AMERICAN SOCIOLOGICAL ASSOCIATION

Journal of Health and Social Behavior
2016, Vol. 57(1) 1–21

DOI: 10.1177/0022146515627682
jhsb.sagepub.com
SAGE

Stuck in Unhealthy Places: How Entering, Exiting, and Remaining in Poor and Nonpoor Neighborhoods Is Associated with Obesity during the Transition to Adulthood

Adam M. Lippert[1]

Abstract

Adolescents from poor versus nonpoor neighborhoods are more likely to become obese during the transition to adulthood. It is unclear whether this pertains to all adolescents from poor neighborhoods or only those who remain in disadvantaged settings. Further, it is unknown how neighborhood poverty entries and exits are associated with obesity. Using census and interview data from 12,164 National Longitudinal Study of Adolescent Health participants, I find that those who consistently live in poor neighborhoods are more likely to become or remain obese by adulthood than those who never live in poor neighborhoods. Exiting severe neighborhood poverty curtails this risk, while entering and remaining in neighborhood poverty in adulthood increases it. These patterns are more pronounced for young women and robust to adjustments for health behaviors and selection bias. Findings support accumulation of risks and social mobility perspectives and highlight how previous and current neighborhood contexts are relevant for health.

Keywords

neighborhood poverty, obesity, population health, transition to adulthood, United States

Over 35% of U.S. adults are obese and at higher risk than their leaner peers for conditions like diabetes, inflammation, and bone and joint problems (U.S. Surgeon General 2007). Obese young people are especially vulnerable to these conditions due to the cumulative toll that obesity takes on the body (Ferraro and Kelley-Moore 2003). Roughly one in five American adolescents is obese (Ogden et al. 2010), and more than 1 in 10 non-obese adolescents become obese by young adulthood (Gordon-Larsen et al. 2004; Lee, Harris, and Gordon-Larsen 2009).

Recent studies find that neighborhood poverty is linked to both greater body mass index (BMI) during adolescence and weight gain over time (Burdette and Needham 2012; Lee et al. 2009; Nicholson and Browning 2012). Scholars hypothesize that this link is partly attributable to the uneven distribution of exercise amenities, healthy food sources, and stress exposure across poor and nonpoor neighborhoods (Chung and Myers 1999; Estabrooks, Lee, and Gyurcsik 2003; Gordon-Larsen et al. 2006). Several issues, however, limit what conclusions can be

[1]University of Colorado Denver, Denver, CO, USA

Corresponding Author:
Adam M. Lippert, University of Colorado Denver, 1380 Lawrence Street, Suite 420, Denver, CO. 80204, USA.
E-mail: adam.lippert@ucdenver.edu

drawn from these findings. First, point-in-time measures of residential disadvantage in adolescence have been used to predict changes in body weight over time. This implies that neighborhood poverty exposure in adolescence fosters weight gain irrespective of future residential circumstances. This expectation is grounded in the sensitive periods model (Ben-Shlomo and Kuh 2002), whereby insults to health have greater effects when they occur during developmentally vulnerable stages. However, the cross-sectional design of past studies does not account for continuity or change in neighborhood poverty exposure and cannot determine if the effects of neighborhood poverty are conditional on the timing in which they occur or operate through cumulative processes.

Additionally, it is unclear how neighborhood poverty entries and exits are associated with obesity. A number of adolescents from poor neighborhoods exit neighborhood poverty by young adulthood (Sharkey 2012, 2013; Swisher, Kuhl, and Chavez 2013), while others experience downward residential mobility as they leave the protective environments of school and family. Studies using cross-sectional measures of neighborhood disadvantage cannot identify how obesity risks vary among those who enter, exit, and remain in (non)poor neighborhoods during the transition to adulthood.

Given prior findings (e.g., Nicholson and Browning 2012; Robert 1999; Robert and Reither 2004), it is expected that certain residential trajectories will be more consequential for women's obesity than men's. This is because neighborhood disadvantage is experienced in different ways for young women and young men (Carvalho and Lewis 2003; Clampet-Lundquist et al. 2011; Mujahid et al. 2008). The behavioral pathways forming the gendered link between long-term neighborhood poverty exposure and obesity have not been explored in prior work.

Given these research gaps, the current study asks five main questions: (1) How is consistently living in a poor neighborhood associated with the risk for becoming or remaining obese during the transition to adulthood? (2) Do those who enter or exit poor neighborhoods have different risks for obesity versus those who remain in poor or nonpoor neighborhoods? (3) Do these associations vary by gender? (4) How do health behaviors including sleep, exercise, sedentary activities, and dietary practices explain the association between neighborhood poverty exposure and obesity for young women and men? (5), Do neighborhood poverty entries have longer-run impacts on obesity stretching into formal adulthood? Using data from the National Longitudinal Study of Adolescent Health (Add Health) and census-based measures of neighborhood poverty, I address these questions and assess the extent to which the findings are sensitive to selection bias and varying neighborhood poverty cutoffs.

BACKGROUND

Neighborhood Disadvantage and Body Weight

Evidence suggests that neighborhood poverty shapes exposure to the proximate behavioral, social, and physiological risks for obesity. For instance, neighborhood disadvantage has been directly tied to physical (in)activity and diet. Compared to residents of more affluent communities, residents of low-income neighborhoods have less access to free-to-use recreational outlets (Estabrooks et al. 2003; Gordon-Larsen et al. 2006)—a factor that is associated with adolescent obesity (Gordon-Larsen et al. 2006; Mota et al. 2005). Impediments to maintaining healthy diets are also evident in poor neighborhoods given that there are fewer large supermarkets located in and around poor versus nonpoor neighborhoods (Chung and Myers 1999; Morland et al. 2002) but greater densities of fast food outlets (Larson, Story, and Nelson 2009). This disadvantage is reflected in the dietary intakes of community members, with at least one study finding an inverse association between tract-level poverty and consumption of vegetables, fruits, and lean protein sources (Diez-Roux et al. 1999).

The social environment of poor neighborhoods is also linked to obesity. Residents of low-income communities report that high crime, social disorder, and distrust of neighbors discourage them from regular outdoor exercise (Franzini et al. 2010; Wilson et al. 2004; Yen and Kaplan 1998). Parents' (Weir, Etelson, and Brand 2006) and adolescents' (Clampet-Lundquist et al. 2011) perceptions of low neighborhood safety similarly discourage outdoor activities and may promote excess sedentary behaviors like television viewing and playing video games (Brown et al. 2008)—each of which is positively associated with obesity and weight gain (Boone et al. 2007; Mitchell et al. 2013). Adolescents living in low-income neighborhoods are also adversely affected at nighttime, with one study finding that the prevalence of sleep problems—a risk factor for adolescent obesity (Patel and Hu 2008)—is over 50% higher for those from low-income versus higher-income communities (Singh and Kenney 2013).

Poorer neighborhoods might also drive weight gain by exposing residents to chronic stress. The social disorganization and limited socioeconomic opportunities accompanying neighborhood poverty (Anderson 1999; Wilson 1987) exacerbate chronic stress among community members (Wheaton and Clarke 2003). Chronic stress may initiate physiological processes that increase the risk for obesity, particularly central adiposity (Bjorntorp 2001; De Vriendt, Moreno, and De Henauw 2009).

In sum, due to the excess of obesity-related risks in poor communities, neighborhood poverty is a key meso-level factor that contributes to energy imbalance and obesity (McNeill, Kreuter, and Subramanian 2006; Schnittker and McLeod 2005). Adults and adolescents from poorer neighborhoods, especially females, tend to be heavier than their counterparts from nonpoor neighborhoods (Boardman et al. 2005; Robert and Reither 2004) and tend to gain more weight over time (Burdette and Needham 2012; Kling et al. 2004; Lee et al. 2009; Nicholson and Browning 2012; Ruel et al. 2010). However, prior studies linking neighborhood poverty to adolescent weight gain rely on point-in-time measures of the neighborhood. Thus, it is unclear whether the measured time point constitutes a sensitive period for weight gain, a beginning of an accumulation of exposure to neighborhood poverty, or a point of change from a previous position of worse (or better) neighborhood circumstances.

The Transition to Adulthood, Neighborhood Poverty, and Obesity

As many as 1 in 10 non-obese adolescents become obese by young adulthood (Harris 2010), and recent studies show that adolescents from disadvantaged neighborhoods are both heavier at baseline and gain more weight as they enter adulthood than their peers from nonpoor communities (Burdette and Needham 2012; Lee et al. 2009; Nicholson and Browning 2012). These findings could be interpreted to support what is known as the *sensitive periods model*, whereby insults to health have greater impacts when they occur during developmentally vulnerable stages in life (Ben-Shlomo and Kuh 2002). This perspective is based on work investigating early-life influences on later-life health outcomes (e.g., Barker 1998; Hertzman et al. 2001) and has been used to explain the early-life origins of health disparities later in life. For instance, studies find that childhood poverty negatively influences disease immunity in childhood (Dowd, Zajacova, and Aiello 2009) as well as socioeconomic attainment, health behaviors, and adult life expectancy (Haas 2006; Hayward and Gorman 2004).

Questions remain about the link between neighborhood poverty in adolescence and the risk for young adult obesity. It is possible that this association simply reflects the impact of prolonged residence in poor neighborhoods. In other words, the risk for becoming obese in young adulthood may be higher for adolescents from poor neighborhoods, but only for those who also live in poor neighborhoods as young adults. This logic is consistent with the *accumulation of risks* perspective, which holds that harmful exposures at multiple stages in life operate jointly to produce additive health effects (Ben-Shlomo and Kuh 2002; Dannefer 2003; DiPrete and Eirich 2006; Stringhini et al. 2011). This perspective is used in research on socioeconomic status and health declines over adulthood, which shows that earlier advantages (and disadvantages) influence the accumulation of resources (or hardships) throughout life, widening health inequalities over time (Galobardes, Lynch, and Smith 2004; House et al. 1994; Kahn and Pearlin 2006; Mirowsky and Ross 2003; Ross and Wu 1996).

