HHS Public Access
Author manuscript
Soc Sci Med. Author manuscript; available in PMC 2015 August 12.

Published in final edited form as:
Soc Sci Med. 2013 August ; 90: 40–48. doi:10.1016/j.socscimed.2013.04.024.

Contextual factors and weight change over time: a comparison between U.S. Hispanics and other population sub-groups

S. Heidi Ullmann[a], **Noreen Goldman**[b], and **Anne R. Pebley**[c]

[a]United Nations Economic Commission for Latin America and the Caribbean, Santiago, Chile

[b]Office of Population Research, Wallace Hall, Princeton, NJ, U.S.A

[c]California Center for Population Research, UCLA, Los Angeles, CA, U.S.A

Abstract

In recent decades there has been an increasing interest in understanding the role of social and physical contexts in influencing health behaviors and outcomes. This is especially true for weight, which is considered to be highly dependent on environmental factors. The evidence linking neighborhood characteristics to weight in the United States, however, is mixed. Many studies in this area are hampered by cross sectional designs and a limited scope, insofar as they investigate only one dimension of neighborhood context. It is also unclear to what extent neighborhood characteristics account for racial/ethnic disparities in weight. Using longitudinal data from the Los Angeles Family and Neighborhood Survey (L.A. FANS), we compare patterns of weight change between Hispanics and other racial and ethnic groups in order to evaluate whether we observe a pattern of unhealthy assimilation in weight among Hispanic immigrants and to identify differences in the rate at which different groups gain weight over time. We also explore the extent to which patterns of weight change are related to a wider range of community characteristics. We find that weight increases across all groups between the two study waves of L.A. FANS and that the increases are significant except for Asian/Pacific Islanders. With respect to differences in the pace of weight change, second and higher generation Hispanic women and black men gain weight more rapidly than their first generation Hispanic counterparts. Although the evidence presented indicates that first generation Hispanics gain weight, we do not find evidence for convergence in weight since the U.S.-born gain weight at a more rapid rate. The inclusion of community-level variables does not alter the relationships between the race, ethnicity, and immigrant generation categories and weight change. Of the six types of community characteristics considered, only collective efficacy is consistently and significantly associated with weight change, although the protective effect of neighborhood collective efficacy is seen only among women.

Corresponding Author, S. Heidi Ullmann, Ph.D., United Nations Economic Commission for Latin America and the Caribbean, Santiago, Chile, heidi.ullmann@cepal.org.

Keywords

United States; weight; neighborhood context; social environment; Hispanics; sex differences

Introduction

By recent estimates, the prevalence of obesity in the United States has plateaued over the past decade. Nevertheless, it continues to increase among minority populations, especially minority women (Flegal et al., 2012). Although genetic factors are implicated in weight gain (Sorenson, 2001), mounting evidence points to the importance of dietary and physical activity patterns that lead to excess weight. These patterns appear to be highly influenced by personal factors as well as elements of the social, built, and natural environments in which people live and work. The potential influence of the neighborhood context on weight has received much attention, although the evidence linking neighborhood characteristics to weight is inconsistent (Feng et al., 2010).

In the U.S. some investigations of the neighborhood correlates of weight find a relationship between weight and the built environment, such as physical features of the neighborhood and the local food environment, while others do not. In their review of the relationship between obesity-related health disparities and built environments, Lovasi and colleagues report that the presence of food stores, places to exercise, and safety are potentially important for the development of obesity (Lovasi et al., 2009). More recent reviews by Ferdinand et al. (2012) and Feng et al. (2010), however, suggest that the existing evidence does not identify a clear and strong role for built environmental risk factors in weight. These reviews conclude that inconsistent results may be due to heterogeneous and potentially inadequate study designs and methodologies (Ferdinand et al., 2012; Feng, 2010).

As researchers have pointed out, there are many methodological challenges in trying to estimate neighborhood effects (Oakes, 2004; Diez Roux, 2004). One important issue is that the majority of studies that have attempted to estimate neighborhood effects on weight are based on cross-sectional designs. Neighborhoods change over time, individuals change neighborhoods, and weight is also dynamic, therefore trying to capture the relationship between these two facets using a static study design is problematic. Another issue is that studies typically focus on one dimension of the neighborhood context, while few studies have simultaneously explored the effects of various dimensions related to the sociodemographic, physical, and social-interactional environments (Leal et al., 2012).

Beyond the methodological issues presented by many of the studies in this area of research, an analytic gap that has been identified is our poor understanding of how the neighborhood context contributes to racial/ethnic disparities in weight status (Osypuk & Acevedo-Garcia, 2010; Robert & Reither, 2004). Studies have documented differences in the strength and pattern of the association between neighborhood-level variables and weight by race/ethnicity (Do et al., 2007; Nicholson & Browning, 2012), but relatively less is known about nativity-based disparities in this relationship. This avenue of inquiry is important because immigration has a major effect on the size, distribution, and composition of the U.S. population. According to a recent estimate, the increase in the foreign-born population between 1990 and 2010 directly contributed to one third of U.S. population growth (Martin & Midgley, 2010) and as such the health of the immigrant population will have major implications for the future health burden in the country.

Despite widespread recognition of the measurement and conceptual issues of acculturation and assimilation as variables to understand health among immigrants (Abraído-Lanza et al., 2006; Hunt et al., 2004), and indications that the acculturation paradigm for immigrant health is too simplistic (Creighton et al., 2012), a majority of studies investigating weight change in immigrant populations in the U.S. rely on the acculturation/assimilation framework as an explanation. Although findings vary substantially, the stylized story is that initially immigrants have more favorable weight profiles than their U.S.-born counterparts, but over time their weight converges to levels observed for the U.S.-born (Goel et al., 2004). This pattern has been especially noted among Hispanic immigrants (Barcenas et al., 2007; Kaplan et al., 2004). The measurement of acculturation varies considerably from study to study, but place of birth, length of residence in the U.S., and language use are frequently used proxies. A limitation of previous studies is that they almost exclusively use whites as the comparison group (Abraído-Lanza et al., 2006), which suggests that whites are the group to which Hispanics will assimilate. This tendency not only precludes a fuller understanding of how weight among Hispanics evolves relative to other groups in American society, but it is also inconsistent with theories that suggest that there are multiple patterns of assimilation and acculturation (Portes & Zhou, 1993).

Our study has two overarching objectives that attempt to extend the literature on neighborhood effects and weight by addressing the limitations outlined above. First, we use longitudinal data to compare patterns of weight change between Hispanics and other race/ethnic groups, specifically whites, blacks, and Asian/Pacific Islanders. We are interested in assessing whether we observe a pattern of unhealthy assimilation in weight among Hispanic immigrants, and in contrast to earlier studies, we compare Hispanics to other groups, not just non-Hispanic whites. Second, we investigate the extent to which a wide range of neighborhood-level variables contributes to weight change, and we explore whether these variables influence the association between weight change among the different study population sub-groups.

Data and Measures

Data

To investigate weight change among adults we use data from two waves of the Los Angeles Family and Neighborhood Survey (L.A. FANS). L.A. FANS is a longitudinal study of individuals, households, and neighborhoods. L.A. FANS −1 included approximately 3,000 households in a stratified probability sample of 65 tracts (using 1990 census-tract boundaries) in Los Angeles County in 2000 and 2001. Poor neighborhoods and households with children were oversampled (Sastry et al., 2006). L.A. FANS −1 interviewed one randomly selected adult via face-to-face interview in each household. L.A. FANS −2, conducted between 2006 and 2008, interviewed panel respondents via face-to-face interview where possible and via phone otherwise (e.g., for those who moved out of L.A. County).

