0.554***	0.557***
	(0.403-0.554)	(0.415-0.570)	(0.463-0.661)	(0.465-0.661)	(0.467-0.664)
Japanese	0.855	0.851	0.879	0.882	0.885
	(0.637-1.147)	(0.633-1.143)	(0.653-1.183)	(0.654-1.190)	(0.657-1.193)
Korean	0.548***	0.562***	0.646*	0.665*	0.673*
	(0.398-0.755)	(0.406-0.778)	(0.462-0.934)	(0.477-0.926)	(0.482-0.939)
Filipino	0.835	0.841	0.922	0.920	0.928
	(0.662-1.054)	(0.667-1.059)	(0.722-1.177)	(0.721-1.174)	(0.726-1.186)
South Asian	0.716*	0.705*	0.828	0.833	0.854
	(0.543-0.943)	(0.535-0.929)	(0.620-1.106)	(0.623-1.115)	(0.642-1.136)
Vietnamese	0.634**	0.685*	0.774	0.775	0.777
	(0.465-0.864)	(0.499-0.939)	(0.552-1.085)	(0.551-1.092)	(0.552-1.093)
Other Asian	0.510**	0.526**	0.565*	0.580*	0.586*
	(0.321-0.808)	(0.330-0.838)	(0.352-0.907)	(0.363-0.925)	(0.371-0.924)
100-199% FPL		0.968	0.947	0.949	
		(0.819-1.145)	(0.798-1.123)	(0.800-1.126)	
200-299% FPL		1.015	0.960	0.959	
		(0.855-1.204)	(0.806-1.144)	(0.805-1.144)	
300% FPL and above		1.154†	1.071	1.066	
		(0.984-1.353)	(0.907-1.265)	(0.899-1.263)	
Some college		1.119†	1.100	1.096	1.113†
		(0.998-1.254)	(0.980-1.235)	(0.976-1.231)	(0.994-1.247)
College or above		1.129*	1.132*	1.118*	1.152***
		(1.026-1.243)	(1.028-1.246)	(1.014-1.233)	(1.046-1.268)
Life in US (21-40)			1.173	1.169	1.169
			(0.894-1.540)	(0.889-1.535)	(0.891-1.534)
Life in US (41-60)			1.076	1.068	1.069
			(0.839-1.381)	(0.832-1.372)	(0.833-1.371)
Life in US (61-80)			1.289*	1.292*	1.305*
			(1.013-1.640)	(1.013-1.646)	(1.034-1.647)
Life in US (81+)			1.393**	1.385**	1.426***
			(1.116-1.740)	(1.108-1.730)	(1.160-1.752)
English Proficiency			0.999	1.003	
			(0.836-1.194)	(0.838-1.257)	
Neighborhood safety				1.042	
				(0.864-1.257)	
Access to open space				1.204***	1.215***
				(1.083-1.340)	(1.091-1.354)

Note: N=37164. 95% Confidence Intervals are in parentheses. All data are weighted to reflect the complex sampling design of CHIS using the SVY commands in STATA 11.2.

† p<0.1, * p<0.05, ** p<0.01, *** p<0.001.

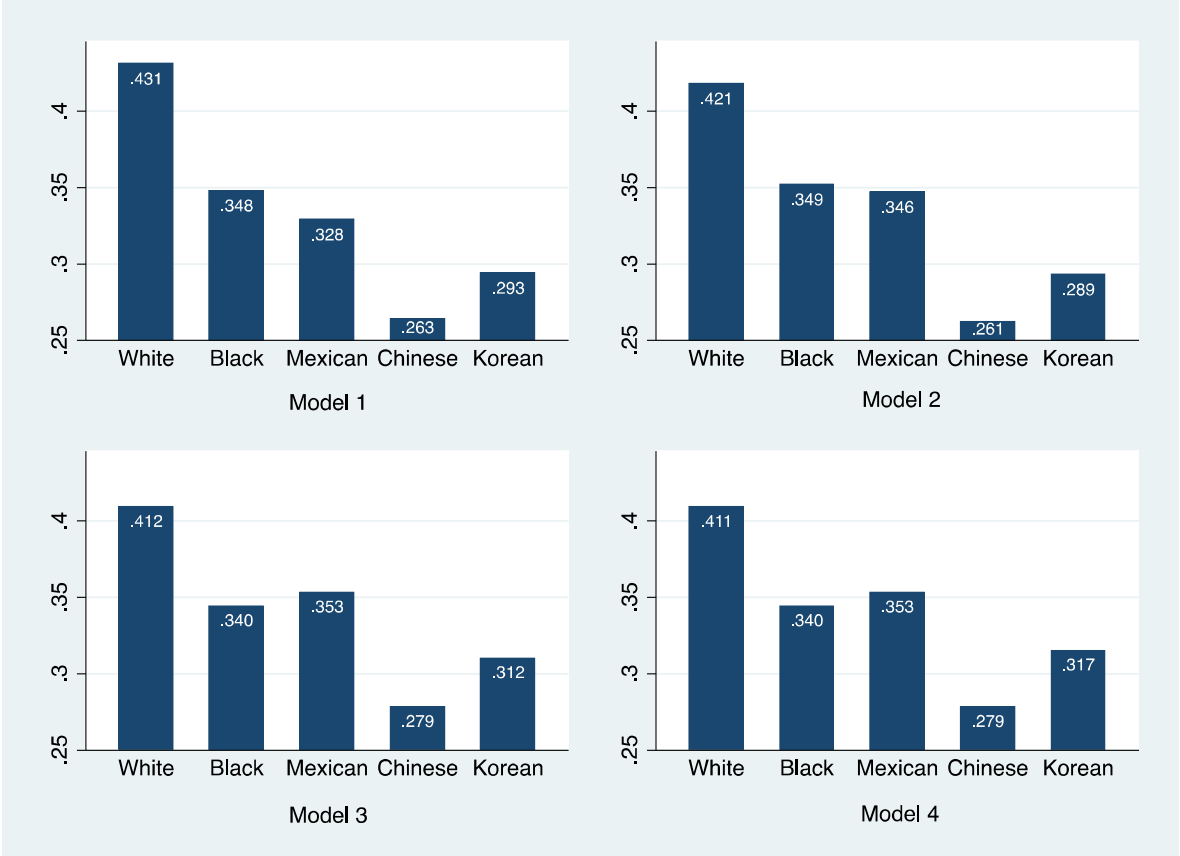

Figure 1. Predicted Probabilities of Leisure-time Physical Activity by Race/Ethnicity.

Note: probabilities are calculated using the *margins, at means* commands following the logistic regression models in Table 2 in STATA 11.2.