The durability of neighborhood poverty exposure over the life course is also consistent with the central tenets of the accumulation model. For instance, Sharkey (2013) finds that 40% and 67% of white and black adolescents, respectively, from neighborhoods in the poorest quintile of American communities move to similarly impoverished neighborhoods in adulthood. In other words, residential disadvantage in adolescence is often a forebear to uninterrupted neighborhood poverty exposure over one's life. The accumulation of exposure to obesogenic features within poor neighborhoods could foster weight gain during the transition to adulthood. This expectation leads to Hypothesis 1:

> *Hypothesis 1*: Individuals living in poor neighborhoods during both adolescence and young adulthood are more likely to become or remain obese than those with less or no exposure to poor neighborhoods.

Despite the durability of neighborhood poverty exposure, a subset of youth will experience upward or downward residential mobility as they become adults (Sharkey 2012, 2013; Swisher et al. 2013). Youth who change their residential circumstances may have different risks for obesity than those who remain in poor or nonpoor places. Undergirding this expectation is the *social mobility model*, which holds that effects from earlier-life conditions can be modified by later circumstances, with the direction of social mobility having bearing on later health outcomes (Cohen et al. 2010). This is supported with evidence that the health of upwardly mobile individuals is often better over the life course than people who experience prolonged disadvantage (Hallqvist et al. 2004; Langenberg et al. 2003). Similarly, youth who disrupt their exposure to place-based obesity risks by moving from poor to nonpoor neighborhoods could curtail their odds of becoming obese. Conversely, adolescents shifting from nonpoor to poor neighborhoods in young adulthood may face elevated obesity risks than those who remain in nonpoor communities. This leads to Hypotheses 2 and 3:

> *Hypothesis 2*: Those who live in poor neighborhoods during adolescence and nonpoor neighborhoods in young adulthood will be less likely to become obese relative to those who consistently live in poor neighborhoods.

> *Hypothesis 3*: Those who live in nonpoor neighborhoods during adolescence and poor neighborhoods in young adulthood will be more likely to become obese relative to those who consistently live in nonpoor neighborhoods.

Of course, given the time required for obesity to develop, the effects of upward or downward residential mobility may not manifest immediately. For instance, obesity risks may not differ between those leaving versus remaining in nonpoor neighborhoods until formal adulthood. Further, consistent with the accumulation of risks perspective, it may be that only those adolescents who enter poor neighborhoods by young adulthood *and remain in them* will be at higher risk for obesity in formal adulthood than those who never live in neighborhood poverty. Thus, Hypothesis 3a:

> *Hypothesis 3a*: Among those who lived in nonpoor neighborhoods as adolescents, the risk for adult obesity will be higher for those who enter *and remain in* poor neighborhoods by young adulthood than those who never live in poor neighborhoods.

As past studies show, the link between neighborhood disadvantage and obesity is stronger for women than men (Chang, Hillier, and Mehta 2009; Mujahid et al. 2008). This reflects gender differences in how neighborhood disadvantage is experienced and responded to. Women from low-income communities report safety concerns (Carvalho and Lewis 2003), and adolescent females take deliberate measures to avoid neighborhood-based threats including seeking refuge indoors, traversing elaborate neighborhood routes to avoid trouble spots, and spending more time away from their neighborhoods (Clampet-Lundquist et al. 2011).

Responses to neighborhood disadvantage also appear to differ. Prior research shows that women from low-income neighborhoods are more likely to engage in obesogenic practices like overeating and sedentary behaviors (Jackson, Knight, and Rafferty 2010), while men are prone to risk behaviors like smoking and substance abuse (Williams 2003). Thus, it is expected that the link between long-term measures of neighborhood poverty exposure and obesity will be stronger for young women than men and that health behaviors partially explain this pattern. This leads to Hypothesis 4:

> *Hypothesis 4*: The association between long-term measures of neighborhood poverty exposure and obesity will be stronger for young women than young men and partially attributable to health behaviors linked to both neighborhood poverty and obesity.

Despite the high proportion of adolescents who become obese by adulthood, no research has investigated the five questions guiding this study: (1) How is consistently living in a poor neighborhood associated with the risk for becoming or remaining obese during the transition to adulthood? (2) Do those who enter or exit poor neighborhoods have different risks for obesity versus those who remain in poor or nonpoor neighborhoods? (3) Do these associations vary by gender? (4) How do key health behaviors including sleep, exercise, sedentary activities, and dietary practices explain these associations? (5) Do neighborhood poverty entries have longer-run impacts on obesity in formal adulthood?

DATA AND METHODS

Sample

Study data were drawn from the restricted-use National Longitudinal Study of Adolescent Health (Add Health) and the U.S. census. Add Health is an ongoing, nationally representative, school-based survey of adolescents in 7th through 12th grade from 132 high schools and middle schools (Harris 2011). In 1994, Add Health administered in-school questionnaires to students selected through a stratified random sample of all high schools in the United States (N = 90,118). A subsample participated in home-based interviews between 1994 and 1995 (N = 20,745). All students except for graduating high school seniors were re-interviewed in a second wave of data collection in 1996 (N = 14,738). Third and fourth waves of data were collected in 2001–02 and 2008, respectively, from all Wave I participants. Due to the Wave II exclusion of graduating seniors from Wave I, data from all waves except Wave II were used here.

In addition to data from respondent interviews, contextual data appended to Add Health (Billy, Wenzlow, and Grady 1997; Swisher 2009) were utilized to derive measures of Wave I (1994–95) neighborhood poverty using 1990 census data, Wave III (2001–02) neighborhood poverty using 2000 census data, and Wave IV neighborhood poverty using 2005–09 American Community Survey data. Census tracts were used to approximate neighborhood boundaries.[1]

Several sample restrictions were made. First, only respondents who participated in both the Wave I and III interviews and who have valid sample weights were included (N = 14,322). Omitted from the sample were respondents without GPS-based residential matches or matched physical addresses (N = 1,313), prison detainees (N = 20), active military personnel (N = 195), and women who were pregnant at the time of their interviews (N = 258). To capture the periods of adolescence and young adulthood, I omit respondents who were older than 18 years of age at Wave I or younger than 19 at Wave III (N = 332). This omission yielded a final sample of 12,164.

Though the data are mostly complete, there were substantial missing data on family poverty in adolescence. Stata's ICE program was used to multiply imputed missing values for all variables (Royston 2004). The resulting five sets of complete data were combined to adjust for variance within and between imputed samples to calculate standard errors and coefficients (Acock 2005).

Measures

There were two dependent variables based on the body mass index (BMI). For the first, Wave I height and weight was used to calculate age- and sex-specific adolescent BMI percentiles (Centers for Disease Control and Prevention 2003). BMI percentiles were transformed into scores that were equivalent to adult cutpoints using guidelines from the International Obesity Task Force (IOTF; Cole et al. 2000). Scores were classified into two categories: obese at Wave I (BMI ≥30) or not (BMI <30). This method of harmonizing BMI categories between adolescence and adulthood has been used before in longitudinal studies of adolescent obesity change (Frisco, Houle, and Lippert 2013; Gordon-Larsen et al. 2004).

The adolescent obesity measure was then combined with a binary measure of Wave III young adult obesity. This was calculated by dividing weight in kilograms by height in meters squared (weight[kg] / height[m]^2) and classifying the resulting scores into two categories—not obese (BMI <30) and obese (BMI ≥30). Combining the adolescent and young adult obesity indicators yielded the first dependent variable with the following values: non-obese by young adulthood (=0).[2] became obese by young adulthood (=1). or consistently obese in adolescence and young adulthood (=2).

The second dependent variable was a binary measure of Wave IV adult obesity using the formula (weight[kg] / height[m]^2) and obesity cutpoints (i.e., BMI ≥30 = obese) used for deriving young adult obesity. Obesity measures were based on self-reported height and weight at all waves because Wave I included only self-reported measures.[3]

Neighborhood Poverty Change. Measures of Wave I to Wave III and Wave III to Wave IV neighborhood poverty change were constructed over several steps. First, binary indicators of neighborhood poverty were based on the census-derived percentage of individuals with incomes below the federal poverty line within a respondent's Wave I, III, and IV tract. Following conventions in the literature (Jargowsky and Bane 1991; South and Crowder 1997; Timberlake 2007), these indicators = 1 if the respondent lives in a neighborhood where 20% or more if their neighbors are below the poverty line and 0 otherwise.

Binary indicators were combined into separate four-category measures indicating Wave I to Wave III and Wave III to Wave IV neighborhood poverty change with the following categories: consistently lived in nonpoor neighborhoods (reference), moved from a nonpoor neighborhood at one wave to a poor neighborhood at the next (=1), moved from a poor neighborhood at one wave to a nonpoor neighborhood at the next (=2), or consistently lived in poor neighborhoods at each wave (=3). For simplicity, I referred to the middle two categories as entered and exited poor neighborhoods, respectively.

Health Behaviors. Multiple health behaviors were examined to assess explanatory pathways. *Wave I sleep* had a range of 0 to 12 hours and was based on a Wave I question asking respondents: "How many [whole] hours of sleep do you usually get?" For Wave III, respondents were asked four sleep-related questions: "On days when you go to work, school, or similar activities, what time do you usually wake up?"; "What time do you usually go to sleep the night (or day) before?"; "On days you don't have to get up at a certain time, what time do you usually get up?"; and "On those days, what time do you usually go to sleep the night or day before?" Based on these items, which were intended to measure sleep on weekdays and weekends, a weighted average of whole sleep hours ranging from 0 to 12 was created by weighting the weekday items by five-sevenths and the weekend items by two-sevenths. A second constructed variable—*Wave I–III change in sleep*—was the difference in Wave I and III sleep hours.

Wave I and III exercise frequency were from items asking how many days in the past week respondents participated in physical activities including weight lifting, jogging, gymnastics, and dancing. Response options varied slightly between waves but were made equivalent with the following categories: 0 days (reference), 1 to 2 days (=1), 3 to 4 days (=2), and 5 to 7 days (=3). *Wave I–III change in exercise* was the difference in Wave I and III exercise frequency.

