

Published in final edited form as:

Am J Health Behav. 2013 January ; 37(1): 104–111. doi:10.5993/AJHB.37.1.12.

Subjective Social Status and Health Behaviors Among African Americans

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Abstract

Objectives—To examine associations of the US and community subjective social status (SSS) ladders with smoking status, at-risk drinking, fruit and vegetable intake, physical activity, and body mass index among 1467 church-going African American adults from a larger cohort study.

Methods—Regression analyses, adjusted for sociodemographics, examined associations between SSS ladders and health behaviors.

Results—The SSS-US ladder was significantly associated with fruit and vegetable consumption ($p = .007$) and physical activity ($p = .005$). The SSS-community ladder was not significantly associated with any health behaviors.

Conclusions—Among this sample of African Americans, the SSS-US ladder is more predictive of some health behaviors than is the SSS-community ladder.

Keywords

African Americans; social status; cancer risk behavior; physical activity; fruit and vegetable intake

Subjective social status (SSS), or an individual's perception of his or her relative position in the social hierarchy, has been associated with health status^[eg,1,2–4] and health behaviors^[eg,5–7] independent of objective socioeconomic indicators such as income, education, and employment status. It has been argued that SSS functions as a unique predictor of health-related outcomes over and above objective measures of socioeconomic status (SES) for several reasons. For example, SSS captures the nuances of SES that affect

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Authors have no competing interests pertaining to this research.

social class (eg, quality of education, job prestige), allows for consideration of rarely assessed socioeconomic components (ie, wealth), includes experiences of societal inequities (eg, discrimination), and incorporates consideration of future prospects.^{1,4,8-10} Together, these aspects of SSS may uniquely affect health-related outcomes through their associations with the psychological and physiological variables that influence health and health-related behaviors [eg, depression and negative affect (cf.^{7,11})].

Most research on the relations of SSS with health outcomes has included the use of a single SSS scale, which asks individuals to rank their standing relative to that of others in the United States (or *society* in some international studies). Known as the SSS-US (or SSS-SES) ladder, directions specify the consideration of relative standing in the United States with regard to, for example, money, education, and occupation.¹² A lesser used SSS scale is the SSS-community ladder, which asks individuals to rank how they stand relative to others in their self-defined communities, without reference to SES.¹² Research indicates that respondents tend to primarily consider material wealth, occupational status, and education in providing SSS-US rankings, whereas everyday altruistic practices (eg, participation in giving activities such as volunteering or being a good neighbor) were among the highest considerations in providing SSS-community rankings.¹² Accordingly, the SSS-US ladder typically demonstrates stronger associations with objective SES indicators than does the SSS-community ladder.^{5,12} For this reason, the SSS-community ladder may be particularly relevant for individuals of lower SES, who might not rate themselves highly on the SSS-US ladder, but who have important and influential roles in their communities that would elevate their SSS-community rankings. Because the referents and determinants of SSS-US and the SSS-community ladder rankings differ, so too may their associations with health outcomes and behaviors. A greater understanding of the relative associations of these ladders with health behaviors would help inform future research, aid in the identification of individuals or groups at risk for negative health outcomes, and expand our knowledge of how different dimensions of social standing affect health outcomes.

The first published study that examined both ladders in their relation to health behaviors was by Ghaed and Gallo, who focused on cardiovascular risk behaviors among a sample of (largely) white women. Results indicated that higher SSS-US endorsements were significantly associated with greater consumption of fruits and vegetables in analyses adjusting for sociodemographics, but this association was not significant with the SSS-community ladder.⁵ In addition, there were no independently significant relations between either of the ladders and physical activity, body mass index (BMI), or smoking status in adjusted analyses.⁵ Only a couple of papers published following the Ghaed and Gallo study used both the SSS-US and the SSS-community ladders, but with a focus on different health outcomes or nonadult populations. For example, although not the main objective, one study found that leisure-time exercise among adults was significantly and negatively correlated with the SSS-US ladder, and not associated at all with the SSS-community ladder.¹³ Another study among Mexican adolescents indicated differing associations with smoking and drinking outcomes for an SSS ladder focused on comparisons with the larger Mexican society (a modified version of the SSS-US ladder) versus the SSS-community ladder. Specifically, this study found negative associations between the SSS-society ladder and smoking and drinking behaviors, but positive associations between the SSS-community ladder and smoking and drinking behaviors.¹⁴ Together, these studies seem to suggest that the SSS-US and the SSS-community ladder are distinct from one another in their association with health behaviors, and mixed results suggest the need for additional research in this area.

