HHS Public Access

Author manuscript

J Immigr Minor Health. Author manuscript; available in PMC 2017 April 01.

Published in final edited form as:

J Immigr Minor Health. 2016 April ; 18(2): 345–352. doi:10.1007/s10903-015-0186-0.

Self-Efficacy as a Mediator of the Relationship between the Perceived Food Environment and Healthy Eating in a Low Income Population in Los Angeles County

Lauren N. Gase[a,*], **Beth Glenn**[b], and **Tony Kuo**[c]

[a]Los Angeles County Department of Public Health, Division of Chronic Disease and Injury Prevention, Los Angeles, California. University of California, Los Angeles, Fielding School of Public Health, Los Angeles, California

[b]University of California, Los Angeles, Fielding School of Public Health, Los Angeles, California. University of California, Los Angeles, Jonsson Comprehensive Cancer Center, Center for Cancer Prevention and Control Research, Los Angeles, California

[c]Los Angeles County Department of Public Health, Division of Chronic Disease and Injury Prevention, Los Angeles, California. University of California, Los Angeles, David Geffen School of Medicine, Department of Family Medicine, Los Angeles, California

Abstract

Background—While previous studies have described psychosocial and environmental factors that contribute to healthy eating, much remains unknown about the interactions between them.

Methods—We assessed the relationship between the perceived food environment, self-efficacy and fruit and vegetable consumption, using data from a sample of racially diverse, low-income adult clientele of five public health centers in Los Angeles County (n=1,503). We constructed a negative binomial regression model to examine the association between perceived food environment and the number of fruits and vegetables consumed.

Results—For every one point increase on the perceived food environment scale, individuals ate about 5% more fruits and vegetables (95% CI: 1.007, 1.089), controlling for other covariates. Self-efficacy was shown to be a significant mediator (mediated effect = 0.010; 95% confidence interval 0.002, 0.020), accounting for 22.9% of the effect.

Discussion—Efforts to increase access to healthy options may not only improve eating behaviors, but also influence individuals' beliefs that they can eat healthfully.

Keywords

fruit and vegetable consumption; healthy eating; obesity; self-efficacy

[*]*Corresponding Author* Lauren N. Gase, MPH, 3530 Wilshire Blvd, 8th Floor, Los Angeles, CA 90010, Tel: (213) 427-4409; Fax: (213) 351-2713, lgase@ph.lacounty.gov..

Compliance with Ethical Standards The authors report no conflicts of interest. All procedures involving human subjects were approved by the Los Angeles County Department of Public Health Institutional Review Board. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all individual participants included in the study.

Background

Poor diet has been linked to a number of preventable health conditions, including obesity, cardiovascular disease, hypertension, diabetes, osteoporosis and some forms of cancer. [1] Diet is influenced by a variety of environmental, social and individual factors. Physical food environments, including community and institutional environments, for example, are thought to influence food intake because they determine which foods are available, thereby providing opportunities (or posing barriers) that facilitate (or obstruct) healthy eating.[2] Likewise, intrapersonal factors, such as habit, knowledge, beliefs, and motivation, play a substantive role in determining eating behavior.[3]

Although a number of studies have described key psychosocial and environmental factors that may contribute to healthy eating, [2,3] much remains unknown about the interactions between them, for example, how perceptions of the food environment might influence diet-related beliefs and behaviors. Research assessing the relationship between access to healthy food and healthy eating behaviors among adults has demonstrated mixed results. [4] Moreover, few studies have described the role that interpersonal factors might play in determining the strength of the relationship between food environments and healthy eating. [5]

The goal of the present analysis is to assess the relationship between the food environment, self-efficacy and healthy eating in a low-income population. The analysis focused on two research questions. First, what is the relationship between perceived food environment and healthy eating? We hypothesized that individuals who perceive greater access to healthy foods will eat more fruits and vegetables than individuals who do not. Second, does self-efficacy mediate the relationship between the perceived food environment and healthy eating? We hypothesized that access to healthy food will have a positive effect on self-efficacy because having fruits and vegetables that are easy and convenient to access can increase individuals' confidence that they can buy and consume them, which will in-turn lead to higher fruit and vegetable intake.