Measures of physical *in*activity were based on questions from both waves on the number of hours spent per week (1) watching television, (2) watching movies or videos, and (3) playing computer or video games. Responses were combined and summed to create continuous measures of *Wave I and III screen time*, ranging from 0 to 40 hours weekly. *Wave I–III change in screen time* was the difference in Wave I and III screen hours.

While few nutrition-related measures were available, breakfast skipping—a potential risk for obesity (Niemeier et al. 2006)—was measured at both waves. Wave I respondents were asked if they normally eat breakfast, which I reverse-coded into a new variable = 1 if breakfast is normally skipped and 0 otherwise. In Wave III, respondents were asked: "On how many of the past seven days did you eat breakfast—that is, a meal within an hour of getting up?" Based on this, I created a new measure of Wave III breakfast skipping = 1 if breakfast was consumed on two or fewer days in the past week and 0 otherwise. These measures were combined into *Wave I–III breakfast skipping*, with the following categories: never skipped breakfast (reference), began eating breakfast regularly by Wave III (=1), began skipping breakfast regularly by Wave III (=2), and always skipped breakfast (=3).

Controls

Race-ethnicity is self-reported non-Hispanic white (reference), non-Hispanic black, Hispanic/Latin, or other race. *Native born* indicated that the respondent was born in the United States (=0 if not). *Family structure* included indicators for two-parent families (reference), single-parent families, step families, or other family types. *Parental education* was the highest educational attainment reported by either parent and was coded into: less than a high school education (reference), high school diploma/equivalent, and four-year degree or higher. Because of its correlation with both neighborhood disadvantage and obesity, family poverty is controlled using a linear specification of the *income-to-poverty* ratio. This is the ratio of family income to the U.S. Census Bureau's official 1994 poverty threshold adjusted by household size and age structure. Because body weight is influenced by puberty and gender, a control for Wave I *pubertal development* is also included. These measures are estimated separately for males and females and are based on the Tanner scores (Peterson et al. 1988) derived from Likert-style items ranging from low (e.g., 1 = I looked younger than most boys/girls my age) to high (e.g., 5 = I look older than most boys/girls my age). Males' pubertal stage was constructed using four self-assessments: the amount of underarm hair (1 to 5), thickness of facial hair (1 to 4), deepening of one's voice since grade school (1 to 5), and self-assessed physical development relative to similarly aged boys (1 to 5). Females' pubertal stage was based on three self-assessments, with response categories ranging from 1 to 5: breast development, body curvature, and self-assessed physical development relative to similarly aged girls. Combining these yielded summed measures with reasonable reliability (average α for males and females = .68) and ranges of 1 to 5 for females and 1 to 4.75 for males.

Because of its correlation with neighborhood poverty and respondents' body weight, *parental obesity* from Wave I was controlled (=1 if either parent is obese, 0 otherwise). Several emerging adult statuses measured at the Wave III interview were also included. These included *relationship transitions* (=0 if single and never married/cohabited, =1 if in a cohabiting relationship for six or more months, =2 if became married, =3 if previously married/cohabited), *education* (=1 if currently attending college, =2 if a four-year college degree has been completed, =0 if neither), *parenthood* (=1 if residing with a child dependent, =0 otherwise), *employment* (=1 if currently working full-time, =0 otherwise), and *income from earnings at Wave III* (=0 if \$20,000 per year, =1 if between \$20,000 and \$29,999, =2 if \$30,000 or more). Additional controls included *age in years* at Wave I and *years of residence* at Wave I and Wave III addresses. Descriptive statistics for all variables are shown in Table 1.

Data Analysis

Table 2 summarizes results from three multinomial logistic regression models predicting the odds of becoming obese (Panel A) and remaining obese (Panel B) by young adulthood, where the reference category was being non-obese by young adulthood. Model 1 is unadjusted, Model 2 adds control variables,[4] and Model 3 adds interactions between sex and neighborhood poverty. Table 3 summarizes two separate sets of sex-specific multinomial logistic models, with Model 1 of each set including the neighborhood poverty change measure and all controls, while Model 2 introduces health behaviors. Drawing on the subsample of respondents who lived in nonpoor neighborhoods in adolescence, Table 4 summarizes results from two separate sets of sex-specific binary logistic regression models predicting the odds of being obese by Wave IV (formal adulthood). Model 1 is an unadjusted model including only Wave III-to-Wave IV neighborhood poverty change, and Model 2 adds controls.

In all models, the reference category for neighborhood poverty change was never lived in a poor neighborhood. In supplementary models, the reference categories were rotated to obtain full comparisons. Where applicable, each table denotes statistically significant differences ($p < .05$) relative to those who entered or exited poor neighborhoods.

Because Add Health respondents lived in different tracts over time, the data were not nested in a conventional way, and Wave III tract clustering was low.[5] Thus, neighborhood poverty was modeled as an individual-level exposure. Adjustments were made to correct standard errors for within-cluster homogeneity by clustering on primary (Wave I tract) and secondary (Wave III) sampling units. Analyses were weighted to correct for survey design effects.

RESULTS

In Table 2, Model 1 of Panel A shows that neighborhood poverty exits are associated with higher odds of becoming obese by young adulthood. The odds ratio for neighborhood poverty exits—1.44—indicates that those exiting poor neighborhoods have 44% higher odds ([1.44 – 1.00] × 100) of becoming obese than those who never live in poor neighborhoods. There is a similar pattern for those consistently living in poor neighborhoods, who have 90% higher odds of becoming obese than those never living in poor neighborhoods and 130% higher odds versus those who enter neighborhood poverty (OR = 2.30, $p < .001$, 95% CI = 1.69, 3.12).

In Model 1 of Panel B, those exiting or consistently living in poor neighborhoods have 76% and 124% higher odds, respectively, of being consistently obese than those who never live in poor neighborhoods. Compared to those entering poor neighborhoods, supplementary models reveal that those exiting poor neighborhoods have 102% higher odds of being consistently obese (OR = 2.02, $p < .001$, 95% CI = 1.35, 3.00), and those consistently living in poor neighborhoods have 157% higher odds of being consistently obese (OR = 2.57, $p < .001$, 95% CI = 1.71, 3.86).

These patterns are attenuated once controls are added to Model 2. In Panel A, the contrasts between those exiting poor neighborhoods and those who consistently lived in or entered poor neighborhoods are nonsignificant. Likewise, the odds ratio for consistent residence in poor neighborhoods is reduced by 17% to 1.58 but remains significant. Those consistently living in poor neighborhoods also remain more likely to become obese young adults relative to those entering poor neighborhoods (OR = 1.70, $p < .01$, 95% CI = 1.24, 2.32).

In Panel B, Model 2 shows that neighborhood poverty exits remain associated with higher odds of being consistently obese relative to those never living in poor neighborhoods net of controls, but not compared to those entering poor neighborhoods. Those who consistently live in poor neighborhoods have 85% higher odds of being consistently obese compared to those never living in neighborhood poverty, and 71% higher odds relative to those who entered poor neighborhoods (OR = 1.71, $p < .01$, 95% CI = 1.14, 2.59).

Interaction terms in Model 3 of Panel A indicate that the associations in Model 2 are generally stronger for women versus men. To better illustrate this, predicted probabilities from Model 3 are shown in Figure 1.

Table 3 is divided into two parts summarizing sex-specific multinomial logistic models. Among women, Model 1 in Panel A shows that net of controls, consistent residence in poor neighborhoods is associated with 75% higher odds of becoming

Table 1. Sample Description, National Longitudinal Study of Adolescent to Adult Health (N = 12,164).[a]

Variable	Mean/Proportion	SD
BMI category change Wave I–Wave III		
Non-obese by young adulthood (reference)	.81	.01
Became obese	.12	.01
Consistently obese	.07	.00
Wave IV obesity (1 = obese, 0 = non-obese)	.32	.01
Wave I to Wave III neighborhood poverty change		
Never lived in a poor neighborhood (reference)	.63	.03
Entered poor neighborhood	.12	.01
Exited poor neighborhood	.12	.02
Consistently lived in a poor neighborhood	.13	.02
Wave I sleep (in average daily hours)	7.85	.02
Wave I–III change in sleep	.82	.05
Wave I average weekly exercise frequency (range, 0–3)[b]	1.62	.02
Wave I–III change in exercise	−1.11	.02
Wave I screen time (in average weekly hours)	18.12	.29
Wave I–III change in screen time	1.17	.26
Wave I–III breakfast skipping		
Always ate breakfast regularly (reference)	.43	.01
Began eating breakfast regularly	.37	.01
Began skipping breakfast regularly	.07	.01
Always skipped breakfast	.13	.01
Female	.51	.01
Race-ethnicity		
Non-Hispanic white (reference)	.67	.03
Non-Hispanic black	.15	.02
Hispanic	.11	.01
Other	.07	.01
Native born	.94	.01
Wave 1 age (in years)	15.32	.04
Family structure		
Two-parent household (reference)	.59	.01
Single-parent household	.21	.01
Step-family	.15	.01
Other family structure	.05	.00
Parental education		
Less than high school or equivalent (reference)	.11	.01
High school or equivalent	.57	.01
Four-year college degree or more	.32	.02
Income-to-poverty ratio	3.07	.96
Years at Wave I address	7.32	.12
Years at Wave III address[c]	2.88	.10
One or both biological parents obese	.24	.01
Tanner pubertal development score	3.08	.02
Education[c]		
High school diploma or less (reference)	.67	.02
Currently enrolled in college	.23	.01
Completed four-year degree or more	.11	.01

(continued)

Table 1. (continued)

Variable	Mean/Proportion	SD
Relationship transitions[c]		
Never married or cohabited (reference)	.51	.01
Currently cohabiting	.16	.01
Currently married	.15	.01
Previously cohabited or married	.19	.01
Co-residing with child dependent[c]	.20	.01
Working full-time[c]	.52	.01
Past year income from wages[c]		
<$20,000 (reference)	.77	.01
$20,000–$29,999	.15	.01
$30,000 or more	.08	.00

[a]Estimates weighted and cluster adjusted for design effects.
[b]Response options are: no weekly exercise (=0), 1 to 2 days (=1), 3 to 4 days (=2), and 5 to 7 days (=3).
[c]Based on reports from the Wave III young adult interviews.

obese compared to never living in a poor neighborhood. The odds of becoming obese are also 67% higher for women consistently living in poor neighborhoods versus those who enter neighborhood poverty (OR = 1.67, $p < .05$, 95% CI = 1.05, 2.63). Adjustments for health behaviors in Model 2 of Panel A do not attenuate these differences significantly but do show that women who exercise more frequently at baseline or increase exercise frequency between waves have lower odds of becoming obese. Conversely, baseline screen time is positively associated with the odds of becoming obese, while a one-hour between-wave increase in screen time is associated with a 2% increase in these odds. Young women who regularly skipped breakfast are also at higher risk.