It is also important to note that the influence of SSS on health outcomes may not be the same among different racial/ethnic groups. For example, previous studies found that race/ethnicity moderated relationships between SSS and sleep quality,¹⁵ self-rated health,² and

hypertension.¹⁰ Specifically, one study found that the SSS-society ladder was related to greater impairment in sleep quality among Asian and African Americans, but was unrelated among whites.¹⁵ Another found that, after accounting for the effects of objective SES, ratings on the SSS-US ladder were positively associated with self-rated health among white and Chinese American women, but not African American and Latina women. Another found that ratings on the SSS-US ladder were significantly associated with hypertension among white men and women and African American women in fully adjusted analyses, but there was no relationship between SSS and hypertension among African American men.¹⁰ In addition, research suggests that the determinants of SSS may vary by racial/ethnic group. For example, one study found that objective SES measures were not associated with SSS-US ladder rankings as strongly among African American as among white participants.¹⁰ Therefore, it seems important to examine the effects of SSS on health outcomes within racial/ethnic groups. To the best of our knowledge, there have been no previous studies comparing the relative associations of the ladders with multiple health behaviors among African American adults. The purpose of the current work was to address this gap in the literature.

The current study examined the relative associations of the SSS-US and the SSS-community ladders with multiple health-related behaviors (ie, smoking status, at-risk drinking, fruit and vegetable intake, physical activity, and BMI) in a sample of African American adults enrolled in a church-based longitudinal cohort study. This research builds upon the Ghaed and Gallo study, which examined the relative influence of the SSS ladders on these outcomes while controlling for objective SES indicators,⁵ and extends it to a large African American sample of men and women. We hypothesized that the SSS-US and the SSS-community ladders would be associated with health-related behaviors, over and above the influence of sociodemographics, but were not more specific in our predictions given the exploratory nature of this study within an African American sample.

METHODS

Participants and Procedures

Data were collected as part of a longitudinal cohort study designed to investigate associations of behavioral, social, and environmental factors with health behaviors among African American adults. Participants were recruited from a large mega-church in Houston, Texas. Recruitment strategies included printed and televised media within the church and in-person solicitation during church services and at a church health fair. Individuals were eligible to participate if they were 18 years of age, reported residence in the Houston area, had a functional telephone number, and attended church (though they were not required to be a member of the church).

Participants were 1467 African Americans who were enrolled December 2008 through July 2009. Surveys were completed in person at the church. Participants were compensated with a \$30 Visa debit card following survey completion. Study procedures were approved by the Institutional Review Board at The University of Texas MD Anderson Cancer Center, and informed consent was obtained from all participants. The current study reflects data from the first year of the cohort data collection (ie, baseline).

Measures

Participants viewed questionnaire items on a computer screen and entered responses into the computer using the keyboard.

Sociodemographics—Sociodemographics included age, gender, partner status, total annual household income, educational level, employment status, and insurance status. Sociodemographics were treated as covariates in the analyses due to known associations with health-related behaviors.