Conceptual Framework

To assess the relationship between food environment, self-efficacy and healthy eating, we developed an elaboration model [6] to guide data analysis (Figure 1). Age, gender, race/ethnicity and education level were identified as appropriate control variables. Previous research has shown that these factors are associated with eating patterns [5] and nutrition environments. [7] Based on the Model of Community Nutrition Environments, [7] nutritional knowledge was identified as a potentially alternative theoretical explanation; this alternative was controlled for in the analysis.

Self-efficacy was identified as a potential mediator of the relationship between perceived food environment and healthy eating. We expected that access to healthy food (focal independent variable) would have a positive effect on self-efficacy (mediator) because greater availability of healthy food options may increase individuals' confidence to buy and consume them. In contrast, not having access to produce can decrease these individuals'

interest and ability to eat healthfully (e.g., because they would have to travel out of their way to find fruits and vegetables).

Methods

Participants

The population of interest in this study was low income adults who live in Los Angeles County. Adults were targeted because they are typically the decision-makers for purchasing and preparing foods for themselves and their children. Low-income adults were of interest because they have greater rates of obesity and chronic conditions, and frequently experience lack of access to healthy food options.

Data Collection

We used data obtained from the second round of the Los Angeles County Health and Nutrition Examination Survey (LA HANES II) to test our research hypotheses. Participants of LA HANES II were a sample of non-institutionalized adults (over age 18) who visited 5 large, multi-purpose, public health centers in Los Angeles County between February and April of 2012. To recruit participants, trained recruiters approached all individuals waiting for services in the clinic waiting areas to screen them for interest and eligibility. To be eligible, participants had to be: a) age 18 years or older; b) seeking services at the center on the recruitment day (i.e., excluded persons providing transportation only or parents bringing children in for appointments), c) residents of Los Angeles County, d) able to complete surveys in English or Spanish, and e) not currently pregnant or have a serious chronic condition (e.g., cancer). If an individual was eligible and interested in participating, he/she was scheduled for an appointment. All interviews were completed on Saturdays by trained interviewers, who also collected anthropometric measures from participants. Participants were compensated with a $50 Visa gift card for their time. All procedures involving human subjects were approved by the Los Angeles County Department of Public Health Institutional Review Board. Written consent was obtained from all participants prior to enrollment in the study.

Measures

Dependent Variable—Healthy eating was operationalized by asking participants to self-report intake of fruits and vegetables in the past seven days. Participants were asked to respond to 6 items about their frequency of eating fruits and vegetables for morning meal/snack, lunchtime/afternoon snack, and suppertime/evening snack, adapted from previously validated questions included in the National Institutes of Health's Quick Food Scan. [8,9] Participant responses (never, 1–3 times per week, 4–6 times per week, 1 time per day, 2 times per day, 3 times per day, or 4 times per day) for each of the six items were coded and summed to obtain a measure of the average number of fruits and vegetables eaten per day, using scoring criteria defined by the National Cancer Institute. [10]

Independent Variable—The perceived food environment was measured by asking respondents to select a number from 1 (strongly disagree) to 5 (strongly agree) for the phrase “In my neighborhood, it is easy for me to find fresh fruits and vegetables.” Although access

to food environments can be measured using distance to store or density measures, [11] self-reported measures using items that are more practical are potentially adequate alternatives. This variable was constructed with this in mind, adapting the content of similar items in prior surveys. [12,13]

Intervening Variables—Self-efficacy for healthy eating was measured using a 19-item scale in which respondents were asked to rate how confident they felt at performing various eating behaviors using a scale of 0 (I know I cannot) to 4 (I know I can). Examples of items included “eat meatless (vegetarian) entrees for dinner” and “add less salt than the recipe calls for.” [14] Responses to items on the scale demonstrated high reliability ($\alpha = 0.95$). Responses to the items were averaged. To examine a potentially competing hypothesis, a rival intervening variable was also tested - interest in eating healthy. This was measured by asking respondents, “If you saw an item labeled as `heart healthy' or `low sodium' would you be more likely to order it,” coded as “yes” or “no”.