In Panel B, young women consistently living in poor neighborhoods had 110% higher odds of being consistently obese than women who never live in poor neighborhoods. This difference is robust to adjustments for health behaviors in Model 2. The odds of being consistently obese are 31% lower for every one-unit increase in baseline exercise frequency and 3% higher for every additional baseline hour spent behind a screen. Women who began regularly eating breakfast by Wave III had 56% higher odds of being consistently obese than women who always ate breakfast.

Among men, in Model 1 of Panel A, consistent residence in poor neighborhoods is associated with 43% higher odds of becoming obese compared to never living in poor neighborhoods and 77% higher odds versus entering neighborhood poverty (OR = 1.77, $p < .05$, 95% CI = 1.08, 2.89). Adding health behaviors to Model 2 attenuates these differences, but the associations remain significant. Regarding health behaviors, increasing exercise frequency between waves is associated with lower odds of becoming obese.

In Panel B, the odds of being consistently obese are higher for men exiting or consistently living in poor neighborhoods versus never living in neighborhood poverty. Compared to neighborhood poverty entries, the odds of being consistently obese are 112% higher for neighborhood poverty exits (OR = 2.12, $p < .05$, 95% CI = 1.15, 3.90) and 101% higher for consistent residence in poor neighborhoods (OR = 2.01, $p < .05$, 95% CI = 1.10, 3.68).

These differences are attenuated after adjusting for health behaviors (Model 2). Compared to those entering poor neighborhoods, supplemental models show that the odds of being consistently obese are higher for both those exiting (OR = 2.00, $p < .05$, 95% CI = 1.05, 3.81) or consistently living in poor neighborhoods (OR = 1.89, $p < .05$, 95% CI = 1.03, 3.48). The odds of being consistently obese increase 3% for every additional hour of baseline screen time and 161% and 109% for young men who began skipping or never regularly ate breakfast, respectively.

Unexpectedly, those entering neighborhood poverty are at similar risk for becoming obese as those who never lived in poor neighborhoods. To examine whether this pattern extends into formal adulthood, Table 4 presents results from two sets of sex-specific models based on the subsample of respondents from nonpoor neighborhoods in adolescence. Model 1 includes a Wave III to Wave IV neighborhood poverty typology analogous to the measure used previously, and Model 2 adds controls.[6]

Table 2. Multinomial Logistic Models Predicting the Odds of Becoming/Being Consistently Obese by Young Adulthood (N = 12,164).[a]

	Panel A. Became Obese Versus Not Obese at Wave III			Panel B. Consistently Obese Versus Not Obese at Wave III		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Variable	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Neighborhood poverty change						
Entered poor neighborhood	.83	.93	.79	.87	1.08	.83
	(.64, 1.07)	(.73, 1.19)	(.53, 1.16)	(.63, 1.21)	(.78, 1.49)	(.50, 1.39)
Exited poor neighborhood	1.44**	1.17	.86	1.76***†	1.54**	1.53*
	(1.07, 1.93)	(.84, 1.63)	(.57, 1.30)	(1.33, 2.31)	(1.15, 2.05)	(1.01, 2.30)
Consistently in poor neighborhood	1.90***†	1.58***†	1.20	2.24***†	1.85***†	1.46
	(1.52, 2.38)	(1.24, 2.00)	(.86, 1.68)	(1.65, 3.05)	(1.31, 2.59)	(.96, 2.21)
Female		1.00	.83		.62***	.54***
		(.84, 1.19)	(.69, 1.02)		(.50, .77)	(.42, .71)
Female × entered poor neighborhood			1.37			1.69
			(.79, 2.37)			(.88, 3.25)
Female × exited poor neighborhood			1.70*			1.01
			(1.09, 2.64)			(.57, 1.76)
Female × consistently in poor neighborhood			1.65*			1.65*
			(1.06, 2.57)			(1.01, 2.68)
Race						
Non-Hispanic black		1.52**	1.51**		1.37*	1.36*
		(1.14, 2.02)	(1.14, 2.01)		(1.04, 1.80)	(1.03, 1.79)
Hispanic		1.16	1.17		1.39*	1.39*
		(.84, 1.60)	(.86, 1.61)		(1.06, 1.83)	(1.05, 1.83)
Other		1.16	1.17		1.05	1.05
		(.79, 1.71)	(.80, 1.72)		(.57, 1.93)	(.57, 1.96)
Native born		1.43	1.44		1.29	1.28
		(.94, 2.19)	(.94, 2.21)		(.79, 2.10)	(.79, 2.09)

(continued)

Table 2. (continued)

Variable	Panel A. Became Obese Versus Not Obese at Wave III			Panel B. Consistently Obese Versus Not Obese at Wave III		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Wave 1 age (in years)		1.03	1.03		1.07	1.06
		(.98, 1.09)	(.98, 1.09)		(.99, 1.14)	(.99, 1.14)
Family structure						
Single-parent household		.95	.95		.85	.85
		(.78, 1.17)	(.78, 1.17)		(.66, 1.11)	(.66, 1.11)
Step-family		1.13	1.13		.92	.93
		(.89, 1.44)	(.89, 1.44)		(.66, 1.29)	(.67, 1.29)
Other family structure		.87	.87		.82	.83
		(.61, 1.23)	(.61, 1.23)		(.52, 1.31)	(.52, 1.31)
Parental education						
High school or GED		.75	.75		.98	.97
		(.56, 1.01)	(.55, 1.01)		(.70, 1.38)	(.69, 1.36)
Four-year college degree or higher		.65*	.65*		.69	.69
		(.45, .93)	(.45, .93)		(.46, 1.04)	(.46, 1.03)
Income-to-poverty ratio		.99	.99		.92*	.92*
		(.95, 1.03)	(.95, 1.03)		(.86, .98)	(.86, .98)
Years at Wave I address		1.00	1.00		1.00	1.01
		(.99, 1.02)	(.99, 1.02)		(.99, 1.03)	(.99, 1.03)
Years at Wave III address[b]		1.02	1.02		1.04**	1.04**
		(.99, 1.04)	(.99, 1.04)		(1.01, 1.06)	(1.01, 1.07)
One or both biological parents obese		2.08***	2.09***		4.25***	4.26***
		(1.69, 2.56)	(1.70, 2.57)		(3.42, 5.29)	(3.43, 5.31)
Tanner pubertal development score		1.52***	1.51***		1.68***	1.67***
		(1.38, 1.67)	(1.37, 1.66)		(1.46, 1.92)	(1.46, 1.91)

(continued)

Table 2. (continued)

	Panel A. Became Obese Versus Not Obese at Wave III			Panel B. Consistently Obese Versus Not Obese at Wave III		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Variable	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Education[b]						
Currently enrolled in college		.65**	.65**		.44***	.44***
		(.50, .84)	(.50, .84)		(.31, .63)	(.31, .63)
Completed four-year degree or more		.47***	.47**		.50***	.50***
		(.31, .71)	(.31, .72)		(.33, .74)	(.33, .75)
Relationship transitions[b]						
Currently cohabiting		1.00	1.02		.58***	.59***
		(.77, 1.30)	(.79, 1.32)		(.42, .79)	(.43, .81)
Currently married		1.60***	1.62***		.55***	.55***
		(1.23, 2.08)	(1.25, 2.10)		(.39, .77)	(.39, .78)
Previously cohabited or married		.87	.87		.76	.76
		(.67, 1.13)	(.67, 1.13)		(.57, 1.01)	(.57, 1.01)
Co-residing with child dependent[b]		1.08	1.06		1.29	1.27
		(.89, 1.31)	(.87, 1.28)		(.95, 1.74)	(.94, 1.73)
Working full-time[b]		.95	.94		1.10	1.10
		(.79, 1.13)	(.79, 1.13)		(.88, 1.37)	(.88, 1.38)
Past year income from wages[b]						
$20,000–$29,999		.88	.88		.61*	.61*
		(.68, 1.13)	(.69, 1.14)		(.42, .89)	(.42, .89)
$30,000 or more		.88	.87		.71	.71
		(.61, 1.27)	(.60, 1.26)		(.42, 1.21)	(.42, 1.20)

[a]All models are weighted and cluster adjusted for design effects and treat non-obese by Wave III as the omitted outcome.
[b]Based on reports from the Wave III young adult interviews.
†Significantly ($p < .05$) larger coefficients versus those who entered poor neighborhoods.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 3. Multinomial Logistic Regression Models Estimating the Effects of Neighborhood Poverty Exposure and Health Behaviors on the Odds of Becoming/ Being Consistently Obese (N = 12,164).[a]