L.A. FANS was reviewed and approved by the Institutional Review Boards of the University of California Los Angeles and the RAND Corporation.

The community-level variables for this analysis come from three sources: the first wave of L.A. FANS, the 2000 Census corresponding to the first wave of data collection, and the American Community Survey (ACS) 2005–2009 estimates roughly corresponding to the second wave of data collection.

Sample

Approximately 2,600 adults were randomly selected to complete the wave 1 adult module. Of these, 1,193 were matched to wave 2 data. Preliminary analyses (not shown) reveal that the weight profiles of those who participated only in wave 1 of data collection do not differ from those of respondents who contributed data to both waves. However, race, ethnicity, and immigrant generation are related to having participated in both waves: blacks, whites, and second plus generation Hispanics are more likely to have participated in both waves than first generation Hispanics. Of the 1,193 respondents in the base sample, 218 are excluded due to missing values on nativity, socioeconomic status, and anthropometric data. Our final sample comprises 975 adults who were at least 18 years of age at wave 1.

Individual-level measures

Weight—Our outcome is annual weight change in kilograms. Weight is self-reported at both waves in pounds and we convert it into kilograms. We calculate the difference in reported weight between the two waves (wave 2 minus wave 1) divided by the number of years that elapsed between the two waves. Standardization for the length of time between interviews is necessary because the length of follow-up varied from 5 to 8 years across respondents.

Race, ethnicity, and immigrant generation—Our sample includes five mutually exclusive racial, ethnic, and immigrant generation (REI) categories: Hispanic respondents (1^{st} and 2^{nd}/ 3^{rd} + generation), the majority of whom are Mexican-origin, and whites, blacks, and Asian/Pacific Islanders of all generations. For Hispanics, first generation respondents are those who were born abroad, second generation respondents were born in the U.S. to at least one foreign-born parent, and third plus generation respondents were born in the U.S. to U.S. born parents. Although we initially distinguished between second and third plus generation Hispanic immigrants, we combined the two groups because they had similar results throughout the analysis. For those who indicated mixed race, we use the racial category that they reported that they most identify with. Finally, even though Asians and Pacific Islanders may have very different weight profiles the categories are combined due to small sample sizes.

Socioeconomic, demographic, and anthropometric characteristics—We control for the respondent's level of education at wave 1 by including a binary variable indicating whether the respondent completed high school. We also include the respondent's sex, marital status at wave 1, and age at wave 1. Several specifications for age were tested and a linear specification provided the best fit. Finally, we control for the respondent's reported weight and height at wave 1 in order to address the possibility that an individual's starting weight and height influence the way he/she gains weight. Weight at wave 1 is reported in pounds and converted to kilograms and we use a simple average of the height reported at wave 1 and height at wave 2 to account for misreporting of height. Relatively few respondents, i.e. only the youngest and oldest, would be expected to have a true height change between the waves.

Community-level measures

Census-tract estimates from the 2000 Census and from the 2005–2009 ACS are used to construct weighted averages for three of the tract-level measures. These measures provide a composite view of the type of place a respondent lived in over the course of the study. Detailed residential history data are used to construct the weights by dividing the number of days a respondent lived at each residence recorded in the history by the total number of days that elapsed between the waves. Estimates from the 2000 Census were used for exposures in the relevant tracts that occurred prior to 1/1/2005, whereas estimates from the 2005–09 ACS were used for exposures subsequent to that date. Calculations (not shown) reveal that for some of the community-level measures using the weighted average differs from the corresponding estimates based solely on the 2000 Census or the 2005–2009 ACS data. Approximately 59 percent of the sample (N=573) did not move between the two waves. Of the 402 respondents who moved, 274 moved once and 128 moved more than once. There are a total of 547 census-tracts represented in the sample: the 65 original L.A. FANS census-tracts, plus an additional 482 contributed by respondents who moved to non-L.A. FANS census-tracts over the course of the study.

Built environment—Following Lopez (2007), we use census-tract population density as a proxy for the physical characteristics of the community. Areas with higher population density may have a higher density of establishments, which promotes walking. In order to facilitate analysis, population density is expressed on a log scale. Using L.A. FANS wave 1 data, Jones et al. (2011) show that the percent of adult poverty in the census-tract, also included in this analysis (see below), is highly correlated with other facets of the built environment, i.e., levels of observed physical disorder.

Immigrant characteristics and composition—The immigrant profile of the community is reflected in percent foreign-born in the census-tract. A second variable captures the racial and ethnic composition of the community. This variable is based on a cluster analysis from the 2000 Census of the percent of the population in the census-tract that belongs to five race/ethnic groups. The categories for this variable are: 1=High Asian/Pacific Islander, 2=Predominately white, 3=Hispanic and black, 4=Predominately Hispanic, and 5=White and other group (Peterson et al., 2007). "High" is defined as 35 percent of the census-tract population and "predominantly" is defined as 75 percent of the census-tract population.

Socioeconomic disadvantage—Using factor analysis we construct an index of community socioeconomic disadvantage consisting of three items: percent female headed household, percent of population over the age of 25 with less than high school education, and percent of adults in poverty (Cronbach's alpha = 0.91). The index ranges from 0.03–0.47 (higher values indicate more socioeconomic disadvantage) with a mean of 0.19. In preliminary analyses (not shown) this index performed better than a four item index (the previous three measures plus percent foreign-born) and better than census-tract median household income.

Collective efficacy—The L.A. FANS data contain a rich set of neighborhood collective efficacy measures, which are derived from the measures in Sampson et al. (1997). Individual responses to each question are averaged across respondents in each census-tract, and subsequently, the average value is appended to the data for each of the individual respondents residing in the census-tract. Then using factor analysis we create a collective efficacy scale based on the assessments of 10 questions gathered during the first wave of data collection:

1. This is a close-knit neighborhood.
2. There are adults in this neighborhood that children can look up to.
3. People around here are willing to help their neighbors.
4. People in this neighborhood generally don't get along with each other.
5. You can count on adults in this neighborhood to watch out that children are safe and do not get in trouble.
6. People in this neighborhood do not share the same values.
7. People in this neighborhood can be trusted.
8. Parents in this neighborhood know their children's friends.
9. Adults in this neighborhood know who the local children are.
10. Parents in this neighborhood generally know each other.

The response categories are 'Strongly Agree,' 'Agree,' 'Unsure,' 'Disagree,' and 'Strongly Disagree.' The scale ranges from 2 to 4.1 (mean 3.46) with higher values reflecting a higher degree of collective efficacy (Cronbach's alpha = 0.92). Because the distribution of this scale is trimodal, we code it into terciles (low/medium/high).

Neighborhood safety—Neighborhood safety is indicated by the respondents' responses to two questions during the first wave of data collection:

1. While you have lived in this neighborhood, have you or anyone in your household had anything stolen or damaged inside or outside your home, including your cars or vehicles parked on the street?
2. How safe is it to walk around alone in your neighborhood after dark?