Subjective social status—SSS was measured with 2 versions of the MacArthur Scale of Subjective Social Status: the US ladder and the community ladder.¹² The SSS-US ladder presents a 10-rung ladder to represent where people stand in the United States, with higher rungs indicating higher status (ie, more money, more education, and better jobs).¹² Participants select the rung that best represents where they think they stand relative to others in the United States, resulting in a ranked indicator variable with 10 possible levels. The SSS-community ladder presents a 10-rung ladder to represent where people stand in their communities, with higher rungs indicating higher status. Participants select the rung that best represents where they think they stand relative to others in their (self-defined) community. In this study, the SSS-community ladder was administered prior to the SSS-US ladder per recommendations in the literature.¹² The SSS ladders have been used in several studies with racially/ethnically diverse participants and have demonstrated adequate reliability and validity [eg,^{2,3,10,12}]. The correlation between the SSS-US ladder and the SSS-community ladder in this sample was 0.52.

Health-related behaviors—Data were collected on smoking status, at-risk drinking, fruit and vegetable intake, physical activity, and BMI. Smoking status was assessed with a single survey item resulting in classification as a current smoker (smoked ≥100 cigarettes in lifetime and currently smoke), former smoker (smoked ≥100 cigarettes in lifetime but quit), or never smoker (smoked <100 cigarettes in lifetime). At-risk drinking was assessed with the *Alcohol Quantity and Frequency Questionnaire*, a self-report measure of the average alcohol consumption on each day of the week over the last 30 days.¹⁶ Males were classified as at-risk drinkers if they consumed an average of >14 drinks per week, and females were classified as at-risk drinkers if they consumed an average of >7 drinks per week. Alcohol quantity and frequency measures have been used extensively in research,¹⁶ including among African American samples (eg,¹⁷). Fruit and vegetable intake was assessed with the *NCI Five-A-Day fruit and vegetable questionnaire*.¹⁸ This questionnaire yielded a continuous variable of daily fruit and vegetable servings that was highly skewed. Because of this, we chose to focus on a binary outcome whereby participants were classified as meeting recommendations for daily intake (≥5 servings of fruits and vegetables a day) or not meeting recommendations for daily intake (<5 servings of fruits and vegetables a day) in our main analyses. This measure has demonstrated adequate convergent validity with more comprehensive dietary intake measures^{19,20} and has been used previously among African American church-based samples (eg,^{21,22}). Physical activity was assessed with the International Physical Activity Questionnaire – Short Format (IPAQ), which is a self-report questionnaire used to measure the amount of time spent in moderate activity, vigorous activity, and walking during the past 7 days.²³ Weekly minutes spent engaging in each type of activity were multiplied by the corresponding metabolic equivalent (MET) value, which is a metric used to quantify energy expenditure (ie, the ratio of energy expended during an activity to the energy expended during rest).²⁴ Then, MET minutes were summed to arrive at the total weekly MET minutes spent in physical activity. Again, the resulting data were highly skewed. Thus, we chose to classify participants as engaging in low, moderate, or high rates of physical activity during the previous week based on total weekly MET minutes, the number of days per week engaged in PA, and the amount of time spent in each type of PA for our main analyses (see guidelines for data processing and analysis of the IPAQ, 2005). The short version of the IPAQ has good test-retest reliability and acceptable criterion validity against the Computer Science Applications, Inc accelerometer.²³ Finally, BMI (kg/

m²) was calculated using staff-administered height and weight measurements. Participants with a BMI 16 to <18.5 were considered underweight, those with a BMI 18.5 to <25 were considered normal, those with a BMI of 25 to 29.9 were considered overweight, and those with a BMI ≥30 were considered obese. Because the number of underweight participants (BMI=16–18.5) in the sample was very small (N=10, <1% of total sample), these individuals were combined with the normal BMI group for analysis. There were no severely underweight individuals in the sample.