	Young Women				Young Men			
	Panel A. Became Obese Versus Not Obese at Wave III		Panel B. Consistently Obese Versus Not Obese at Wave III		Panel A. Became Obese Versus Not Obese at Wave III		Panel B. Consistently Obese Versus Not Obese at Wave III	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Variable	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Neighborhood poverty change								
Entered poor neighborhood	1.05 (.72, 1.51)	1.07 (.74, 1.56)	1.37 (.90, 2.09)	1.36 (.89, 2.08)	.81 (.54, 1.20)	.79 (.53, 1.18)	.84 (.51, 1.38)	.85 (.51, 1.41)
Exited poor neighborhood	1.35 (.92, 1.99)	1.29 (.90, 1.84)	1.36 (.90, 2.05)	1.22 (.80, 1.86)	.97 (.64, 1.47)	.94 (.63, 1.41)	1.77**† (1.20, 2.63)	1.70*† (1.12, 2.56)
Consistently in poor neighborhood	1.75***† (1.27, 2.41)	1.74***† (1.26, 2.40)	2.10** (1.30, 3.39)	2.09** (1.29, 3.38)	1.43*† (1.02, 2.00)	1.39*† (1.00, 1.94)	1.68*† (1.10, 2.58)	1.60*† (1.06, 2.43)
Wave I sleep (in average daily hours)		.99 (.89, 1.10)		1.00 (.88, 1.13)		.91 (.82, 1.01)		.94 (.83, 1.07)
Wave I–III change in sleep		1.00 (.95, 1.06)		.97 (.90, 1.05)		.99 (.94, 1.04)		.97 (.92, 1.03)
Wave I average weekly exercise frequency[b]		.77* (.62, .97)		.69* (.52, .92)		.85 (.72, 1.00)		.97 (.79, 1.20)
Wave I–III change in exercise		.77* (.73, .94)		.82 (.63, 1.07)		.82** (.72, .93)		1.02 (.87, 1.21)
Wave I screen time (in average weekly hours)		1.03*** (1.01, 1.04)		1.03** (1.01, 1.05)		1.01 (.99, 1.02)		1.03** (1.01, 1.05)
Wave I–III change in screen time		1.02*** (1.01, 1.03)		1.01 (.99, 1.03)		1.00 (.99, 1.01)		1.01 (.99, 1.02)
Wave I–III breakfast skipping								
Began eating breakfast regularly		1.17 (.93, 1.46)		1.56* (1.02, 2.39)		1.04 (.83, 1.31)		1.21 (.87, 1.69)
Began skipping breakfast regularly		.81 (.52, 1.25)		1.56 (.95, 2.58)		1.09 (.68, 1.76)		2.61*** (1.52, 4.48)
Always skipped breakfast		1.54** (1.09, 2.17)		1.46 (.92, 2.29)		1.26 (.83, 1.91)		2.09** (1.35, 3.25)

[a]All models are weighted and cluster adjusted for design effects, treat non-obese by Wave III as the omitted outcome, and control for the following: race, nativity, age, family structure, parental education, income-to-poverty ratio, years at Wave I and III addresses, parental obesity, pubertal development, and young adult attainments (education, relationship status, childrearing, employment, and income).
[b]Response options are: no weekly exercise (=0), 1 to 2 days (=1), 3 to 4 days (=2), and 5 to 7 days (=3).
†Significantly ($p < .05$) larger coefficients versus those who entered poor neighborhoods.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 4. Logistic Regression Models Estimating the Effect of Wave III-to-Wave IV Neighborhood Poverty Change on Wave IV Obesity for Those from Nonpoor Wave I Neighborhoods (N = 9,123).

	Panel A. Young Women (N = 4,744)		Panel B. Young Men (N = 4,379)	
	Model 1[a]	Model 2[b]	Model 1[a]	Model 2[b]
Variable	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Wave III–Wave IV neighborhood poverty change[c]				
Entered poor neighborhood	1.43**†	1.21	.87	.85
	(1.09, 1.87)	(.90, 1.63)	(.62, 1.23)	(.58, 1.24)
Exited poor neighborhood	.88	1.01	.65*	.79
	(.66, 1.17)	(.76, 1.34)	(.46, .92)	(.55, 1.13)
Consistently in poor neighborhood	1.68**†	1.51*	.75	.77
	(1.17, 2.42)	(1.03, 2.20)	(.48, 1.16)	(.48, 1.24)

[a]Unadjusted for controls.
[b]Adjusted for the following: race, nativity, age, family structure, parental education, income-to-poverty ratio, years at Wave I and III addresses, parental obesity, pubertal development, and young adult attainments (education, relationship status, childrearing, employment, and income).
[c]Reference category is never lived in a poor neighborhood.
†Significantly (p < .05) larger coefficients versus those who entered or exited poor neighborhoods, respectively.
*p < .05, **p < .01.

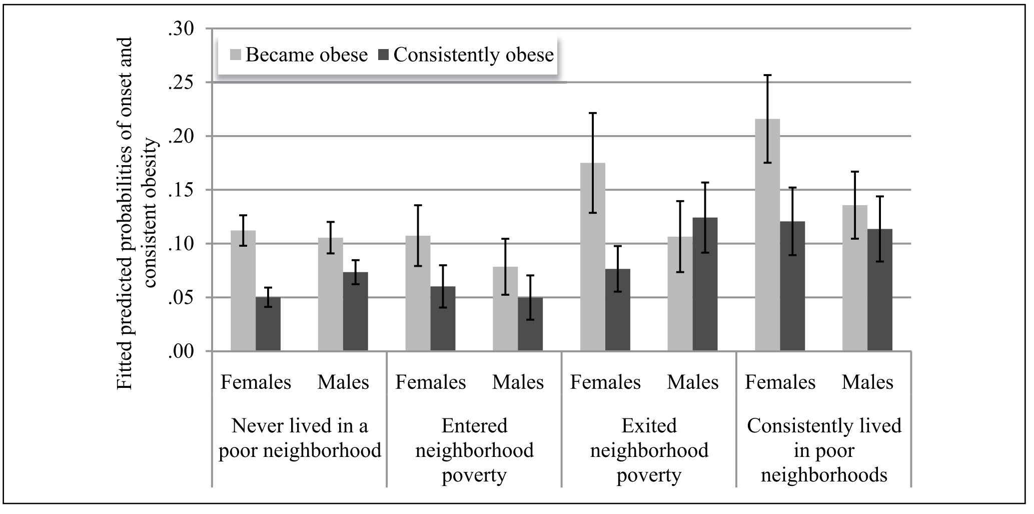

Figure 1. Young Women's and Men's Predicted Average Probabilities of Becoming and Consistently Being Obese (N = 12,164).
Note: Estimates are from multinomial logistic models based on the full sample and adjusted for race, nativity, age, family structure, parental education, income-to-poverty ratio, tenure at Wave I and III addresses (in years), parental obesity, pubertal development, and young adult attainments (education, relationship status, childrearing, employment, and income from wages). Upper and lower 95% confidence intervals are shown with error bars.

Model 1 in Panel A indicates that women entering poor neighborhoods in Wave IV or living in them at both Waves III and IV are at higher risk for being obese in formal adulthood than women who never live in poor neighborhoods. Supplemental models reveal that these odds are also higher for neighborhood poverty entries (OR = 1.63, p < .05, 95% CI = 1.11, 2.39) and consistent residence in poor neighborhoods (OR = 1.92, p < .01, 95% CI = 1.22, 3.01) versus neighborhood poverty exits.

Table 5. Propensity-Score Matching (PSM) Estimates of the Effect of Consistent Residence in Poor Neighborhoods on Obesity (N = 10,657).

	Panel A. Consistently in Versus Never Lived in Poor Neighborhoods		Panel B. Consistently in Versu. Exited Poor Neighborhoods	
	Became Obese	Consistently Obese	Became Obese	Consistently Obese
Average probability of obesity outcome for matched treated	.17	.13	.17	.13
Average probability of obesity outcome for matched control	.14	.10	.14	.13
Difference between the treated and controls	ATT = .03	ATT = .03	ATT = .03	ATT = –.00
	SE = .01	SE = .01	SE = .02	SE = .01
	$t = 2.63$	$t = 2.13$	$t = 2.06$	$t = -.17$
	$p < .01$	$p < .05$	$p < .05$	$p > .05$

Note: Estimates are for the full sample and based on $k = 1$ nearest-neighbor matching. Models using radius matching with calipers of .1, .01, and .001 produced similar results, even when constrained to the region of common support. Treatment and control groups are matched on race, nativity, age, family structure, parental education, income-to-poverty ratio, years at Wave I and III addresses, parental obesity, pubertal development, young adult attainments (education, relationship status, childrearing, employment, and income), Wave I self-rated health, desire to attend college, and neighborhood attachment, satisfaction, and desire to relocate. ATT = average treatment effect on the treated; SE = standard error.

Once controls are added in Model 2, only those women who consistently lived in poor neighborhoods have higher odds of being obese in formal adulthood than women who never live in poor neighborhoods.

In Panel B, results from Model 1 show that men who exited poor neighborhoods by Wave IV were less likely to be obese than men who never lived in neighborhood poverty. This difference is not robust to the addition of controls.

Sensitivity Analyses

While adjustments were made for confounding factors, residential self-selection could introduce bias. To investigate this, propensity-matched models are estimated for two sets of neighborhood poverty exposures: (1) consistently living in versus never living in neighborhood poverty and (2) consistently living in versus exiting neighborhood poverty. Results based on the full sample and $k = 1$ nearest-neighbor matching are shown in Table 5.

Results from propensity-matched models are consistent with the main findings. Those who consistently live in poor neighborhoods have a higher probability of becoming obese than those who never live in poor neighborhoods (Panel A) or those who exit them (Panel B). Results from Table 5 also show that consistent residence in poor neighborhoods is associated with a higher probability of being consistently obese relative to never living in neighborhood poverty (Panel A).

A second concern is that the operational definition of the exposure variable is based on a widely used but nevertheless arbitrary threshold for neighborhood poverty. To address this, a supplemental multinomial logistic model is estimated for the full sample using a Wave I to Wave III neighborhood poverty typology that includes neighborhood poverty rate thresholds, ranging from less than 10% to 30% or more, encountered in adolescence and young adulthood. For ease of interpretation, results from this model are shown in Figure 2.