For the first question, the response category is binary (Yes/No) and for the second question the categories are 'Completely safe,' 'Fairly safe,' 'Somewhat dangerous,' and 'Extremely dangerous.' We create a binary term to indicate whether the respondent feels the community is safe ('Completely safe,' 'Fairly safe') versus not safe ('Somewhat dangerous,' and

'Extremely dangerous'). As with the collective efficacy questions, the responses on neighborhood safety are averaged across respondents in each tract and the average values are then applied to each respondent in the tract.

Average community weight profile—Research has found that individuals living in neighborhoods characterized by relatively high proportions of obese residents are at increased risk of being of unhealthy weight themselves, net of individual-level differences (Boardman et al., 2005; Wen & Maloney, 2011). We estimate individual-level body mass index (BMI, ($kg/(m^2)$)) at using wave 1 reported weight and height. BMI is then averaged for all respondents residing in the census-tract to create a measure of average community BMI.

Analytic strategy

To estimate the effect of community context on weight change over time we employ multilevel random intercept regression models. These models account for clustering at the census-tract level and are estimated with the *xtmixed* command in STATA11 (STATACorp, 2009). Our analysis proceeds in six stages. First we provide a description of the weighted characteristics of the sample and we test differences in mean weight between study waves for each study group using paired t-tests. Subsequently, we specify a bivariate model to compare differences in weight change across the REI groups. Next we assess to what extent individuallevel characteristics account for any differences observed between the groups. We then explore community-level correlates of weight change, and we assess whether including these community-level measures alters the relationships between REI groups and weight change over time. Given that sex differences in weight change have been reported within racial and ethnic groups (Sanchez-Vaznaugh et al., 2008), we run separate models for men and women in the final stage of the analysis.

Results

The weighted characteristics of the sample are presented in Table 1. Over one-third of the respondents in the sample are Hispanic, and a majority of these are first generation immigrants. Just over 40 percent of the sample is white; black and Asian/Pacific Islanders comprise approximately 8 and 15 percent of the sample, respectively. The sample is almost evenly divided by sex, and respondents were 40 years old on average at wave 1 (range 18–85). The mean weight for respondents in the sample at baseline is 74.6kgs (SD 13.5) and it increases to 76.4kgs (SD 13.7) at the second wave of data collection. Controlling for age, sex, and height no differences are found in baseline weight between first generation Hispanics and those in the other groups, except Asian/Pacific Islanders, who have lower initial weight. At wave 2, Asian/Pacific Islanders continue to weigh less ($p<0.01$) and black respondents weigh more ($p<0.05$) than first generation Hispanic respondents.

Figure 1, which presents weight in kilograms at each wave by REI categories, reveals that weight increases across all groups in the study. The increases are statistically significant except for second plus generation Hispanics for whom the increase is only marginally significant, and for Asian/Pacific Islanders for whom it is not significant.

Figure 2 explicitly examines the annual change in weight by REI categories, separately for men and women. These estimates indicate that, on average, second plus generation Hispanic women gain 0.45 kilograms per year more than first generation Hispanic women (*$p<0.01$*). As an illustration, based on the unadjusted estimates presented in Figure 2, if we consider two women – a first and a second plus generation Hispanic – who are both in the study for 7 years, the first generation woman would gain 2.8kgs (approximately 6.1lbs), whereas the second generation woman would gain 5.9kgs (approximately 13.0lbs) over the course of the study.

The characteristics of the communities in the sample are presented in Table 2. The wide range for most of these variables indicates that the communities in the sample are quite heterogeneous. Perhaps not surprisingly, they also differ by race/ethnicity and immigrant generation (results not shown). For example, on average, whites, second plus generation Hispanics, and Asians live in communities that have higher collective efficacy and lower levels of socioeconomic disadvantage relative to first generation Hispanic respondents.

Despite apparent sex differences in the magnitude of weight change (Figure 2), we first fit a model on the total sample in order to facilitate comparisons with other studies that do not disaggregate by sex. Table 3 presents the results from multilevel random intercept regression models predicting annual kilogram weight change. Although all groups experience increases in weight during the observation window, only second and higher generation Hispanics do so at a more rapid pace than first generation Hispanics (Model 1).

This difference between second plus and first generation Hispanics is not explained by individual-level characteristics (Model 2). In the presence of controls for demographic and socioeconomic variables, second plus generation Hispanics experience a 0.3kgs greater weight increase per year relative to their first generation counterparts ($p<0.01$). A respondent's weight and age at wave 1 are negatively associated with annual weight change ($p<0.01$ for both), whereas having less than high school education at wave 1 is positively, but only marginally, associated with weight change ($p<0.10$), and, finally, height is also positively correlated with weight change ($p<0.01$).

Of the six types of community characteristics considered, only collective efficacy is consistently and significantly associated (but in some cases only marginally so) with annual change in weight. In the interest of space, we only present the results from the models including community level variables that are statistically significant. However, results for the univariate analyses of all of the community variables can be found in the Appendix.

The results from Model 3 indicate that community collective efficacy is potentially protective against increases in weight. Controlling for neighborhood disadvantage and the individual-level variables, residents of medium collective efficacy communities gain, on average, 0.17 fewer kilograms per year relative to residents of low collective efficacy communities ($p<0.10$). Although those living in high collective efficacy communities also appear to have lower weight change compared to those in low collective efficacy communities, this difference is not statistically significant. Results from this model also reveal differences by race/ethnicity. As in the previous models, second plus generation

Hispanics gain weight more rapidly than first generation Hispanics ($p<0.01$). Furthermore the results from this model indicate that both blacks and whites appear to gain weight more rapidly than first generation Hispanics, although these differences are only marginally significant ($p<0.10$ for both).

In view of evidence that the patterns of weight increase differ for men and women, we disaggregate Model 3 by sex in Table 4. Some noteworthy differences emerge. First, among the women, second plus generation Hispanic women have a more rapid increase in weight relative to first generation Hispanic women ($p<0.01$). In contrast, black men experience a faster increase in weight than first generation Hispanic men ($p<0.01$). On average, black men gain 0.58 more kilograms per year than first generation Hispanic men, which is equivalent to just over 4kgs (8.8lbs) change over 7 years in the study. In terms of the community-level correlates of weight change, the protective effect of neighborhood collective efficacy is seen only among women. Living in either medium ($p<0.01$) or high ($p<0.05$), relative to low collective efficacy neighborhoods, is associated with slower increases in weight among women, with a difference of about 0.35 fewer kilograms or 0.78lbs per year in both types of neighborhoods.

We conducted several robustness checks. We re-estimated the models using change in BMI per year as the outcome, controlling for both weight and height at wave 1. The substantive findings presented above remain the same with this alternate outcome. In light of earlier findings linking length of residence in the U.S. to weight among Hispanic immigrants (Sanchez-Vaznaugh et al., 2008), the first generation Hispanic category was disaggregated by length of residence in the U.S. No differences were found between those who had been in the U.S. more than 18 years versus 18 years or fewer (18 is the mean duration in the U.S. for this group of respondents).

Discussion

In recent decades there has been increasing interest in understanding the role of social and physical contexts in influencing health behaviors and outcomes (MacIntyre & Ellaway, 2003). This is especially true for weight, which is considered to be at least partially dependent on environmental factors (Boardman et al., 2012). In light of important differences in weight status among different population sub-groups in the U.S., researchers have called for a fuller understanding of how neighborhood context contributes to racial/ ethnic disparities in weight status (Osypuk & Acevedo-Garcia, 2010; Robert & Reither, 2004).