Data Analysis

Participant characteristics were examined using descriptive statistics, and relations of the SSS ladders with objective SES variables were examined using Pearson and Spearman correlations. For the main analyses, a series of logistic regression models were used to examine the associations between the SSS scales and health behaviors. Models 1–4 tested the relations of the SSS-US ladder with smoking status, at-risk drinking, fruit and vegetable intake, and physical activity (respectively) controlling for sociodemographics (ie, age, gender, partner status, total annual household income, educational level, employment status, and insurance status). Model 5 tested the relations of the SSS-US ladder with BMI while controlling for sociodemographics, fruit and vegetable intake, and physical activity. Models 6–9 tested the relations of the SSS-community ladder with smoking status, at-risk drinking, fruit and vegetable intake, and physical activity (respectively) controlling for sociodemographics. Finally, Model 10 tested the relations of the SSS-community ladder with BMI while controlling for sociodemographics, fruit and vegetable intake, and physical activity. If the SSS-US and the SSS-community ladders emerged as independently predictive of the same health-related behavior, follow-up analyses were planned to examine their relative significance within a single adjusted model.

Analyses were performed using Statistical Analysis Software version 9.2 (SAS Institute, Cary, NC). Significant models were checked for adherence to underlying assumptions, and no violations were found.

RESULTS

Participant Characteristics

Participants (N=1467; 75% female) were 45 years old on average (± 12.9), and slightly less than half reported being married or living with a significant other. Three quarters of participants reported an annual household income of \leq \$40,000 year, with the same proportion reporting employment. Almost half of the participants had a bachelor's or advanced degree. See Table 1 for all participant characteristics. Compared with population-based estimates of African American adults, our sample had a lower percentage of current smokers²⁵ and individuals meeting fruit and vegetable intake recommendations.²⁶ In contrast, our sample had a comparatively higher prevalence of obesity, as well as reported rates of physical activity [cf.²⁶].

Relations of SSS Ladders With SES

The SSS-US ladder was significantly associated with total annual household income ($r = .23$, $p < .0001$) and educational level ($r = .21$, $p < .0001$), but not employment status ($r = .03$, $p = .28$). As expected, associations of the SSS-community ladder and these variables were more attenuated than with the SSS-US ladder, though still significant in the case of income ($r = .11$, $p < .0001$) and education ($r = .11$, $p < .0001$), but not employment status ($r = -.05$, $p = .09$).

Main Analyses

The SSS-US ladder was significantly associated with fruit and vegetable intake [$\beta = 0.13$, $SE = .05$; $\chi^2 = 7.34$, $p = .007$; $OR = 1.13$ (95% $CI = 1.04-1.24$)] and physical activity [$\beta = .09$, $SE = .03$; $\beta^2 = 8.22$; $p = .004$; $OR = 1.09$ (95% $CI = 1.03-1.16$)]. Specifically, participants with higher SSS-US endorsements were more likely to meet recommended fruit and vegetable intake guidelines and were more likely to engage in high versus low or moderate rates of physical activity. The SSS-US ladder was not significantly associated with smoking status ($p = .20$), at-risk drinking ($p = .52$), or BMI ($p = .84$).

The SSS-community ladder was not significantly associated with smoking status ($p = .21$), at-risk drinking ($p = .42$), fruit and vegetable intake ($p = .09$), physical activity ($p = .11$), or BMI ($p = .17$). See Table 2 for detailed results of these models.

Exploratory Analyses

A series of exploratory analyses were conducted following the main analyses. First, we were interested in how results might differ with an alternative conceptualization of fruit and vegetable consumption. Therefore, we conducted post hoc analyses to determine associations of the ladders with the number of servings of fruits and vegetables per day (a continuous variable). A log transformation was applied to the dependent variable due to the skewness of the distribution. Such transformations reduce the spread of values in the upper range of data points and are helpful when the skewness of the data distribution represents a threat to the underlying assumption of normality necessary for planned analyses.²⁷ A failure to transform highly skewed data can distort associations and lead to erroneous conclusions.²⁸ In addition to the log transformation, regression diagnostics were performed to identify unusual and influential data points. Observations with large residual and high leverage were carefully checked and excluded from analysis (< 3% of observations). Results of these adjusted analyses indicated that both the SSS-US and the SSS-community ladders were significantly associated with the number of daily fruit and vegetable servings in this sample [SSS-US = $\beta = .02$, $SE = .01$, $p < .001$; SSS-community = $\beta = .01$, $SE = .01$, $p = .029$]. However, when both SSS ladders were included simultaneously in an adjusted model, only the SSS-US ladder emerged as independently associated with the number of daily fruit and vegetable servings [$\beta = .02$, $SE = .01$, $p = .007$].