Control Variables—Nutritional knowledge was measured by asking people to identify how many calories a typical adult is supposed to consume in a day. Those who answered 1501–2000 were coded as “correct”, while those were checked one of the other six response options (1000 or less, 1001–1500, 2001–2500, 2501–3000, 30001 or more, or not sure) were coded as “incorrect,” in accordance with standards for nutrient intake based on the Food and Drug Administration and the United States Department of Agriculture. [1,15,16]

Respondents were asked to provide their age (as a continuous variable), gender (male or female), education level (completed less than high school, high school graduate/ GED, some college, or college graduate/ professional degree) and race/ethnicity (African American, Hispanic, white, Asian, Native American, or multiethnic). Because of the small number of Asians, Native Americans, and those who identified as multiethnic, these races were combined into an “other” category.

Analysis

Case wise deletion was conducted so that all descriptive and multivariable analyses were performed using the sub-set of cases that included no missing data on any of the variables included in the analyses. Descriptive and bivariate analyses were conducted to examine distributions of all variables and the relationships between them. Because the dependent variable was a count variable that displayed a skewed distribution, a negative binomial regression model (that allowed for over-dispersion) was developed to examine the association between perceived food environment and fruit and vegetable consumption.

To assess mediation, bivariate analyses were first conducted to examine the association between a) the independent variable and the mediator; and b) the mediator and the dependent variable. Next, the methods developed by Karlson, Holm, and Breen (KHB) [17,18] were used to compare two versions of the negative binomial regression models: with and without the mediator included. The KHB method, which was developed to compare the estimated coefficients between two nested nonlinear probability models, decomposes the total effect of a variable into a direct and an indirect effect. Bootstrapping with 5000 replications was used to calculate the 95% percentile confidence interval for the indirect

(mediated) effect. All control variables were included in both versions of the model. All calculations and model analyses were performed using Stata version 12.1 (*StataCorp LP, College Station, Texas*).

Results

Of the 3,317 adults approached in the public health centers, 2,184 were deemed to be eligible and made appointments. Of these 2,184, 1,503 completed the survey, for a response rate of 69%. After case wise deletion of individuals with missing data on any of the variables of interest, 1,440 (95.8% of the sample) was included in the analysis.

A majority of the survey participants were either African American or Latino. A quarter reported being born outside of the United States. Most had less than a college degree and only about a third reported being employed (either full or part-time). There was roughly an equal distribution of men and women. On average, participants were thirty-five years old, but the ages ranged from 18 to 84 (Table I).

Most participants reported consuming less than the recommended number of five servings of fruits and vegetables per day. The mean number consumed was 3.9 (SD=4.6). Most respondents (73.0%) reported that they either agreed or strongly agreed that it was easy for them to find fresh fruits and vegetables, although responses spanned the entire range from 1 to 5. Overall, LA HANES II participants reported moderate levels of confidence in eating healthy, with the average score close to “maybe I can” (mean=2.7, SD=0.9), although responses spanned the entire range from 0 to 4. Relatively few participants accurately reported the number of recommended daily calories (Table I).

In the multivariable modeling analyses, perceived food environment was significantly and positively related to fruit and vegetable consumption. For every one point increase on the perceived ease of accessing fruit and vegetable scale, individuals were estimated to consume 5% more (or 1.047 times as many) fruits and vegetables (95% CI: 1.007, 1.089), after controlling for other factors in the model (Table II).

Healthy eating self-efficacy was positively correlated with fruit and vegetable consumption (ρ=0.17) and was significantly associated with the outcome in the multivariable model (β = 0.21, $p<0.0001$). In addition, perception of ease of access to fruits and vegetables was significantly associated with self-efficacy (β= 0.05, p=0.007). Results of the KHB analysis showed that self-efficacy was a mediator of the relationship between perceived food environment and fruit and vegetable consumption; the mediated effect, 0.010 (95% confidence interval 0.002, 0.020) was statistically significant (p=0.020). After controlling for self-efficacy (as well as all of the other control variables), the relationship between perceived food environment and fruit and vegetable consumption was no longer statistically significant (Table III). Self-efficacy mediated 22.9% of the relationship between perceived food environment and fruit and vegetable consumption (data not in table). The rival intervening variable, interest in eating healthy, was also significantly associated with the outcome (β=0.24, $p<0.0001$); however, the independent variable (food environment) was not

significantly associated with the mediator (β= 0.01, p=0.861), therefore, no further analyses were conducted.