Our results indicate that almost all groups in the study experience a statistically significant increase in weight between the two waves. We find no differences in baseline weight between first generation Hispanics and respondents from other study groups, except for Asians/Pacific Islanders, who weigh less than first generation Hispanics at wave 1. This finding is inconsistent with the prevailing finding emerging from the weight/acculturation literature that Hispanic immigrants to the U.S. have more favorable weight profiles or lower likelihood of being overweight/obese than the native-born (Antecol & Bedard, 2006; Barcenas et al., 2007; Sanchez- Vaznaugh et al., 2008). These conflicting results likely reflect the current period of rapid secular changes in weight profiles, in the U.S. and in its main migrant-sending country, Mexico (Rtveladze et al., 2013). It is also possible that these inconsistencies arise because, across different study samples, the “Hispanic” category may include different ethnic groups (e.g. Mexicans, Cubans, and other Hispanic sub-groups) that have divergent weight profiles. Indeed, even the Mexican-origin population in the U.S. is comprised of distinct regional sub-groups that differ with respect to weight (Young et al., 2012).

However, second plus generation Hispanic women in the study do appear to gain weight more rapidly than their first generation counterparts. One possible explanation for this result is differences in diet. An analysis based on the second wave of L.A. FANS reports that U.S.-born Mexicans consume less fruit, more sweetened drinks, and more fast food than foreign-born Mexicans (Creighton et al., 2012). Sharkey and colleagues report that U.S.-born Mexican women specifically consume more sweetened beverages and fast food than Mexican-born women (Sharkey et al., 2011). Another possibility for the difference observed between first generation and second plus generation Hispanic women is discrimination. As Viruell-Fuentes (2007) notes in her analysis of immigrant status and integration, first generation women tend to socialize within the ethnic neighborhood, which limits their encounters with people and institutions that could deliver “othering” and discriminating messages. By contrast, second plus generation Hispanic women live and work in more racially and ethnically diverse areas, where they are more likely to experience “othering” messages, which may make them aware of belonging to a marginalized group (Viruell-Fuentes, 2007). Discrimination can, in turn, adversely impact physical health and health behaviors (Finch et al., 2001; Williams & Mohammad, 2009).

For men, race/ethnic differences in weight change are observed between first generation Hispanic and black men. Dietary practices likely play a role here as well. A study examining the diet of Hispanic and black men in North Carolina reports that first generation Hispanic men consume less fast food and more fruits per day than non-Hispanic black men (Ayala et al., 2009), which is consistent with national-level reports on fruit consumption (CDC, 2007). Another explanation for the weight differences between first generation Hispanic men and black men in this study is occupation. First generation Hispanic men are, on average, employed in sectors that require higher energy expenditure than black men, which may result in divergent paths in their weight gain trajectories (He & Baker, 2005; Marquez et al., 2010). A final speculation concerns living arrangements. First generation Hispanic men, particularly those who are younger or more recently arrived in the U.S., tend to reside with unrelated persons or in complex non-nuclear households (Angel & Tienda, 1982; Blank, 1998), whereas black men may be more likely to reside with their families. These disparate social environments and their corresponding food cultures and practices may shape the way in which men gain weight.

In general the finding that first generation immigrants gain weight at a slower pace than other groups is consistent with Park and colleagues’ (2009) analysis of cohorts observed in repeated cross-sections. These authors report that, although foreign-born Hispanics grow more obese with time, these trends are not converging to the obesity levels of U.S.-born Hispanics: traced within cohorts, obesity is growing even more rapidly among U.S.-born

Hispanics and the increases among first generation Hispanics are insufficient to close the gap (Park et al., 2009). In her analysis of adolescents, Jackson also finds a slower increase in weight among first generation Hispanics compared with third generation and higher Hispanics (Jackson, 2011). Together these findings challenge the assumption that increases in weight among the foreign-born equate to convergence in weight. Although the evidence presented here indicates that first generation Hispanics gain weight, we do not find evidence for assimilation or convergence in weight since the U.S.-born gain weight at a more rapid rate.

Previous studies have provided important insights into the relationship between contextual factors and excess weight; however, they are primarily based on cross-sectional study designs (see, for example, Do et al., 2007; Wen & Maloney, 2011). This static perspective limits the types of conclusions that can be drawn and precludes an analysis of how contextual factors relate to weight *change* for different groups. In contrast, our analysis is based on longitudinal data and we explicitly examine changes in weight status over a five-to eight-year interval. In the present study, inclusion of community-level variables did not alter the relationships between the REI categories and weight. Moreover, we see remarkable consistency in the coefficients for the REI categories across different models. Of the six types of community characteristics that we analyzed, we find evidence for an association only between collective efficacy and weight.

Community social characteristics have been linked to self-rated health (Kawachi et al., 1999; 2006; Subramanian et al., 2002), mortality (Kawachi et al., 1997), and adolescent obesity (Cohen et al., 2006a). In their study using the first wave of L.A. FANS, Cohen and colleagues show that group-level social factors among adults in the community influence three weightrelated outcomes among adolescents (Cohen et al., 2006a). These authors speculate that there may be indirect pathways through which collective efficacy may impact weight. For instance, those living in communities with lower levels of collective efficacy may have fewer social support mechanisms to buffer against stressful experiences, which may increase stress and subsequently influence weight (McEwen, 1998). It is also possible that, because adults in high collective efficacy communities have substantial contact with one another, they may be especially subject to the influence of others' dietary practices and exercise behaviors. This can influence weight in both directions, deterring weight gain if the prevailing community practices are healthy, or promoting weight gain if they are not.

The sex-specific models suggest that the collective efficacy links with weight are present only among women. Stronger neighborhood effects for females than males have been reported in other studies investigating BMI and obesity (Do et al., 2007; Wen & Maloney, 2011). Researchers hypothesize that sex differences in physical activity may be due in part to differential use of parks (Cohen et al., 2006b). However, in the present study, sex differences relate to social, and not physical features of the neighborhood. Some researchers believe that because women traditionally spend more time in the home, the neighborhood environment may have a greater influence on them than on men (Robert, 1999). It is also possible that women use informal networks in the community to access information on health and health risks more so than men.

Our study has several important strengths. First, it uses longitudinal data to present a dynamic picture of weight. This allows us to compare the pace of weight change among different groups, which few studies have done. Not only do we track weight gains and losses over time, but we account for demographic changes within communities and individual residential moves. Communities are not monolithic, so the ways in which communities can impact weight may also vary over time. Moreover, we examine the impact of a wide range of community-level variables on weight change. Finally, by comparing Hispanics to other race/ethnic groups, not only non-Hispanic whites, we identify a different pattern of weight change between first generation Hispanic men and black men.

Nonetheless, there are also some limitations which need to be kept in mind. Due to sample size considerations, we are able to focus only on the Hispanic immigrant population, but no other immigrant groups (i.e. Asians) nor particular Hispanics sub-groups, such as Mexicans. Additionally, our outcome measure is based on self-reports of weight which are inherently subjective. This is particularly a concern if there are racial/ethnic differences in the reporting of weight (Gillum & Sempos, 2005). We also rely on indirect measures of neighborhood characteristics. Finally, as with all studies that investigate contextual influences on health, we cannot exclude the possibility that individuals differentially select into communities. In particular, for respondents that moved between waves, changes of residence may be associated with respondents' demographic or socioeconomic characteristics, and be correlated with the previous location (Sharkey & Elwert, 2011).

