Residential Mobility and Trajectories of Adiposity among Adolescents in Urban and Non-urban Neighborhoods

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ABSTRACT *Using data from the 1994–2008 National Longitudinal Study of Adult Health (Add Health), this research examines the relationship between residential mobility and weight gain over time among urban and non-urban young adults. It is theorized that changes in residence act as a barrier to achieving an active lifestyle, which would increase an individual's body mass index (BMI) over time. Relying on linear mixed-effects growth curve models, the results indicate that mobility is protective against weight gain over time after controlling for sociodemographic characteristics. For young adults who are residentially stable in urban neighborhoods, increases in physical activity are associated with a linear decline in BMI. In non-urban areas where respondents are residentially mobile, body weight does not fluctuate as sedentary behavior increases. However, in those areas, weight increases as sedentary behavior increases for those who did not move. Overall, the results suggest that the effect of mobility on weight gain is partially due to the kind of health behaviors that one engages in as well as whether or not one lives in an urban area. Policies geared toward relocating residents (such as Moving to Opportunity), and neighborhood processes that can lead individuals to change residences (such as foreclosures or gentrification) may have adverse health effects depending on whether they are occurring in urban or non-urban areas.*

KEYWORDS *Active lifestyle, Body mass index, Mobility, Neighborhoods, Obesity, Sedentary behavior*

INTRODUCTION

Obesity in childhood and young adulthood remains a critical public health concern in the USA. Recent estimates suggest that, while the obesity pandemic is showing some signs of decline, over 16.9 % of children age 2–19 years are obese and another 14.9 % are at risk of being obese.¹ The consequences of being obese during childhood are well-established: obese children have elevated risks of other co-morbidities in childhood such as type II diabetes.^{2,3} Socially, obese children are also likely to be targets of early and systematic social discrimination, which could hinder a child's social and academic development.⁴ Moreover, obese children and adolescents have high risks of being obese in adulthood,⁵ and adult obesity is likely to be more severe the earlier the onset of obesity during childhood.⁶

Within the public health and medical literature, obesity is presented as a function of caloric intake and expenditure. Sedentary lifestyle and unhealthy dietary behaviors are often used as explanations for the rise in obesity in the USA and

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worldwide.⁷ These mechanisms are seen as modifiable risk factors that could assist in reversing the obesity pandemic. However, these risk factors are more concentrated in disadvantaged populations within the USA, particularly in households with low financial and social capital, as well as racial and ethnic minority families.^{8,9}

Residential mobility is also related to the socioeconomic well-being of the household. That is, the propensity to relocate is largely predicated on the extent to which individuals have the means either to maintain their current residence or to afford the costs of moving. Thus, changes in residence can be a sign of high or low socioeconomic status (SES). In the former case, residential mobility can be indicative of upward economic mobility, as with the mass migration of white families to the newly created suburbs during the 1940s and 1950s. These families were able to increase their socioeconomic status through the Serviceman's Readjustment Act, which, among other things, provided vocational and college education to World War II veterans, 1-year unemployment compensation, and low-interest loans to buy homes and start businesses with no money down.¹⁰ Conversely, residential mobility can also signal downward economic mobility. It is well-established that gentrification and some revitalization efforts have inevitably led to individuals being priced out of their homes and subsequently having to relocate to properties in different neighborhoods where housing costs are more affordable.¹¹ In addition, the demolition of housing projects (such as Pruitt-Igoe in St. Louis, Missouri) that are replaced with housing that cannot accommodate those who are displaced suggests that some individuals have to look elsewhere for housing.¹²

Regardless of the reason, residential mobility is quite common in the USA. Panel data from 1960 to 1994 indicates that nearly 17 % of children ages 2–18 years moved in the previous year.¹³ Further, a recent Census brief reports an estimated 46 % of individuals (ages 5 or older) did not live in the same residence continuously between 1995 and 2000.¹⁴