Discussion

Results from the present study support the hypotheses that the perceived food environment is positively associated with healthy eating behavior and that the relationship between perceived food environment and healthy eating is at least partially mediated by self-efficacy. Our study adds to the existing literature on the determinants of healthy eating. The results are similar to those found in other analyses that have suggested that the food environment [2] and self-efficacy [3] are positively related to healthy eating behaviors including healthier food selection. Our results are in contrast to findings from other studies that found no association between the physical environment and fruit and vegetable consumption.[4] One potential reason for this difference may be because our analysis used self-reported perceived access versus an objective measure of access (e.g., physical distance from the grocery store, fast food outlet density); such objective and self-reported measures have been shown to differ.[19] Our results also support previous work that has shown perceived availability of healthy foods to be associated with greater self-efficacy. [5]

The study builds on previous work by conducting a mediation analysis, which suggests a potential pathway through which food environment may be having an effect on healthy eating. Results support the hypothesis that the perceived food environment may be influencing eating behavior by increasing confidence in one's ability to make healthy choices. To our knowledge only one other study has examined self-efficacy as a mediator in the relationship between environmental factors and healthy eating. The Pro Children study, conducted with 11-year-old children in Europe, found that liking fruit and self-efficacy were both significant mediators of the relationship between fruit availability at home and fruit consumption. [20] The authors concluded that fruit intake is not a completely automatic or unconscious behavior and cognitive factors may be an important target for interventions to improve eating behavior in children in combination with efforts to improve the food environment.

In recent years, there has been growing interest among public health researchers and practitioners to understand and influence the determinants of healthy eating.[2] Many long-standing social and behavioral theories emphasize the role of reciprocal causation (ecological model) and reciprocal determinism (social cognitive theory) in which people, behaviors, and environments interact and influence each other. Such theories point to the importance of intervening at multiple levels (e.g., environmental, social, individual) to promote behavior change [21] and interventions grounded in theories that recognize such individual/environmental linkages have shown promise in changing eating behaviors. [3, 22, 23] However, application of theory to intervention design remains limited. [24] Furthermore, although many theories conceptualize interrelationships between behavioral determinants, empirical assessment of the concrete pathways through which environmental (e.g., food access) and psychosocial (e.g., self-efficacy, behavioral capability) variables interact to influence behavior remains largely unexplored in both the theoretical and practice literature. Results of our study illustrates one such pathway - self-efficacy as a mediator between

perceived environment and healthy eating; future research may benefit from further examination of this and other pathways and inter-relationships among the determinants of food selection and consumption.

A more robust understanding of how key theoretical constructs interact can inform the development of intervention strategies. The results of this study suggest that increasing perceived access to healthy foods (e.g., where to purchase fruits and vegetables, where discounts might be offered) could increase consumption. Furthermore, by increasing perceived access to healthy foods we may be able to help individuals achieve greater confidence in their ability to make healthier choices. In light of the study findings, and extant social and behavioral theories of the determinants of healthy eating, public health practitioners, among other professionals, might consider identifying opportunities for synergy between interventions aimed at increasing perceived access and self-efficacy, for example, providing cooking demonstrations or nutrition education classes near places where fruits and vegetables are readily available and affordable. Although our study analysis provides insights into the association between perceived food environment, self-efficacy, and healthy eating, it has limitations. By grounding the analysis in the elaboration model, we are able to rule out some sources of redundancy and spuriousness, and identify a potential pathway through which the independent variable may be affecting the outcome; however, this does not provide definitive evidence on cause and effect. Because this study used a cross sectional data, it is impossible to ascertain whether the exposure preceded the mediator; therefore the direction of the relationship remains unclear. For example, people who eat more fruits and vegetables, could seek them out, and therefore have a different perception of their environment. Second, we were only able to assess some of the key influences on healthy eating. Because we were not fully able to measure all of the variables associated with the independent and dependent variables, the analysis has the potential to overstate the importance of perceived food environments in determining fruit and vegetable consumption. In addition, while we would have liked to have tested additional potential mediators, data were not available. Third, although the findings are statistically significant, the overall magnitude of the relationship between perceived food environment and fruit and vegetable consumption is small. Fourth, use of the KHB method with count outcomes is still considered a method in development. Finally, because the data were collected in a public health center setting, survey participants may have tended to over report fruit and vegetable consumption as a result of social desirability bias.