Despite these limitations, our analysis provides a more nuanced picture of racial, ethnic, and nativity-based differences in weight change. We contribute to a growing body of literature that challenges the traditional paradigms for understanding patterns of weight among Hispanic immigrants. In contrast to many studies, we investigate a wide range of neighborhood characteristics, but find that neighborhood context has only a limited impact on weight change across all groups. The only community-level variable that is consistently associated with weight change reflects the social environment of the community, pointing to the importance of social capital and interpersonal relationships in influencing weight status, especially among women. Future studies should explore the relationship between weight and other community social characteristics, such as social support and networks. Another future avenue of inquiry is how individual-level perceptions of community characteristics shape the risk of weight gain.

Acknowledgements

The authors gratefully acknowledge support from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (R24-HD047879; R01-HD051764). Additionally the authors would like to thank Chang Chung for his programming support and Germán Rodriguez for his guidance on methodological issues.

References

Abraído-Lanza AF, Armbrister AN, Flórez KR, Aguirre AN. Toward a theory-driven model of acculturation in public health research. American Journal of Public Health. 2006; 96(8):1342–1346. [PubMed: 16809597]

Angel R, Tienda M. Determinants of extended household structure: cultural pattern or economic need? The American Journal of Sociology. 1982; 87(6):1360–1383.

Antecol H, Bedard K. Unhealthy assimilation: why do immigrants converge to American health status levels? Demography. 2006; 43(2):337–360. [PubMed: 16889132]

Ayala GX, Ornelas I, Rhodes SD, Amell JW, Dodds JM, Mebane E, Horton E, Montano J, Armstrong-Brown J, Eng E. Correlates of dietary intake among men involved in the MAN for Health Study. American Journal of Mens Health. 2009; 3:201–213.

Barcenas CH, Wilkinson AV, Strom SS, Cao Y, Saunders KC, Mahabir S, Hernández-Valero MA, Forman MR, Spitz MR, Bondy ML. Birthplace, years of residence in the United States, and obesity among Mexican-American adults. Obesity. 2007; 15:1043–1052. [PubMed: 17426341]

Blank S. Hearth and home: The living arrangements of Mexican immigrants and U.S.-born Mexican Americans. Sociological Forum. 1998; 13(1):35–59.

Boardman JD, Saint Onge JM, Rogers RG, Denney JT. Ethnicity differentials in obesity: the impact of place. Journal of Health & Social Behavior. 2005; 46:229–243. [PubMed: 16259146]

Boardman JD, Roettger ME, Domingue BW, McQueen MB, Haberstick BC, Harris KM. Gene-environment interactions related to body mass: School policies and social context as environmental moderators. Journal of Theoretical Politics. 2012; 24(3):370–388. [PubMed: 23236222]

Centers for Disease Control and Prevention. Fruit and vegetable consumption among adults—United States, 2005. Morbidity and Mortality Weekly Report. 2007; 56:213–217. [PubMed: 17363889]

Cohen DA, Finch BK, Bower A, Sastry N. Collective efficacy and obesity: the potential influence of social factors on health. Social Science & Medicine. 2006a; 62:769–778. [PubMed: 16039767]

Cohen, D.; Sehgal, A.; Williamson, S.; Sturm, R.; McKenzie, TL.; Lara, R.; Lurie, N. Park use and physical activity in a sample of public parks in the City of Los Angeles. Santa Monica: RAND Corporation; 2006b.

Creighton MJ, Goldman N, Pebley AR, Chung CY. Durational and generational differences in Mexican immigrant obesity: Is acculturation the explanation? Social Science & Medicine. 2012; 75(2):300–310. [PubMed: 22575698]

Diez Roux AV. Estimating neighborhood health effects: the challenges of causal inference in a complex world. Social Science & Medicine. 2004; 58:1953–1960. [PubMed: 15020010]

Do DP, Dubowitz T, Bird CE, Lurie N, Escarce JJ, Finch BK. Neighborhood context and ethnicity differences in body mass index: A multilevel analysis using the NHANES III survey (1988–1994). Economics and Human Biology. 2007; 5:179–203. [PubMed: 17507298]

Feng J, Glass TA, Curriero FC, Stewart WF, Schwartz BS. The built environment and obesity: a systematic review of the epidemiologic evidence. Health & Place. 2010; 16:175–190. [PubMed: 19880341]

Ferdinand AO, Sen B, Rahurkar S, Engler S, Menachemi N. The relationship between built environments and physical activity: a systematic review. American Journal of Public Health. 2012; 102(10):e7–e13. [PubMed: 22897546]

Finch KA, Hummer RA, Kol B, Vega WA. The role of discrimination and acculturative stress in the physical health of Mexican-origin adults. Hispanic Journal of Behavioral Sciences. 2001; 23(4): 399–429.

Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of obesity and trends in the distribution of Body Mass Index among US adults, 1999–2010. Journal of the American Medical Association. 2012; 307(5):491–497. [PubMed: 22253363]

Gillum RF, Sempos CT. Ethnic variation in validity of classification of overweight and obesity using self-reported weight and height in American women and men: the Third National Health and Nutrition Examination Survey. Nutrition Journal. 2005; 6:4–27.

Goel MS, McCarthy EP, Phillips RS, Wee CC. Obesity among US immigrant subgroups by duration of residence. Journal of the American Medical Association. 2004; 292(23):2860–2867. [PubMed: 15598917]

He XZ, Baker DW. Differences in leisure-time, household, and work-related physical activity by race, ethnicity, and education. Journal of General Internal Medicine. 2005; 20(3):259–266. [PubMed: 15836530]

Hunt LM, Schneider S, Comer B. Should “acculturation” be a variable in health research? A critical review of research on US Hispanics. Social Science & Medicine. 2004; 59:973–986. [PubMed: 15186898]

Jackson MI. Nativity differences in youths' weight trajectories: foreign-born integration during the transition to adulthood. Social Science Research. 2011; 40(5):1319–1333.

Jones M, Pebley AR, Sastry N. Eyes on the block: measuring urban physical disorder though in-person observation. Social Science Research. 2011; 40:523–537. [PubMed: 21643484]

Kaplan MS, Huguet N, Newsom JT, McFarland BH. The association between length of residence and obesity among Hispanic immigrants. American Journal of Preventative Medicine. 2004; 27:323–326.

Kawachi I, Kennedy BP, Glass R. Social capital and self-rated health: a contextual analysis. American Journal of Public Health. 1999; 89(8):1187–1193. [PubMed: 10432904]

Kawachi I, Kennedy B, Lochner K, Prothrow-Stith D. Social capital, income inequality and mortality. American Journal of Public Health. 1997; 87:1491–1498. [PubMed: 9314802]

Leal C, Bean K, Thomas F, Chaix B. Multicollinearity in associations between multiple environmental features and body weight and abdominal fat: using matching techniques to assess whether the associations are separable. American Journal of Epidemiology. 2012; 175(11):1152–1162. [PubMed: 22534206]

Lopez RP. Neighborhood risk factors for obesity. Obesity. 2007; 15:2111–2119. [PubMed: 17712130]

Lovasi GS, Hutson MA, Guerra M, Neckerman KM. Built environments and obesity in disadvantaged populations. Epidemiologic Reviews. 2009; 3:7–20. [PubMed: 19589839]

MacIntyre, S.; Ellaway, A. Neighborhoods and health: an overview health. In: Kawachi, I.; Berkman, LF., editors. Neighborhoods and health. New York: Oxford University Press; 2003. p. 20-44.