The results are generally consistent with the main findings. For instance, those consistently living in neighborhoods with poverty rates exceeding 20% or 30% had higher probabilities of becoming obese than those consistently living in low-poverty neighborhoods. Figure 2 also shows that certain neighborhood poverty exits may curtail one's risk for becoming obese. Among those originating in the poorest neighborhoods, the probability of becoming obese is lower for those moving to a non-poor neighborhood by young adulthood versus those who remain in severely poor neighborhoods. Conversely, the probability of becoming obese is

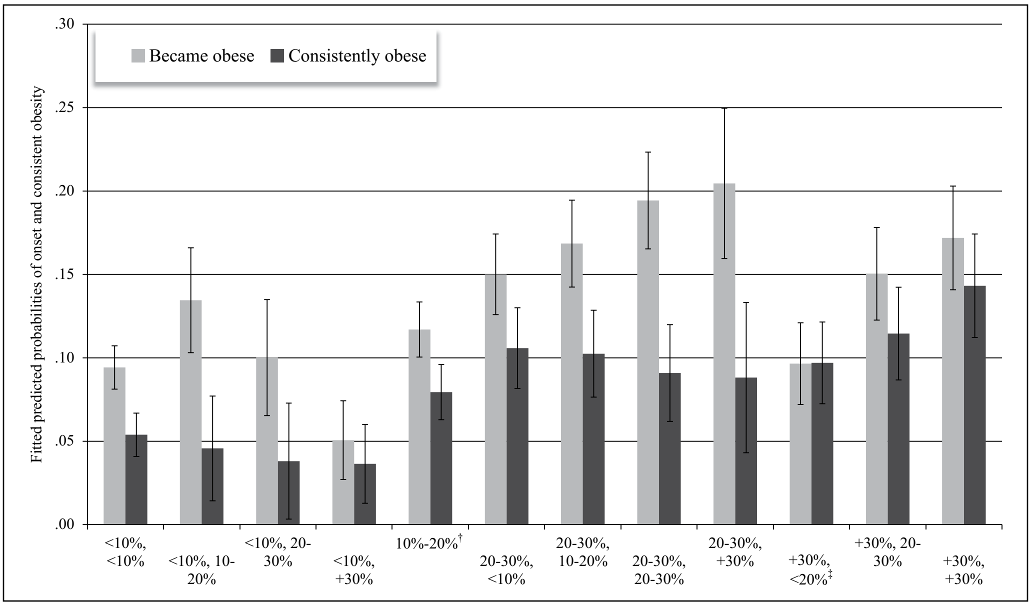

Figure 2. Predicted Average Probabilities of Becoming and Consistently Being Obese across Varying Thresholds of Wave I-to-Wave III Neighborhood Poverty Exposure (N = 12,164).

Note: Estimates are from multinomial logistic models based on the full sample and adjusted for race, nativity, age, family structure, parental education, income-to-poverty ratio, years at Wave I and III addresses, parental obesity, pubertal development, young adult attainments (education, relationship status, childrearing, employment, and income from wages), Wave I-to-Wave III breakfast skipping, and baseline and change measures of average daily sleep (in hours), exercise frequency (in average days per week), and screen time (in average weekly hours). The first and second percentages refer to respondents' Wave I and Wave III neighborhood poverty rates, respectively. Upper and lower 95% confidence intervals are shown with error bars.

†Includes all respondents who as adolescents lived in neighborhoods with poverty rates between 10% and 20%.

‡Includes all respondents who moved from neighborhoods with poverty rates +30% to neighborhoods with rates <20%.

not significantly lower for those exiting neighborhoods with poverty rates between 20% and 30% compared to those who remain in such neighborhoods or those who move to poorer places.

DISCUSSION

Recent studies find that adolescents from low-income neighborhoods have higher risks for becoming obese young adults than their peers from nonpoor communities (Burdette and Needham 2012; Lee et al. 2009; Nicholson and Browning 2012). However, it remains unclear whether adolescence is a sensitive period or if the link between neighborhood poverty and heightened risk for young adult obesity is characterized by cumulative processes. Additional knowledge gaps include ambiguity over how neighborhood poverty entries and exits are linked to obesity, how these patterns differ for young women compared to men, and whether health behaviors explain these associations.

The current study examined how the odds of becoming or being consistently obese varied for young women and men as a function of entering, exiting, or consistently living in poor and nonpoor neighborhoods during the transition to adulthood. Data from the National Longitudinal Study of Adolescent Health were used to address these questions and assess how baseline and change measures of multiple health behaviors explained the findings.

Consistent with the accumulation of risks perspective and Hypothesis 1, I found that those who consistently lived in poor neighborhoods were more likely to become obese young adults relative to those who never lived in a poor neighborhood or entered one by young adulthood. The risk for being consistently obese is also higher among those locked in low-income neighborhoods relative to those who never live in neighborhood poverty.

According to the social mobility perspective, adolescents who improve on their residential circumstances by moving from poor to nonpoor neighborhoods should bear lower risks for obesity than their counterparts who remain in poor neighborhoods (Hypothesis 2). Conversely, adolescents who experience downward residential mobility by moving from nonpoor to poor communities should have elevated risks relative to those who remain in nonpoor communities (Hypothesis 3/3a). The findings revealed qualified support for each of these scenarios. Adolescents from the poorest neighborhoods who as young adults lived in neighborhoods with < 20% poverty rates were less likely to become obese than their peers who remained in severely poor neighborhoods. Regarding downward residential mobility, youth from nonpoor communities were more likely to be obese in formal adulthood (Wave IV) if they shifted into *and remained in* low-income neighborhoods in adulthood.

Finally, I evaluated whether these patterns were different for young women versus men and whether adjustments for multiple health behaviors explained the association between neighborhood poverty and obesity. Consistent with Hypothesis 4, I found that women's risk for obesity varied more strongly across the neighborhood poverty typology compared to men. Adjustments for health behaviors attenuated the association between consistent neighborhood poverty exposure and the obesity outcomes, but only slightly.

The study has several noteworthy limitations. First, the dietary and physical activity measures need improvement. To the extent that long-term residence in poor neighborhoods is associated with obesity, it must be so through proximate mechanisms like diet and exercise. While the results here show robust effects net of health behaviors, this association may shift with improved measures of energy intake and expenditure. Additional mediating pathways could also include stress-related factors. Residents of poor neighborhoods report feeling trapped and present higher levels of distress than those from nonpoor neighborhoods (Ross, Reynolds, and Geis 2000). This could influence weight gain by affecting the body's energy utilization and fat deposition or by stimulating overeating. Research is needed on how stress-related factors are implicated in the link between neighborhood poverty and obesity.

Second, selection bias could remain problematic. Bias arising from residential self-selection was addressed using propensity matching. However, like all regression-based techniques, propensity matching is sensitive to omitted variable bias, and this may influence the results. Third, this study is focused on a limited moment in the life course, and it is unclear whether the cumulative function identified here is applicable to other stages in the life course—especially those occurring early in life. Indeed, findings from recent research suggest that body weight trajectories are established in early childhood (Cunningham, Kramer, and Narayan 2014).

Finally, the current study ignores how changing neighborhood conditions around stationary individuals influences obesity. The percentage of the study sample switching neighborhoods between adolescence and young adulthood (67%) is consistent with the high rate of residential mobility among this age group (Fischer 2002). But residential mobility is less common at earlier and later stages in life, and future research is needed to understand how changing neighborhood conditions coincide with weight changes. In light of these limitations, future work is needed to better understand how residential trajectories over the life course are implicated in body weight changes, the causal nature of such associations, and the mechanisms undergirding the link between neighborhood disadvantage and obesity.

Notwithstanding its limitations, this study demonstrates the importance of current as well as past residential circumstances to obesity and connects broader findings on the persistence of residential inequalities to health changes over the life course. Importantly, this study is among a few to illustrate the health consequences stemming from the durable residential inequalities characterizing the contemporary United States (Sharkey 2013). While such rigid inequalities are not often explicitly linked to population health disparities, the work presented here suggests that suboptimal housing outcomes for youth entering adulthood have important health consequences.

Encouragingly, the findings also show that escaping neighborhood distress by adulthood may curtail adolescents' risk for becoming obese young adults. Though this finding aligns with recent evidence from the five-city Moving to Opportunity Study (Ludwig et al. 2011), this study is the first to demonstrate the health-protective effects of neighborhood poverty exits among a nationally representative sample of youth entering adulthood. It also does so at a finer resolution of neighborhood poverty exposures, with thresholds of neighborhood poverty exposures ranging from <10% in the neighborhood poor to over 30% poor. As recently demonstrated elsewhere (Chetty, Hendren, and Katz 2015), the results here suggest that providing adolescents resources to improve their residential circumstances as they enter adulthood can have positive impacts on their life chances, including their health. More work is needed to better understand the health consequences that follow improvements to one's residential circumstances through residential relocation and housing voucher programs as well as programs intended to deconcentrate poverty and ameliorate unmet service needs of those living in low-income communities.

ACKNOWLEDGEMENTS

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill and funded by grant P01HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01HD31921 for this analysis. The author thanks Michelle Frisco, Jason Beckfield, and four anonymous reviewers for their valuable feedback and the Robert Wood Johnson Foundation Health & Society Scholars program for its financial support.