New Contributions to the Literature

Healthy eating is influenced by a variety of environmental, social and individual factors, which are frequently inter-related. Results of this study suggest that efforts to increase the perceived availability of healthy foods may help to increase consumption as well as individuals' beliefs that they are able to eat healthy. Public health researchers and practitioners striving to improve healthy eating and reduce obesity should consider the multiple pathways through which policies and programs aimed at increasing access to healthy foods may lead to positive effects. Additional empirical work to consider the pathways through which environmental, social and individual factors influence each other may help augment behavioral and social sciences theories and inform the development of

more effective multi-component interventions. Our study suggests that emerging approaches to redesign the food environment may have the potential to complement other nutrition-focused interventions in the field, including health marketing efforts to change beliefs and norms. In addition, by increasing self-efficacy, an environmentally-focused approach may produce effects that last beyond the intervention period and impact individuals' eating behaviors across settings.

Acknowledgments

The authors thank Carol Aneshensel from the University of California, Los Angeles School of Public Health for her support and contributions to this manuscript and staff from the Institute for Digital Research and Evaluation at the University of California, Los Angeles for their statistical support. This work was supported in part by a grant from the NIH/National Center for Advancing Translational Science UCLA CTSI (TL1TR000121, Gase) and a cooperative agreement from the Centers for Disease Control and Prevention (3U58DP002485-01S1, Kuo).

References

1. U.S. Department of Agriculture. U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. U.S. Government Printing Office; Washington, DC: 2010.
2. Story M, Kaphingst KM, Robinson-Obrien RR. Glanz: Creating healthy food and eating environments: policy and environmental approaches. Annu Rev Public Health. 2008; 29:253–272. [PubMed: 18031223]
3. Guillaumie L, Godin G, Vézina-Im L. Psychosocial determinants of fruit and vegetable intake in adult population: a systematic review. International Journal of Behavioral Nutrition and Physical Activity. 2010; 7(12):1–12. [PubMed: 20145731]
4. Giskes K, Lenthe FV, Avendano-Pabon M, Brug J. A systematic review of environmental factors and obesogenic dietary intakes among adults: are we getting closer to understanding obesogenic environments? Obesity Reviews. 2010; 12:e95–e106. [PubMed: 20604870]
5. Erinosho, TO.; Oh, AY.; Moser, RP.; Davis, KL.; Nebeling, LC.; Yaroch, AL. [Accessed December 31, 2013] Association between perceived food environment and self-efficacy for fruit and vegetable consumption among US adults, 2007; Prev Chronic Dis. 2012. p. 9http://www.cdc.gov/pcd/issues/2012/10_0291.htm
6. Aneshensel, CS. Theory-based data analysis for the social sciences. 2nd ed. Sage Publishers; Thousand Oaks, CA: 2013.
7. Glanz K, Sallis JF, Saelens BE, Frank LD. Healthy nutrition environments: concepts and measures. Am J Health Prom. 2005; 19(5):330–333.
8. Usual dietary intakes: the NCI method. National Cancer Institute; Washington, DC: 2013. http://appliedresearch.cancer.gov/diet/usualintakes/method.html. [Accessed December 11, 2013]
9. quick food scan. National Institutes of Health; Washington, DC: 2000. Eating at America's table study. http://appliedresearch.cancer.gov/diet/screeners/fruitveg/allday.pdf. [Accessed December 11, 2013]
10. Fruit and vegetable screeners in the eating at America's table study: scoring. National Cancer Institute; Washington, DC: 2013. http://appliedresearch.cancer.gov/diet/screeners/fruitveg/scoring/. [Accessed December 31, 2013]
11. Bodor JN, Rose D, Farley TA, Swalm C, Scott SK. Neighbourhood fruit and vegetable availability and consumption: the role of small food stores in an urban environment. Public Health Nutr. 2007; 11(4):413–420. [PubMed: 17617930]
12. Caldwell EM, Miller MK, Dubow WM, Wytinck SM. Perceived access to fruits and vegetables associated with increased consumption. Public Health Nutr. 2009; 12(10):1743–1750. [PubMed: 19105861]
13. Dibsdall LA, Lambert N, Bobbin RF, Frewer LJ. Low-income consumers' attitudes and behavior towards access, availability and motivation to eat fruit and vegetables. Public Health Nutr. 2003; 6(2):159–168. [PubMed: 12675958]