The impact that these residential transitions have on health, if any, is largely unknown. However, constant moving itself (known as instability) is associated with many deleterious health outcomes. Much of the residential stability research analyzes child outcomes such as alcohol/drug use,¹⁵ behavioral problems,¹⁶ cognitive competence,¹⁷ emergency department visits,¹⁸ juvenile delinquency,¹⁹ self-reported health,²⁰ and teenage pregnancy.²¹ Findings almost always suggest that residential instability is detrimental to adolescent health,²² and these effects can be traced back to in utero transitions.²³ In addition, recent research suggests that mobility is associated with increased cortisol levels in the body, which affect weight gain.²⁴ Mobility may also disrupt familiar spatial environments, social relationships, and social institutions such as neighborhood groups.²⁵

Although common, residential relocation itself is not innately negative. An estimated 15–20 % of the US population moves into a different home each year.²⁶ However, most studies suggest that residential mobility is only associated with poor health outcomes where poverty is also involved, and a large number of movers are renters living in households with less than US\$25,000 in annual incomes.²⁶ Thus, the relationship between residential instability and poor health may reflect socioeconomic disadvantage that the family faces rather than some underlying process or condition associated with mobility in general.

Residential mobility is conditioned on internal migration patterns and social processes. Short-distance moves in urban areas redistribute local populations based on housing demand, which could influence transportation flows and development patterns within the city.²⁷ Additionally, gentrification, neighborhood revitalization

efforts, and the recent foreclosure crisis (particularly in urban areas) each have the potential negative ramification of uprooting low SES individuals and forcing displacement and residential mobility.²⁸ Very differently, mobility programs such as the Gautreaux program in Chicago, the Moving to Opportunity (MTO) program, and the recent HOPE VI redevelopment project may promote positive outcomes for low-SES individuals who move from areas of high poverty and high racial/ethnic concentration into areas that are less poor and more ethnically diverse.²⁹ While research is emerging on some of these recent mobility and neighborhood revitalization programs, evidence of the benefits of these programs is mixed. Oakley and Burchfield found that individuals living in high-poverty areas who were a part of a public housing relocation program in Chicago were likely to move to areas that also had high poverty rates.³⁰ Contrarily, Ludwig and colleagues found that adult women who moved through the MTO program had a lower prevalence of obesity than those who did not move.³¹ For children, research from the MTO program suggests that mobility was not associated with any physical health benefits, but there were positive mental health outcomes for girls but not for boys.³² More generally, the social policies and processes that have affected relocation efforts in urban neighborhoods may have consequences on the health of residents in those areas.

The purpose of this research is to disentangle the connections between residential mobility, socioeconomic status, urbanicity, and health behaviors and to discover how these are linked to weight gain over time. Three research questions are answered. First, how does residential mobility affect weight gain over time? Second, does mobility have an effect on weight gain because individuals who relocate also engage in negative health behaviors? Third, does the trajectory of weight gain differ among urban and non-urban residents? Answering these questions could help health and housing policymakers to develop policies that yield better health outcomes.

METHODS

The National Longitudinal Study of Adult Health (Add Health) contains a nationally representative sample of adolescents in grades 7–12 who were followed from 1994 to 2009. At the first wave of data collection in 1994–1995, there were 20,745 adolescents in the core sample, with an oversampling of specific Asian and Hispanic groups.³³ The Add Health cohort has been followed into young adulthood with in-home interviews that took place in 1994–1995 (wave I), 1996 (wave II), 2001–2002 (wave III), and 2008–2009 (wave IV). At the last wave of data collection, the respondents' ages ranged from 24 to 32 years. Age, measured in years, is the time unit used in the analyses.

Measures

Body Mass Index. At each wave of data, respondents were asked to provide their height and weight measurements. Using the Centers for Disease Control and Prevention guidelines for measuring adiposity, body mass index (BMI) was calculated by dividing the weight by the square of the height. This value was then multiplied by 703. Over the course of the four waves, an overwhelming number of participants became adults (i.e., turned 18 years old). While it is conventional to use an adjusted BMI z-score in order to account for age- and gender-based development among children, the current study uses unadjusted BMI. This strategy makes the dependent variable comparable across the four waves. At present, no studies have calculated z-scores for adult BMI that could mimic the z-score calculation available for children less than 18 years of age, ruling out use of the z-scores to compare

individuals who are less than or greater than age 18. In addition, some research suggests the standardized z-score may not accurately reflect change in weight gain among children.³⁴

Residential Mobility. As the key independent measure in this research, residential mobility is defined as whether the respondent changed residences by the start of each of the four waves. There may be heterogeneity in the kind of movement experienced. That is, respondents could have moved across the street or to a different neighborhood, city, county, state, or region. While the type of move is important, this research focuses on whether mobility itself is associated with an elevated risk of gaining excess weight.