Next, we examined the extent to which the ladders were associated with physical activity as measured by the total minutes engaged in all levels of physical activity (a continuous variable). In this case, a square-root transformation was applied to the dependent variable due to the skewness of the distribution. Again, outlying observations were checked and removed from the database as indicated previously (in this case, <1% of observations). Results of these adjusted analyses indicated that only the SSS-US ladder was significantly associated with the total minutes of physical activity [$\beta = .74$, $SE = .22$, $p < .001$].

DISCUSSION

This study was the first to examine the associations of the SSS-US and the SSS-community ladders with multiple health behaviors among an African American sample of adults. Results of our main analyses indicated that only the SSS-US ladder was uniquely associated with fruit and vegetable intake and physical activity over and above the influence of sociodemographics. Specifically, every 1 unit (rung) increase in the SSS-US ladder was associated with a 13% increase in the odds of meeting recommended fruit and vegetable intake guidelines and a 9% increase in the odds of being in the high (versus low or moderate) physical activity group. These findings contribute to a growing research literature linking perceived social status with health behaviors [eg,⁵⁻⁷], even after accounting for the

effects of income, education, and other SES variables, and extend those findings to a large African American sample of adults. Assuming that these data represent a long-term pattern of behavior, results suggest that African American individuals endorsing low social status on the US ladder may be at increased risk of incurring cancer, cardiovascular, and other diseases that are influenced by less than desirable fruit and vegetable intake and lower levels of physical activity.

An additional aim of this study was to compare the associations of the SSS-US ladder versus the SSS-community ladder with health-related behaviors. The SSS-community ladder was unrelated to any of the health-related behaviors examined in our main analyses. Moreover, even though the SSS-community ladder was associated with fruit and vegetable consumption in our exploratory analyses, which treated servings as a continuous variable, it was not incrementally significant in a model that also included the SSS-US ladder. Thus, results suggest the relative value of the SSS-US ladder versus the SSS-community ladder among African Americans in the prediction of at least some health behaviors. These findings were consistent with those of a similar study conducted among (largely) white women, which found significant associations between the SSS-US ladder rankings and fruit and vegetable consumption, but no significant associations between the SSS-community ladder and fruit and vegetable consumption.⁵ Our results are also consistent with recent studies finding stronger associations between health outcomes and the SSS-society ladder rankings versus other SSS scales using more proximal referents, including neighbors.^{29,30} It may be that perceived social status relative to others in a community setting may be less associated with health outcomes and health-related behaviors and instead more associated with psychosocial variables, as suggested by a previous study.⁵ This possibility might be explored further among an African American sample in future research.

It was important to rule out that the significant associations found in this study were not influenced by residence in low SES neighborhoods, which are known to be associated with reduced access to fresh fruits and vegetables [eg,³¹] and greater barriers to physical activity [eg, fewer physical activity resources, lower neighborhood safety^{32,33}]. In order to examine this possibility, we conducted post hoc multilevel analyses that further adjusted our significant models for area-level SES (median household income at the US Census tract level from 2000). Associations between the SSS-US ladder rankings and dietary and physical activity behaviors remained significant in these analyses (p values = .006 and .014), and area-level SES did not account for a significant amount of additional variance in the outcome (p values = .395 and .352). Thus, results suggest that the SSS-US ladder offers value added beyond objective SES measures, at both the individual and area levels, in its association with these dietary and physical activity behaviors. In addition, we also wanted to rule out any influence of depression on our results, as depressed mood may negatively affect dietary and physical activity behaviors. However, post hoc analyses that additionally controlled for participants' scores on the Center for Epidemiologic Studies Depression Scale³⁴ did not alter the pattern of significant results (p values < .001).