NOTES

1. Supplementary analyses using block groups yield results that are nearly identical to those shown here. Add Health does not account for intercensal boundary changes; thus, comparing the same tract over time is potentially problematic.
2. The category of individuals who were non-obese by Wave III includes a small number (192 cases, 1.5% of the entire sample) who went from an obese to non-obese status between waves. Within this small subgroup, the proportion experiencing any given neighborhood poverty exposure was not statistically different than those who were never obese. However, compared to those who were never obese, the group that went from obese in Wave I to non-obese in Wave III consisted of fewer females (38% vs 51%), more respondents with obese parent(s) (38% vs 20%), and lower income-to-poverty ratios (2.5 vs 3.2). Supplementary analyses omitting them entirely yielded results that are nearly identical to the main findings.
3. While anthropometric measurements are preferred, studies find strong correlations between the two, for example, Brener et al. (2003) and Struss (1999). Even so, supplemntary analyses were estimated using Wave II–Wave III measured heigh and weight. The results were substantively and statistically similar to the main findings.
4. Supplemental models adjust for lifetime residential mobility, school switching in adolescence, and living quarters in young adulthood (e.g., college dormitory, parents' or own home). Results were nearly identical to the findings presented here. Additional models remove current college students altogether, revealing similar results.
5. There was an average of 2.4 respondents per Wave III tract, and 28% of tracts had only one respondent, which caused estimation problems for cross-classified multilevel models.
6. Adjustments for health behaviors are not made due to considerable Wave III to Wave IV changes in health behavior measures.

REFERENCES

Acock, Alan C. 2005. "Working with Missing Values." *Journal of Marriage and the Family* 67(4):1012–28.

Anderson, Elijah. 1999. *Code of the Street: Decency, Violence, and the Moral Life of the Inner City*. New York: W.W. Norton & Company.

Barker, David. 1998. *Mothers, Babies, and Health in Later Life*. Edinburgh: Churchill Livingstone.

Ben-Shlomo, Yoav and Diana Kuh. 2002. "A Life Course Approach to Chronic Disease Epidemiology: Conceptual Models, Empirical Challenges and Interdisciplinary Perspectives." *International Journal of Epidemiology* 31(2):285–93.

Billy, John, Audra Wenzlow, and William Grady. 1997. *User Documentation for the Add Health Contextual Database*. Seattle: Battelle.

Bjorntorp, Per. 2001. "Do Stress Reactions Cause Abdominal Obesity and Comorbidities?" *Obesity Reviews* 2(2):73–86.

Boardman, Jason D., Jarron M. Saint Onge, Richard G. Rogers, and Justin T. Denney. 2005. "Race Differentials in Obesity: The Impact of Place." *Journal of Health and Social Behavior* 46(3):229–43.

Boone, Janne E., Penny Gordon-Larsen, Linda S. Adair, and Barry M. Popkin. 2007. "Screen Time and Physical Activity during Adolescence: Longitudinal Effects on Obesity in Young Adulthood." *International Journal of Behavioral Nutrition and Physical Activity* 4:26.

Brener, Nancy D., Tim McManus, Deborah A. Galuska, Richard Lowry, and Howell Wechsler. 2003. "Reliability and Validity of Self-reported Height and Weight among High School Students." *Journal of Adolescent Health* 32(4):281–87.

Brown, H. Shelton III, Adriana Perez, Gita G. Mirchandani, Deanna M. Hoelscher, and Steven H. Kelder. 2008. "Crime Rates and Sedentary Behavior among 4th Grade Texas School Children." *International Journal of Behavioral Nutrition and Physical Activity* 5:28.

Burdette, Amy M., and Belinda L. Needham. 2012. "Neighborhood Environment and Body Mass Index Trajectories from Adolescence to Adulthood." *Journal of Adolescent Health* 50(1):30–37.

Carvalho, Irene and Dan A. Lewis. 2003. "Beyond Community: Reactions to Crime and Disorder among Inner-city Residents." *Criminology* 41(3):779–812.

Centers for Disease Control and Prevention. 2003. "BMI-for-Age." Division of Nutrition and Physical Activity, Atlanta, GA. Unpublished manuscript.

Chang, Virginia W., Amy E. Hillier, and Neil K. Mehta. 2009. "Neighborhood Racial Isolation, Disorder and Obesity." *Social Forces* 87(4):2063–92.

Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz. 2015. "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment" (NBER working paper 21156). Cambridge, MA: Harvard University and National Bureau of Economic Research. Retrieved June 1, 2015 (http://www.nber.org/papers/w21156).

Chung, Chanjin and Samuel L. Myers. 1999. "Do the Poor Pay More for Food? An Analysis of Grocery Store Availability and Food Price Disparities." *Journal of Consumer Affairs* 33(2):276–96.

Clampet-Lundquist, Susan, Kathryn Edin, Jeffrey R. Kling, and Greg J. Duncan. 2011. "Moving Teenagers out of High-risk Neighborhoods: How Girls Fare Better Than Boys." *American Journal of Sociology* 116(4):1154–89.

Cohen, Sheldon, Denise Janicki-Deverts, Edith Chen, and Karen A. Matthews. 2010. "Childhood Socioeconomic Status and Adult Health." Pp. 37–55 in *Biology of Disadvantage: Socioeconomic Status and Health*, edited by N. E. Adler and J. Stewart. New York: Wiley.

Cole, Tim J., Mary C. Bellizzi, Katherine M. Flegal, and William H. Dietz. 2000. "Establishing a Standard Definition for Child Overweight and Obesity Worldwide: International Survey." *British Medical Journal* 320(7244):1240–43.

Cunningham, Solveig A., Michael R. Kramer, and K. M. Venkat Narayan. 2014. "Incidence of Childhood Obesity in the United States." *New England Journal of Medicine* 370(5):403–11.

Dannefer, Dale. 2003. "Cumulative Advantage/Disadvantage and the Life Course: Cross-fertilizing Age and Social Science Theory." *Journals of Gerontology Series B-Psychological Sciences and Social Sciences* 58:S327–37.

De Vriendt, Tineke, Luis A. Moreno, and Stefaan De Henauw. 2009. "Chronic Stress and Obesity in Adolescents: Scientific Evidence and Methodological Issues for Epidemiological Research." *Nutrition Metabolism and Cardiovascular Diseases* 19(7):511–19.

Diez-Roux, Ana V., F. Javier Nieto, Laura Caulfield, Hermann A. Tyroler, Robert L. Watson, and Moyses Szklo. 1999. "Neighborhood Differences in Diet: The Atherosclerosis Risk in Communities (ARIC) Study." *Journal of Epidemiololgy and Community Health* 53(1):55–63.

DiPrete, Thomas A., and Gregory M. Eirich. 2006. "Cumulative Advantage as a Mechanism for Inequality: A Review of Theoretical and Empirical Developments." *Annual Review of Sociology* 32:271–97.

Dowd, Jennifer B., Anna Zajacova, and Allison Aiello. 2009. "Early Origins of Health Disparities: Burden of Infection, Health, and Socioeconomic Status in US Children." *Social Science & Medicine* 68(4):699–707.

Estabrooks, Paul A., Rebecca E. Lee, and Nancy C. Gyurcsik. 2003. "Resources for Physical Activity Participation: Does Availability and Accessibility Differ by Neighborhood Socioeconomic Status?" *Annals of Behavioral Medicine* 25(2):100–04.

Ferraro, Kenneth F., and Jessica A. Kelley-Moore. 2003. "Cumulative Disadvantage and Health: Long-term Consequences of Obesity?" *American Sociological Review* 68(5):707–29.

Fischer, Claude S. 2002. "Ever-more Rooted Americans." *City & Community* 1(2):177–98.

Franzini, L., W. Taylor, M. N. Elliott, P. Cuccaro, S. R. Tortolero, M. J. Gilliland, J. Grunbaum, and M. A. Schuster. 2010. "Neighborhood Characteristics Favorable to Outdoor Physical Activity: Disparities by Socioeconomic and Racial/Ethnic Composition." *Health & Place* 16(2):267–74.

Frisco, Michelle L., Jason N. Houle, and Adam M. Lippert. 2013. "Weight Change and Depression among US Young Women during the Transition to Adulthood." *American Journal of Epidemiology* 178(1):22–30.

Galobardes, B., J. W. Lynch, and G. D. Smith. 2004. "Childhood Socioeconomic Circumstances and Cause-specific Mortality in Adulthood: Systematic Review and Interpretation." *Epidemiologic Reviews* 26:7–21.

Gordon-Larsen, Penny, Linda S. Adair, Melissa C. Nelson, and Barry M. Popkin. 2004. "Five-year Obesity Incidence in the Transition Period between Adolescence and Adulthood: The National Longitudinal Study of Adolescent Health." *American Journal of Clinical Nutrition* 80(3):569–75.

Gordon-Larsen, Penny, Melissa C. Nelson, Phil Page, and Barry M. Popkin. 2006. "Inequality in the Built Environment Underlies Key Health Disparities in Physical Activity and Obesity." *Pediatrics* 117(2):417–24.

Haas, Steven A. 2006. "Health Selection and the Process of Social Stratification: The Effect of Childhood Health on Socioeconomic Attainment." *Journal of Health and Social Behavior* 47(4):339–54.

Hallqvist, Johan, John Lynch, Mel Bartley, Thierry Lang, and David Blane. 2004. "Can We Disentangle Life Course Processes of Accumulation, Critical Period and Social Mobility? An Analysis of Disadvantaged Socio-economic Positions and Myocardial Infarction in the Stockholm Heart Epidemiology Program." *Social Science & Medicine* 58(8):1555–62.

Harris, Kathleen Mullan. 2010. "An Integrative Approach to Health." *Demography* 47(1):1–22.

Harris, Kathleen M. 2011. "Design Features of Add Health." Retrieved February 11, 2013 (http://www.cpc.unc.edu/projects/addhealth/data/guides/).

Hayward, Mark D., and Bridget K. Gorman. 2004. “The Long Arm of Childhood: The Influence of Early-life Social Conditions on Men’s Mortality.” *Demography* 41(1):87–107.

Hertzman, Clyde, Chris Power, Sharon Matthews, and Orly. Manor. 2001. “Using an Interactive Framework of Society and Lifecourse to Explain Self-rated Health in Early Adulthood.” *Social Science & Medicine* 53(12):1575–85.

House, James S., James M. Lepkowski, Ann M. Kinney, Richard P. Mero, Ronald C. Kessler, and A. Regula Herzog. 1994. “The Social Stratification of Aging and Health.” *Journal of Health and Social Behavior* 35(3):213–34.