Health Behaviors. The active lifestyle scale is a count of the number of times in the previous week that the respondent roller-bladed, roller-skated, skate-boarded, bicycled, played an active sport (e.g., baseball, softball, basketball, soccer, swimming, football), and exercised (e.g., jogging, walking, karate, jumping rope, gymnastics, dancing). Higher values on this scale suggest an active lifestyle. Across the four waves of data, the lowest Cronbach's alpha for the scale is 0.5, suggesting an acceptable result for internal consistency of the items in the scale and therefore internal validity.³⁵ In addition, to assess sedentary behavior, respondents were asked the number of hours per week spent watching television and videos. The lowest Cronbach's alpha for this two-item scale across all four waves is 0.7, suggesting that the scale is valid construct for assessing sedentary behavior based on the two measures.

Sociodemographic Characteristics. Gender and race (white, black, Hispanic, and "other") are demographic controls used in this research. The socioeconomic index, derived from the work of Bearman and Moody,³⁶ uses parent education and occupational status as of wave I, to create a scale which ranges from 1 (low family SES) to 10 (high family SES). The number of children in the household (not including the respondent) is taken from the household roster. Anyone currently in the household who is less than 18 years old is considered to be a child and is counted as such. For self-reported health, respondents were asked at each wave to rate their health on a five-point Likert scale with the values of "excellent," "very good," "good," "fair," and "poor." Much research suggests that self-reported health is a valid measure of actual health among adolescents.³⁷ In addition, respondents were asked if they are doing anything proactive with their weight. Specifically, the respondents indicated if they were trying to lose weight, trying to gain weight, trying to maintain their current weight, or doing nothing with their weight; these are converted into dummy variables with "doing nothing" serving as the omitted category for analysis.

Sample

Of the 20,745 adolescents in the core sample, 15,701 or 75.7 % responded in all four waves of data collection. That balanced panel of respondents is used for all analyses that follow.

Table 1 presents the baseline characteristics (i.e., wave I) for the unweighted sample. The average body mass index (BMI) is 22.6. According to the Centers for Disease Control and Prevention's guidelines, the average BMI corresponds to a person who is of normal weight.³⁸ The average age is 16.2 years. Around 81 % had

TABLE 1 Baseline characteristics for the National Longitudinal Study of Adult Health (n=20,175)

	Mean or percentage	SD	Range
Body mass index ^a	22.6	(4.5)	[11.2, 63.5]
Time (measured by age in years) ^a	16.2	(1.7)	[12, 21]
Mobility ^a	81.4 %		
Health behaviors			
Active lifestyle scale ^a	1.3		[0, 3]
Sedentary behavior scale ^a	31.7		[0, 150]
Sociodemographic characteristics			
Male	49.5 %		
Race/ethnicity			
White	50.4 %		
Black	22.5 %		
Hispanic	17.0 %		
Other	10.0 %		
Socioeconomic index	5.5	(2.7)	[1, 10]
Number of children in household	1.3	(1.3)	[0, 11]
Self-reported health			
Excellent ^a	28.2 %		
Very good ^a	39.1 %		
Good ^a	25.6 %		
Fair ^a	6.6 %		
Poor ^a	0.5 %		
Current weight management			
Trying to lose weight	34.3 %		
Trying to gain weight	19.6 %		
Trying to maintain weight	34.3 %		
Doing nothing	11.8 %		
Urban resident	57.3 %		

^aPresented for baseline, but modeled as a time-varying variable

moved prior to the first wave of data collection. This level of mobility is much higher than national estimates,³⁹ indicating that this sample is over-representing individuals who are likely to have experienced a change in residence.

Regarding health behaviors, the average score on the active lifestyle scale is 1.3. Moreover, for the sedentary behavior scale, the mean value is 31.7. In general, this sample engages in near-average active behaviors but has a considerable amount of sedentary behavior as well.