14. Sallis JF, Pinski RB, Grossman RM, Patterson TL, Nader PR. The development of self-efficacy scales for health related diet and exercise behaviors. Health Ed Research. 1988; 3(3):283–292.
15. Bleich SN, Pollack KM. The publics' understanding of daily caloric recommendations and their perceptions of calorie posting in chain restaurants. BMC Public Health. 2010; 10:121. [PubMed: 20214811]
16. Krukowski RA, Harvey-Berino J, Kolodinsky J, Narsana RT, Desisto TP. Consumers may not use or understand calorie labeling in restaurants. J Am Diet Assoc. 2006; 106:917–920. [PubMed: 16720133]
17. Breen, R.; Karlson, KB.; Holm, A. [Accessed December 31, 2013] Total, direct and indirect effects in logit models. 2011. http://papers.ssrn.com/sol3/papers.cfm?abstractid=1730065.
18. Karlson, KB.; Holm, A.; Breen, R. [Accessed December 31, 20130] Comparing regression coefficients between models using logit and probit: A new method. 2010. http://www.yale.edu/ciqle/Breen_Scaling%20effects.pdf.
19. Gustafson AA, Sharkey J, Samuel-Hodge CD, Jones-Smith J, Fold MC, Cai J, et al. Perceived and objective measures of the food store environment and the association with weight and diet among low-income women in North Carolina. Public Health Nutr. 2011; 14(6):1032–1038. [PubMed: 21324229]
20. Wind M, Velde SJ, Brug J, Sandvik C, Klepp K. Direct and indirect associations between environmental factors and fruit intake, mediation by psychosocial factors: the pro children study. Public Health Nutr. 2010; 13(10A):1736–1745. [PubMed: 20883574]
21. National Cancer Institute. Theory at a Glance: Application to Health Promotion and Health Behavior. Second Edition. US Department of Health and Human Services; Washington, DC: 2005.
22. Knowlden AP, Sharma M, Cottrell RR, Wilson BRA, Johnson ML. Impact evaluation of enabling mothers to prevent pediatric obesity through web-based education and reciprocal determinism (EMPOWER) randomized control trial. Health Education and Behavior. 2014 Epub ahead of print.
23. Baranowski T, et al. Increasing fruit and vegetable consumption among 4th and 5th grade students: results from focus groups using reciprocal determinism. Journal of Nutrition Education. 1993; 25:114–327.
24. Knowlden AP, Sharma M. Systematic review of family and home-based interventions targeting paediatric overweight and obesity. Obesity Reviews. 2012; 13(6):499–508. [PubMed: 22221298]

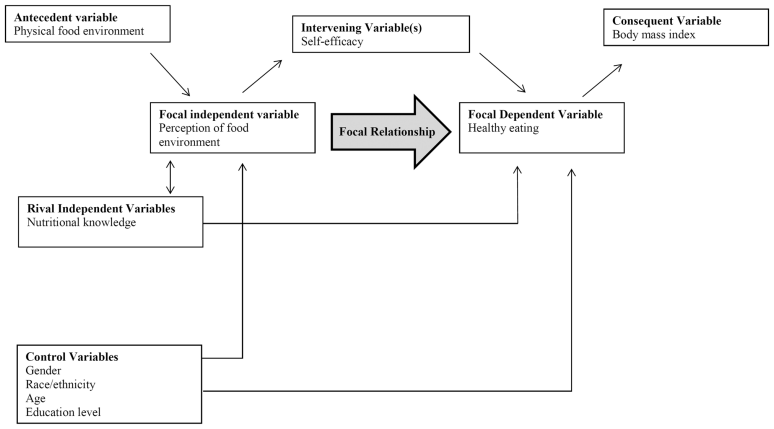

Figure I.