Marquez DX, Neighbors CJ, Bustamante EE. Leisure time and occupational physical activity among racial or ethnic minorities. Medicine & Science in Sports & Exercise. 2010; 42(6):1086–1093. [PubMed: 19997031]

Martin, P.; Midgley, E. [Accessed 5 Sept. 2012] Immigration in America 2010. Population Reference Bureau Update. 2010. Available at: http://www.prb.org/pdf10/immigration-update2010.pdf

McEwen BS. Stress, adaptation, and disease: Allostasis and allostatic load. Annals of New York Academy of Science. 1998; 840:33–44.

Nicholson LM, Browning CR. Racial and ethnic disparities in obesity during the transition to adulthood: the contingent and nonlinear impact of neighborhood disadvantage. Journal of Youth and Adolescence. 2012; 41(1):53–66. [PubMed: 21706260]

Oakes JM. The (mis)estimation of neighborhood effects: causal inference for a practicable social epidemiology. Social Science & Medicine. 2004; 58:1929–1952. [PubMed: 15020009]

Osypuk TL, Acevedo-Garcia D. Beyond individual neighborhoods: a geography of opportunity perspective for understanding racial/ethnic health disparities. Health & Place. 2010; 16(6):1113–1123. [PubMed: 20705500]

Park J, Myers D, Kao D, Min S. Immigrant obesity and unhealthy assimilation: alternative estimates of convergence or divergence, 1995–2005. Social Science & Medicine. 2009; 69(11):1625–1633. [PubMed: 19811864]

Peterson, CE.; Pebley, AR.; Sastry, N. The Los Angeles neighborhood services and characteristics database: codebook. Santa Monica, CA: RAND Corporation; 2007. Available at: http://www.rand.org/pubs/working_papers/WR240z12 [Accessed Nov 2011]

Portes A, Zhou M. The new second generation: segmented assimilation and its variants. Annals of the American Academy of Political and Social Science. 1993; 530:74–96.

Robert SA. Socioeconomic position and health: the independent contribution of community socioeconomic context. Annual Review of Sociology. 1999; 25:489–516.

Robert SA, Reither EN. A multilevel analysis of race, community disadvantage, and body mass index among adults in the US. Social Science & Medicine. 2004; 59:2421–2434. [PubMed: 15474198]

Rtveladze K, Marsh T, Barquera S, Sanchez Romero LM, Levy D, Melendez G, Webber L, Kilpi F, McPherson K, Brown M. Obesity prevalence in Mexico: impact on health and economic burden. Public Health Nutrition, Feb. 2013; 1:1–7. [Epub ahead of print].

Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: A multilevel study of collective efficacy. Science. 1997; 277(5328):918–924. [PubMed: 9252316]

Sanchez-Vaznaugh EV, Kawachi I, Subramanian SV, Sánchez BN, Acevedo-Garcia D. Differential effect of birthplace and length of residence on body mass index (BMI) by education, gender and race/ethnicity. Social Science & Medicine. 2008; 67(8):1300–1310. [PubMed: 18657344]

Sastry N, Ghosh-Dastidar B, Adams J, Pebley AR. The design of a multilevel survey of children, families and communities: the Los Angeles Family and Neighborhood Survey. Social Science Research. 2006; 35:1000e–1024e.

Sharkey P, Elwert F. The legacy of disadvantage: multigenerational neighborhood effects on cognitive ability. American Journal of Sociology. 2011; 116(6):1934–1981.

Sharkey JR, Johnson CM, Dean WR. Nativity is associated with sugar-sweetened beverage and fast-food meal consumption among Mexican-origin women in Texas border colonias. Nutrition Journal. 2011; 10:101. [PubMed: 21962014]

Sorenson TIA. Obesity genes – brief article-editorial. British Medical Journal. 2001; 322:630. [PubMed: 11250836]

StataCorp. Stata Statistical Software: Release 11. College Station, TX: StataCorp LP; 2009.

Subramanian SV, Kim DJ, Kawachi I. Social trust and self-rated health in US communities: a multilevel analysis. Journal of Urban Health: Bulletin of the New York Academy of Medicine. 2002; 79(4):S21–S34. [PubMed: 12473696]

Viruell-Fuentes EA. Beyond acculturation: immigration, discrimination, and health research among Mexicans in the United States. Social Science & Medicine. 2007; 65(7):1524–1535. [PubMed: 17602812]

Wen M, Maloney TN. Latino residential isolation and the risk of obesity in Utah: the role of neighborhood socioeconomic, built-environmental, and subcultural context. Journal of Immigrant and Minority Health. 2011; 13(6):1134–1141. [PubMed: 21274631]

Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. Journal of Behavioral Medicine. 2009; 32(1):20–47. [PubMed: 19030981]

Young KA, Fingerlin TE, Langefeld CD, Lorenzo C, Haffner SM, Wagenknecht LE, Norris JM. Exploring differences in adiposity in two U.S. Hispanic populations of Mexican origin using social, behavioral, physiological, and genetic markers. Ethnicity & Disease. 2012; 22:65–71. [PubMed: 22774311]

Research highlights

- We use longitudinal data to compare patterns of weight change between U.S. Hispanics and other sub-groups and to explore the role of community context in influencing these patterns
- Weight increases are seen across almost all groups between the two study waves
- No differences are found in initial weight between first generation Hispanics and blacks, whites, or second plus generation Hispanics
- Second plus generation Hispanics gain weight at a faster pace than first generation Hispanics
- Community collective efficacy is negatively related to weight change
- Sex differences are observed in the relationship between race, ethnicity, and immigrant generation and weight and in the relationship between collective efficacy and weight