Results suggest that social standing as measured by the SSS-US ladder may have an important influence on some health-related behaviors, and perhaps ultimately health outcomes among African Americans, which rivals or surpasses that of objective SES indicators. Previous research has suggested that SSS is an incremental predictor of health-related outcomes over and above objective measures of SES because it captures unique nuances of social class that play an important role in how individuals act and feel (eg, societal inequities related to race/ethnicity). Our results suggest that this may be the case for fruit and vegetable consumption and physical activity among African Americans. Thus, social standing might be an important component to include within conceptual models focused on the socioeconomic predictors of (at least some) health behaviors [eg,³⁵]. Results

also suggest that the SSS-US ladder might be a useful single-item screener to identify at-risk African American individuals who might benefit from targeted interventions to increase fruit and vegetable consumption and physical activity. Future research should incorporate longitudinal designs to examine the effects of the SSS-US ladder on these health behaviors over time and explore the mechanisms responsible for these associations in order to inform such interventions.

In this study, neither the SSS-US nor the SSS-community ladders were significantly associated with smoking status, at-risk drinking, or BMI in adjusted analyses. These results are similar to the Ghaed and Gallo study,⁵ but extend findings from a largely white sample to an African American sample. Thus, it may be that perceived social standing is unrelated to these health behaviors, whether social status is measured in relation to one's community or the nation as a whole; or it may be that these behaviors are adequately assessed with traditional, objective indicators of SES and that the inclusion of SSS offers no added benefit. However, it is likely that the low base rates of these behaviors contributed to nonsignificant results in this study (eg, only 5% were at-risk drinkers, and 9% were current smokers). In addition, despite the confidentiality of the survey process, some behaviors (eg, at-risk alcohol use, smoking) may have been underreported in this church-based sample due to associated stigma among a religious population. Associations between the SSS ladders and smoking, drinking, and BMI should be explored among a more diverse population of African Americans.

Limitations of this work include the cross-sectional design, which precludes assumptions of causality in the relations between SSS and health behaviors. In addition, we focused on a convenience sample of church-based African American adults from a large metropolitan city in the South. The sample was largely female and generally well educated. Thus, these results may not generalize to other populations inasmuch as those populations might differ from the one examined in this study. Finally, although we attempted to control for a number of potential confounders, it is possible that unknown and unmeasured confounders might have influenced these results. Future research should seek to include large, racially diverse samples in order to examine whether relations of SSS with health behaviors varies by race/ethnicity. Barring adequate diversity, however, future research in this area may be best conducted within racial/ethnic groups so as to mitigate the influence of potential confounders.

In summary, this study was the first to examine associations of the US and community SSS ladders with smoking status, at-risk drinking, fruit and vegetable intake, physical activity, and body mass index among an African American sample. Results support the incremental associations of the SSS-US ladder, but not the SSS-community ladder, with fruit and vegetable consumption and physical activity beyond objective SES indicators. Results suggest that the SSS-US ladder may better capture the role of social disadvantage in these health behaviors than do measures of objective SES status alone, at least among this sample of predominately female, well-educated African American church attendees.

Acknowledgments

We would like to acknowledge the research staff at The University of Texas MD Anderson Cancer Center who assisted with implementation of the original project. We especially want to thank the church leadership and participants, whose efforts made this study possible.

This work was supported by funding from the University Cancer Foundation, the Duncan Family Institute through the Center for Community-Engaged Translational Research, the Ms. Regina J. Rogers Gift: Health Disparities Research Program, the Cullen Trust for Health Care Endowed Chair Funds for Health Disparities Research, the Morgan Foundation Funds for Health Disparities Research and Educational Programs, and the National Institutes of

Health through MD Anderson's Cancer Center Support Grant (CA016672). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the project supporters.