Elaboration Model Guiding the Assessment of the Relationship between Perceived Food Environment, Self-Efficacy, and Healthy Eating

Table I

Participant Characteristics and Survey Responses from the 2012 Los Angeles County Health and Nutrition Examination Survey (n=1,440)[a]

	Number (Percent) or Mean (Standard Deviation)
Demographics	
Gender	
Female	768 (53.3%)
Male	672 (46.7%)
Race/Ethnicity	
African American	699 (48.5%)
Latino	412 (28.6%)
White	170 (11.8%)
Other	159 (11.0%)
Education	
Less than high school	244 (16.9%)
High school graduate	327 (22.7%)
Some college	551 (38.3%)
College graduate	248 (17.2%)
Postgraduate/professional degree	70 (4.9%)
Employed (full or part-time)	518 (36.0%)
Born in the United States	1,043 (72.4%)
Age (years)	35.8 (12.6)
Food Knowledge, Attitudes, Beliefs, Perceptions and Behaviors	
Nutritional knowledge: Accurate knowledge of daily calorie recommendations [b]	233 (16.2%)
Healthy eating self-efficacy: Level of confidence in eating healthy (scale: 0 to 4)	2.7 (0.9)
Perceived food environment: It is easy to access fresh fruits and vegetables	
Strongly disagree	157 (10.9%)
Disagree	126 (8.8%)
Neither agree nor disagree	106 (7.4%)
Agree	593 (41.2%)
Strongly agree	458 (31.8%)
Healthy eating: Number of fruit and vegetables eaten per day	3.9 (4.6)

[a]N includes all survey participants who reported no missing data on any of the variables included in the multivariable model.

[b]Those who reported that a typical adult is supposed to consume 1501–2000 calories per day.

Table II

Relationship between Perceived Food Environment and Healthy Eating in a Sample of Los Angeles County Residents, LA HANES II, 2012 (n=1,440)[a]

Variable	Incident Rate Ratio (95% Confidence Interval)	P value
Focal Independent Variable		
Perceived food environment	1.047 (1.007, 1.089)	0.021
Control Variables		
Race		
Referent: African American/Black	-----	-----
Hispanic/Latino	0.968 (0.852, 1.100)	0.612
White/Non-Hispanic	0.810 (0.678, 0.967)	0.020
Other	1.067 (0.899, 1.267)	0.459
Gender		
Referent: Female	-----	-----
Male	0.911 (0.821, 1.010)	0.077
Education Level		
Referent: Less than high school	-----	-----
High school graduate	1.052 (0.888, 1.245)	0.559
Some college	0.972 (0.832, 1.137)	0.724
College graduate	0.945 (0.783, 1.140)	0.551
Postgraduate/professional degree	1.293 (0.983, 1.701)	0.066
Age	1.006 (1.002, 1.011)	0.002
Nutritional knowledge	0.976 (0.847, 1.125)	0.740

LA HANES II = the second round of the Los Angeles County Health and Examination Survey.

[a]N includes survey participants who reported no missing data on any of the variables included in the multivariable model.

Table III

Relationship between Perceived Food Environment and Fruit and Vegetable Consumption: Mediation Effects of Self-Efficacy, LA HANES II, 2012 (n=1,440)[a]

	β value (95% Confidence Interval)	
	Model 1: Physical Environment[b]	**Model 2: Physical Environment and Self-Efficacy[b]**
Perceived food environment	0.046 (0.007, 0.085)	0.035 (−0.004, 0.074)
	p= 0.021	p=0.075
Healthy eating self-efficacy	N/A	0.202 (0.149, 0.255)
	N/A	p<0.0001

LA HANES II = the second round of the Los Angeles County Health and Examination Survey.

[a]KHB negative binomial regression model; N includes all survey participants who reported no missing data on any of the variables included in the multivariable model.

[b]Both versions of the model include all control variables: age, gender, race/ethnicity, education, and nutritional knowledge.