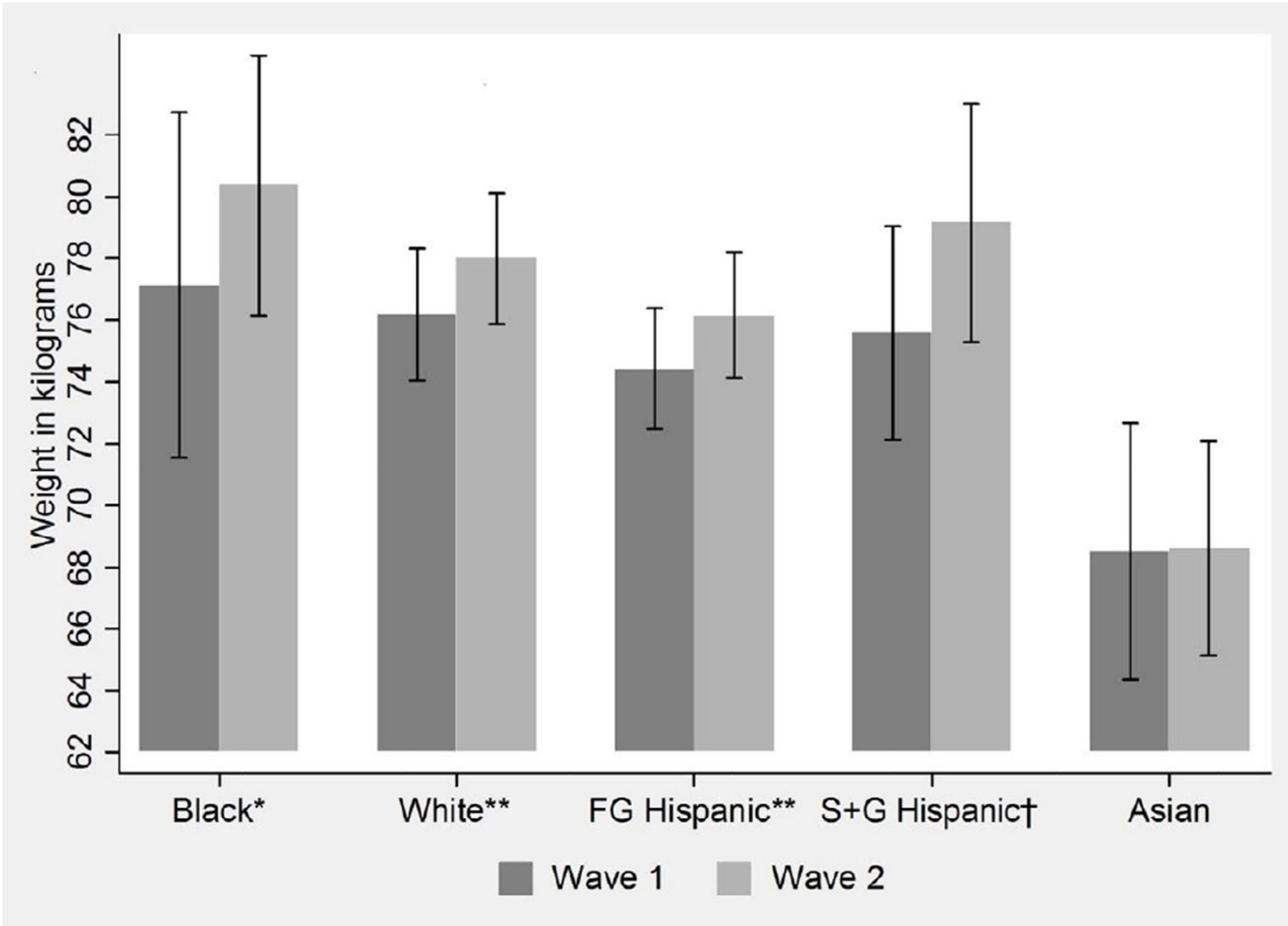

Figure 1.

Mean weight in kilograms at wave 1 and wave 2 by race/ethnic/immigrant generation category

Source: L.A. FANS waves 1 and 2. FG Hispanic – first generation Hispanic; S+G Hispanic – second plus generation Hispanic. Differences in weight between the waves are statistically significant at the **1%, *5%, and †10% level.

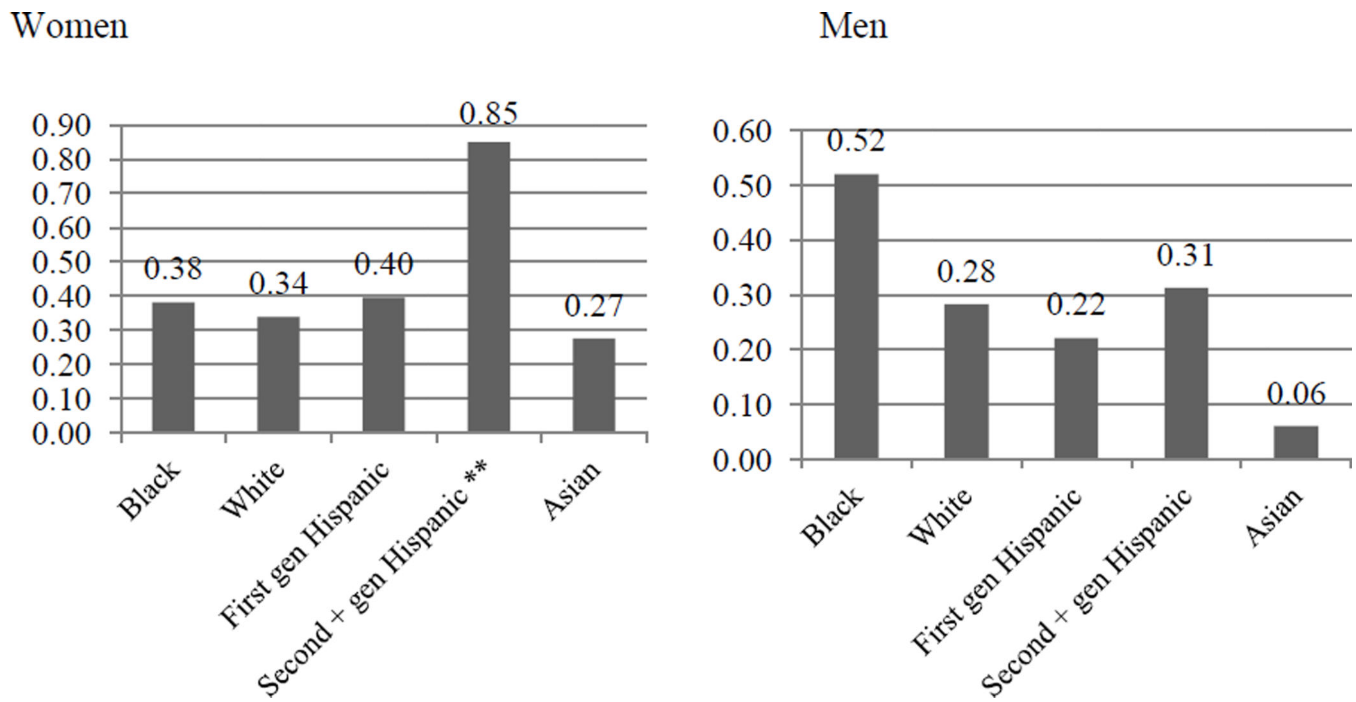

Figure 2.

Mean annual change in kilograms by race/ethnic/immigrant generation category and sex Source: L.A. FANS waves 1 and 2. Differences between each race/ethnicity/immigrant generation category and first generation Hispanics are statistically significant at the **1%, *5%, and †10% level.