Jackson, James S., Katherine M. Knight, and Jane A. Rafferty. 2010. “Race and Unhealthy Behaviors: Chronic Stress, the HPA Axis, and Physical and Mental Health Disparities over the Life Course.” *American Journal of Public Health* 100(5):933–39.

Jargowsky, Paul and Mary Jo Bane. 1991. “Ghetto Poverty in the United States, 1970 to 1980.” Pp. 235–73 in *The Urban Underclass*, edited by C. Jencks and P. E. Peterson. Washington, DC: Brookings Institution.

Kahn, Joan R., and Leonard I. Pearlin. 2006. “Financial Strain over the Life Course and Health among Older Adults.” *Journal of Health and Social Behavior* 47(1):17–31.

Kling, Jeffrey, Jeffrey Liebman, Lawrence Katz, and Lisa Sanbonmatsu. 2004. *Moving to Opportunity and Tranquility: Neighborhood Effects on Adult Economic Self-sufficiency and Health from a Randomized Housing Voucher Experiment*. Cambridge, MA: NBER and Harvard University.

Langenberg, Claudia, Rebecca Hardy, Diana Kuh, Eric Brunner, and Michael Wadsworth. 2003. “Central and Total Obesity in Middle Aged Men and Women in Relation to Lifetime Socioeconomic Status: Evidence from a National Birth Cohort.” *Journal of Epidemiology and Community Health* 57(10): 816–22.

Larson, Nicole I., Mary T. Story, and Melissa C. Nelson. 2009. “Neighborhood Environments Disparities in Access to Healthy Foods in the US.” *American Journal of Preventive Medicine* 36(1):74–81.

Lee, Hedwig, Kathleen M. Harris, and Penny Gordon-Larsen. 2009. “Life Course Perspectives on the Links between Poverty and Obesity during the Transition to Young Adulthood.” *Population Research and Policy Review* 28(4):505–32.

Ludwig, Jens, Lisa Sanbonmatsu, Lisa Gennetian, Emma Adam, Greg J. Duncan, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, Stacy Tessler Lindau, Robert C. Whitaker, and Thomas W. McDade. 2011. “Neighborhoods, Obesity, and Diabetes—A Randomized Social Experiment.” *New England Journal of Medicine* 365(16):1509–19.

McNeill, Lorna Haughton, Matthew W. Kreuter, and S. V. Subramanian. 2006. “Social Environment and Physical Activity: A Review of Concepts and Evidence.” *Social Science & Medicine* 63(4):1011–22.

Mirowsky, John., and Catherine E. Ross. 2003. *Education, Social Status and Health*. New York: Walter de Gruyter, Inc.

Mitchell, Jonathan A., Daniel Rodriguez, Kathryn H. Schmitz, and Janet Audrain-McGovern. 2013. “Greater Screen Time Is Associated with Adolescent Obesity: A Longitudinal Study of the BMI Distribution from ages 14 to 18.” *Obesity* 21(3):572–75.

Morland, Kimberly, Steve Wing, Ana D. Roux, and Charles Poole. 2002. “Neighborhood Characteristics Associated with the Location of Food Stores and Food Service Places.” *American Journal of Preventive Medicine* 22(1):23–29.

Mota, Jorge, Mariana Almeida, Paula Santos, and José C. Ribeiro. 2005. “Perceived Neighborhood Environments and Physical Activity in Adolescents.” *Preventive Medicine* 41(5–6):834–36.

Mujahid, Mahasin S., Ana V. Diez Roux, Mingwu Shen, Deepthiman Gowda, Brisa Sanchez, Steven Shea, David R. Jacobs Jr., and Sharon A. Jackson. 2008. “Relation between Neighborhood Environments and Obesity in the Multi-ethnic Study of Atherosclerosis.” *American Journal of Epidemiology* 167(11):1349–57.

Nicholson, Lisa M., and Christopher R. Browning. 2012. “Racial and Ethnic Disparities in Obesity during the Transition to Adulthood: The Contingent and Nonlinear Impact of Neighborhood Disadvantage.” *Journal of Youth and Adolescence* 41(1):53–66.

Niemeier, Heather M., Hollie A. Raynor, Elizabeth E. Lloyd-Richardson, Michelle L. Rogers, and Rena R. Wing. 2006. “Fast Food Consumption and Breakfast Skipping: Predictors of Weight Gain from Adolescence to Adulthood in a Nationally Representative Sample.” *Journal of Adolescent Health* 39(6):842–49.

Ogden, Cynthia L., Margaret D. Carroll, Lester R. Curtin, Molly M. Lamb, and Katherine M. Flegal. 2010. “Prevalence of High Body Mass Index in US Children and Adolescents, 2007–2008.” *Jama-Journal of the American Medical Association* 303(3):242–49.

Patel, Sanjay R., and Frank B. Hu. 2008. “Short Sleep Duration and Weight Gain: A Systematic Review.” *Obesity* 16(3):643–53.

Petersen, Anne C., Lisa Crockett, Maryse Richards, and Andrew Boxer. 1988. “A Self-report Measure of Pubertal Status: Reliability, Validity, and Initial Norms.” *Journal of Youth and Adolescence* 17(2):117–33.

Robert, Stephanie A., 1999. “Socioeconomic Position and Health: The Independent Contribution of Community Socioeconomic Context.” *Annual Review of Sociology* 25:489–516.

Robert, Stephanie A. and Eric N. Reither. 2004. “A Multilevel Analysis of Race, Community Disadvantage, and Body Mass Index among Adults in the US.” *Social Science & Medicine* 59(12):2421–34.

Ross, Catherine E., John R. Reynolds, and Karlyn J. Geis. 2000. “The Contingent Meaning of Neighborhood Stability for Residents’ Psychological Well-being.” *American Sociological Review* 65(4):581–97.

Ross, Catherine E., and Chia-Ling Wu. 1996. "Education, Age, and the Cumulative Advantage in Health." *Journal of Health and Social Behavior* 37(1):104–20.

Royston, Patrick. 2004. "Multiple Imputation of Missing Values." *Stata Journal* 4(3):227–41.

Ruel, Erin, Eric N. Reither, Stephanie A. Robert, and Paula M. Lantz. 2010. "Neighborhood Effects on BMI Trends: Examining BMI Trajectories for Black and White Women." *Health & Place* 16(2):191–98.

Schnittker, Jason and Jane D. McLeod. 2005. "The Social Psychology of Health Disparities." *Annual Review of Sociology* 31:75–103.

Sharkey, Patrick. 2012. "Temporary Integration, Resilient Inequality: Race and Neighborhood Change in the Transition to Adulthood." *Demography* 49(3): 889–912.

Sharkey, Patrick. 2013. *Stuck in Place: Urban Neighborhoods and the End of Progress toward Racial Equality*. Chicago: University of Chicago Press.

Singh, Gopal K., and Mary K. Kenney. 2013. "Rising Prevalence and Neighborhood, Social, and Behavioral Determinants of Sleep Problems in US Children and Adolescents, 2003–2012." *Sleep Disorders*. Retrieved January 14, 2016 (http://www.hindawi.com/journals/sd/2013/394320/).

South, Scott J., and Kyle D. Crowder. 1997. "Escaping Distressed Neighborhoods: Individual, Community, and Metropolitan Influences." *American Journal of Sociology* 102(4):1040–84.

Strauss, Richard S. 1999. "Comparison of Measured and Self-reported Weight and Height in a Cross-sectional Sample of Young Adolescents." *International Journal of Obesity* 23(8):904–08.

Stringhini, Silvia, Aline Dugravot, Martin Shipley, Marcel Goldberg, Marie Zins, Michael Kivimaki, Michael Marmot, Séverine Sabia, and Archana Singh-Manoux. 2011. "Health Behaviours, Socioeconomic Status, and Mortality: Further Analyses of the British Whitehall II and the French GAZEL Prospective Cohorts." *PLoS Med* 8(2):e1000419.

Swisher, Raymond R. 2009. *Add Health Wave III Contextual Database*. Chapel Hill, NC: Carolina Population Center.

Swisher, Raymond R., Danielle C. Kuhl, and Jorge M. Chavez. 2013. "Racial and Ethnic Differences in Neighborhood Attainments in the Transition to Adulthood." *Social Forces* 91(4):1399–428.

Timberlake, Jeffery M. 2007. "Racial and Ethnic Inequality in the Duration of Children's Exposure to Neighborhood Poverty and Affluence." *Social Problems* 54(3):319–42.

U.S. Surgeon General. 2007. *Overweight and Obesity: Health Consequences*. Rockville, MD: United States Department of Health and Human Services.

Weir, Lori A., Debra Etelson, and Donald A. Brand. 2006. "Parents' Perceptions of Neighborhood Safety and Children's Physical Activity." *Preventive Medicine* 43(3):212–17.

Wheaton, Blair and Philippa Clarke. 2003. "Space Meets Time: Integrating Temporal and Contextual Influences on Mental Health in Early Adulthood." *American Sociological Review* 68(5):680–706.

Williams, David R. 2003. "The Health of Men: Structured Inequalities and Opportunities." *American Journal of Public Health* 93(5):724–31.

Wilson, Dawn K., Karen A. Kirtland, Barbara E. Ainsworth, and Cheryl L. Addy. 2004. "Socioeconomic Status and Perceptions of Access and Safety for Physical Activity." *Annals of Behavioral Medicine* 28(1):20–28.

Wilson, William J. 1987. *The Truly Disadvantaged*. Chicago: University of Chicago Press.

Yen, Irene H., and George A. Kaplan. 1998. "Poverty Area Residence and Changes in Physical Activity Level: Evidence from the Alameda County Study." *American Journal of Public Health* 88(11):1709–12.

AUTHOR BIOGRAPHY

Adam M. Lippert is an Assistant Professor of Sociology at the University of Colorado Denver. His research focuses on how neighborhoods and schools influence health, the transition to adulthood, and the health consequences of work and family circumstances. His work has appeared in *Social Science & Medicine, Health & Place*, and the *American Journal of Epidemiology.*