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Table 1

Participant Characteristics

Characteristics	Mean(SD)/ Percentage	N
Demographics		
Age	45.2 (12.9)	1467
Gender		
Female	74.6	1095
Male	25.4	372
Partner Status		
Single/widowed/divorced	56.5	827
Married/living with partner	43.5	638
Annual Household Income		
\$40,000	25.3	359
\$40,000–\$79,999	39.4	559
\$80,000	35.3	500
Educational Level		
< Bachelor's degree	51.6	756
Bachelor's degree	29.5	432
Master's degree	19.0	278
Employment Status		
Unemployed	26.1	382
Employed	73.9	1083
Health Insurance Status		
None	14.9	214
Private	61.9	891
Medicare/other	23.3	335
Predictors		
Subjective social status-community ladder	7.3 (1.9)	1450
Subjective social status-US ladder	6.6 (1.7)	1441
Health Behaviors		
Smoking Status		
Never smoker	75.9	1101
Former smoker	15.2	221
Current smoker	8.9	129
At-risk Drinker		
No	95.0	1393
Yes	5.0	74
Fruit/Vegetable Intake		
< 5 servings per day	83.6	1227
5 servings per day	16.4	240
Physical Activity Level		
Low	26.7	387

Characteristics	Mean(SD)/ Percentage	N
Moderate	32.0	465
High	41.3	599
Body Mass Index		
Normal (sample range=16.7–24.9)	17.1	248
Overweight (sample range=25–29.9)	29.8	432
Obese (sample range=30–70.4)	53.0	768

Note.

Subjective social status was assessed with 2 versions of the MacArthur Scale of Subjective Social Status: the US ladder and the community ladder. At-risk drinking was assessed with the Alcohol Quantity and Frequency Questionnaire. Fruit and vegetable intake was assessed with the NCI Five-A-Day Fruit and Vegetable Questionnaire. Physical activity level was assessed with the International Physical Activity Questionnaire – Short Format.

Table 2
Adjusted Relations of SSS-US and SSS-Community Ladders With Health-Related Behaviors Among African Americans

Model Number	Independent Variable	Dependent Variable	Coefficient (Std Error)	Odds Ratio (95% CI)	Chi-Square value	p-value
1	SSS-US ladder	smoking status	0.05 (0.04)	1.05 (0.97–1.14)	1.64	0.201
2	SSS-US ladder	at-risk drinking	-0.05 (0.08)	0.95 (0.82–1.10)	0.42	0.518
3	SSS-US ladder	fruit and vegetable intake	0.13 (0.05)	1.13 (1.04–1.24)	7.34	0.007
4	SSS-US ladder	physical activity	0.09 (0.03)	1.09 (1.03–1.16)	8.22	0.004
5	SSS-US ladder	body mass index	-0.01 (0.03)	0.99 (0.93–1.06)	0.04	0.839
6	SSS-Community ladder	smoking status	0.05 (0.04)	1.05 (0.97–1.13)	1.55	0.213
7	SSS-Community ladder	at-risk drinking	-0.06 (0.07)	0.95 (0.83–1.08)	0.65	0.419
8	SSS-Community ladder	fruit and vegetable intake	0.07 (0.04)	1.07 (0.99–1.17)	2.83	0.092
9	SSS-Community ladder	physical activity	0.05 (0.03)	1.05 (0.99–1.11)	2.56	0.110
10	SSS-Community ladder	body mass index	0.04 (0.03)	1.04 (0.98–1.10)	1.88	0.170

Note.

All logistic regression models controlled for age, gender, partner status, total annual household income, educational level, employment status, and insurance status. Models 5 and 10 additionally controlled for fruit and vegetable intake and physical activity. At-risk drinking was assessed with the Alcohol Quantity and Frequency Questionnaire. Fruit and vegetable intake was assessed with the NCI Five-A-Day Fruit and Vegetable Questionnaire. Physical activity level was assessed with the International Physical Activity Questionnaire – Short Format. Reference groups for the dependent variables are as follows: current smoker (smoking status), not at-risk drinker (at-risk drinking), not meeting daily fruit and vegetable intake recommendations (fruit and vegetable intake), low and moderate physical activity (physical activity), and obese (body mass index).