Author Manuscript
Author Manuscript
Author Manuscript

Table 1

Weighted sample demographic and SES characteristics

	Sample	Blacks	Whites	First Gen Hisp	Sec/plus Gen Hisp	Asian/PI
Black: all generations	7.8					
White: all generations	42.5					
Hispanic: first generation	25.3					
Hispanic: second plus generations	9.5					
Asian/Pacific Islander: all generations	14.8					
Female	49 [44–53]	54 [34–73]	44 [36–51]	53 [46–59]	51 [41–60]	52 [39–64]
Age at wave 1 (years)	40 [41–45]	39 [35–49]	44 [44–51]	38 [37–41]	33 [30–36]	43 [41–51]
Married at wave 1	54 [48–60]	32 [15–49]	56 [47–64]	53 [45–62]	44 [33–55]	67 [54–80]
Less than high school education at wave 1	21 [16–26]	8 [0–18]	8 [3–12]	61 [53–68]	20 [8–32]	2 [0–6]
Mean weight in kilograms at wave 1	74.6 [73.3–75.9]	77.1 [71.8– 82.5]	76.1 [74.1–78.3]	74.4 [72.5–76.4]	75.5 [72.2–79.0]	68.5* [64.5–72.5]
Mean weight in kilograms at wave 2	76.4 [75.0–77.9]	80.3* [76.4–84.4]	78.0 [75.9–80.1]	76.1 [74.1–78.2]	79.1 [75.4–82.9]	68.6** [65.3–71.9]
N	975	90	284	399	125	77

Source: L.A. FANS waves 1 and 2. With the exception of age at wave 1, and mean weight in kilograms for the two study waves, these values are percentages in the respective category. 95% confidence intervals are reported in brackets. In sex, age, and height controlled models, differences between each race/ethnicity/immigrant generation category and first generation Hispanics are statistically significant at the **1%, *5%, † 10% level.

Table 2

Community characteristics

	Mean	Median	Range
Socioeconomic disadvantage index	0.24	0.25	0.03–0.47
Collective efficacy scale	3.48	3.44	1.80–4.21
Safe in dark	67.7%	75.0%	0%–100%
HH in community has been robbed	45.9%	44.4%	0%–100%
Median HH income	$46,837	$38,720	$15,663–$147,224
Less than high school education	36.6%	38.6%	2.3%–76.2%
Female headed household	17.0%	16.7%	2.5%–33.6%
Foreign-born	39.1%	40.2%	11.5%–73.6%
Adults in poverty	18.5%	18.1%	0.01%–45.4%
Neighborhood composition			
High Asian/Pacific Islander	11.1%		
Predominantly white	16.6%		
Hispanic and black	10.9%		
Predominantly Hispanic	44.8%		
White and other	16.5%		
Mean community BMI at wave 1	27.1	26.3	23.2–35.4
Population density (persons/square mile)	15,268	12,881	33–58,086

Source: L.A. FANS waves 1 and 2, Census 2000, and ACS 2005–2009. The items used to construct the socioeconomic disadvantage index (percent female headed household, percent of adults with less than high school education, and percent of adults in poverty) are based are average values of the estimates for the 975 individuals in the sample, who lived in 547 census-tracts. These individual estimates, described on page 6, are based on 2000 Census and 2005–2009 ACS data. Collective efficacy, the neighborhood safety variables, and mean census-tract BMI are based on aggregate responses drawn from the first wave of L.A. FANS, based on 65 census-tracts. Census-tract racial and ethnic composition is based on 2000 Census data alone, based on 65 census-tracts.

Table 3

Estimated coefficients from multilevel random intercept regression models predicting weight change (in kilograms) per year [N=975]

	Model 1	Model 2	Model 3
Race/Ethnicity/Immigrant generation (Ref = First generation Hispanic)			
Black	0.11 [−0.13, 0.35]	0.21 [−0.05, 0.45]	0.21† [−0.04, 0.47]
White	−0.02 [−0.18, 0.14]	0.10 [−0.09, 0.29]	0.21† [−0.00, 0.44]
Second plus generation Hispanic	0.31** [0.09, 0.52]	0.30** [0.08, 0.51]	0.35** [0.13, 0.56]
Asian/Pacific Islander	−0.13 [−0.38, 0.12]	−0.09 [−0.35, 0.17]	−0.03 [−0.30, 0.24]
Weight (kilograms) wave 1		−0.02** [−0.03, −0.02]	−0.02** [−0.03, −0.02]
Female		0.03 [−0.15, 0.22]	0.03 [−0.15,0.22]
Age wave 1		−0.01** [−0.02, −0.01]	−0.01** [−0.02, −0.00]
Less than high school education wave 1		0.15† [−0.00,0.32]	0.13 [−0.03,0.29]
Married wave 1		−0.07 [−0.20,0.06]	−0.06 [−0.18,0.07]
Average height		0.01** [0.00,0.03]	0.01** [0.00,0.03]
Neighborhood disadvantage			0.38 [−0.47,1.24]
Neighborhood collective efficacy (Ref=Low) Medium			−0.17† [−0.33,0.00]
High			−0.13 [−0.37,0.10]

Source: L.A. FANS waves 1 and 2, 2000 Census, and 2005–2009 ACS estimates. 95% confidence intervals are reported in brackets. Individual coefficients are statistically significant at the **1%, *5%, †10% level.

Table 4

Estimated coefficients from multilevel regression models predicting BMI change per year by sex

	Women	Men
Race/Ethnicity/Immigrant generation (Ref = First generation Hispanic)		
Black	0.04 [−0.27, 0.35]	0.58** [0.15,1.00]
White	0.14 [−0.13,0.43]	0.24 [−0.09,0.58]
Second plus generation Hispanic	0.45** [0.17,0.72]	0.22 [−0.11,0.57]
Asian/Pacific Islander	0.02 [−0.32,0.36]	−0.04 [−0.47,0.39]
Weight (kilograms) wave 1	−0.02** [−0.03, −0.01]	−0.03** [−0.04, −0.03]
Age wave 1	−0.01** [−0.02, −0.00]	−0.01** [−0.02, −0.00]
Less than high school education wave 1	0.08 [−0.13,0.30]	0.18 [−0.07, 0.43]
Married wave 1	−0.16† [−0.33,0.00]	0.14 [−0.06,0.35]
Average height	0.01* [0.00,0.03]	0.02** [0.00,0.04]
Neighborhood disadvantage	−0.09 [−1.20,1.01]	0.82 [−0.54,2.18]
Neighborhood collective efficacy (Ref=Low)		
Medium	−0.35** [−0.56, −0.13]	0.14 [−0.12,0.40]
High	−0.34* [−0.65, −0.03]	0.20 [-0.15,0.56]
N	**572**	**403**

Source: L.A. FANS waves 1 and 2, 2000 Census, and 2005–2009 ACS estimates. 95% confidence intervals are reported in brackets. Individual coefficients are statistically significant at the **1%, *5%, †10% level.

Appendix

Estimated coefficients from unadjusted multilevel random intercept regression models predicting weight change (in kilograms) per year [N=975]

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Population density (ln)	0.03 [−0.04, 0.09]						
Percent foreign born		0.46* [0.00, 0.91]					
Racial/ethnic composition (Ref = Predominantly white)							
High Asian/Pacific Islander			0.15 [−0.11, 0.41]				
Hispanic and black			0.18 [−0.08, 0.44]				
Predominantly Hispanic			0.19* [0.00, 0.38]				
White and other group			0.06 [−0.17, 0.29]				
Socioeconomic disadvantage index				0.64* [0.12, 1.16]			
Collective efficacy (Ref = Low)							
Medium					−0.22** [−0.38, −0.05]		
High					−0.22** [−0.38, −0.05]		
Theft/vandalism						−0.03 [−0.39, 0.33]	
Safe in dark						−0.30* [−0.54, −0.05]	
Mean BMI at wave 1							−0.04* [−0.08, −0.00]

Source: L.A. FANS waves 1 and 2, 2000 Census, and 2005–2009 ACS estimates. 95% confidence intervals are reported in brackets. In dividual coefficients are statistically significant at the **1%, *5%, † 10% level.