Roughly half of the respondents (49.5 %) are male. Half of the sample (50.4 %) is white, while 22.5 % are black, 17 % are Hispanic, and 10 % are of some other race. The mean value on the socioeconomic index is 5.5. On average, there are 1.3 children in the household (other than respondent) at baseline.

While the majority of the sample report that they have very good or excellent health (67.3 %), over a quarter of the respondents report good health (25.6 %) and around 6 % report fair health. Less than 1 % report being of poor health (0.5 %). Over one third of the sample are likely to manage their weight by trying to lose it (34.3 %). Another third are likely to manage their weight by just maintaining it (34.3 %). Still, a sizable number of individuals are trying to gain weight (19.6 %), and one in eleven are doing nothing about their weight (11.8 %).

Urban, according to 1990 and 2000 US Bureau of the Census classification, is defined as, “all territory, population, and housing units located within an urbanized area (UA) or an urban cluster (UC).”⁴⁰ A sizable majority of the sample (57.3 %) lived in urban areas at the initial survey date.

Analytical Strategy

To account for the complex survey design, the multivariate analyses are weighted using appropriate longitudinal weights. Information on the procedures for weighting Add Health data to be representative of the general population is publicly available.⁴¹ To analyze BMI over time, multivariate growth curve analyses were performed and the unstandardized coefficients of change were estimated. Analyses were performed using the “xtmixed” command in Stata 13.1. This procedure is designed to capture fixed or between-individual effects, such as SES, as well as time-varying or within-individual effects, such as residential mobility, while accounting for the complex survey design in estimating the standard errors. The regressions start with inclusion of the key variables of interest. The health behavior controls are then introduced, followed by the inclusion of a variety of controls, before testing for interaction effects. In addition, the complete model is then run separately for urban and non-urban respondents.

RESULTS

Table 2 reports the coefficients and significance tests of the linear mixed-effects growth curve models that predict BMI over time. In analyses not shown, the functional form for time (proxied by age) best fits a linear growth trajectory, although other functional forms were tested (exponential, logarithmic, quadratic, cubic, and spline). Model 1 includes the time and mobility measures in order to see how mobility affects BMI growth. Model 1 intuitively suggests that increases in age correspond to a higher BMI over time. Also, net of age, residential movement across waves is associated with a 0.2 decline in the average BMI over time.

Model 2, which introduces health behavioral measures to the previous model, suggests similar effects that mobility and age have on BMI over time. That is, net of active lifestyle and sedentary behaviors, increases in age are associated with higher BMI while increases in mobility are associated with lower BMI over time. Intuitively, increases in behaviors associated with activity correspond to significant declines in BMI, and increases in sedentary behaviors are associated with an increase in BMI over time.

In order to see if these relationships are functions of the characteristics of the individuals, sociodemographic variables are added to yield Model 3. In this model, the same relationships between the covariates in the previous models remain. That is, age and sedentary behavior are both associated with increases in BMI over time, and mobility and active lifestyle behaviors correspond to decreases in BMI. These relationships are statistically significant after controlling for the sociodemographic characteristics of the sample.

The sociodemographic characteristics also predict BMI over time. Being a male is associated with 1.6 points higher BMI, relative to being a female. Compared to whites, blacks score 1.3 points higher on their BMI score. Each additional child in the household corresponds to a 0.2-point decline in BMI. Relative to being in excellent health, individuals who rate their health as very good, good, fair, or poor have higher BMI scores. Also, compared to individuals who are doing nothing about

TABLE 2 Linear mixed-effects growth curve models predicting BMI over time

	Model 1	Model 2	Model 3	Model 4
Time (measured by age in years) ^a	0.45***	0.45***	0.42***	0.41***
Mobility ^a	−0.22***	−0.35***	−0.27***	−0.73**
Health behaviors				
Active lifestyle scale ^a		−0.16**	−0.15**	−0.04
Sedentary behavior scale ^a		0.01***	0.01**	0.01*
Sociodemographic characteristics				
Male			1.60***	1.59***
Race/ethnicity (white)				
Black			1.31***	1.30***
Hispanic			0.39	0.39
Other			−0.44	−0.45
Socioeconomic index			−0.06	−0.06
Number of Children in Household			−0.23***	−0.23***
Self-reported health (excellent)				
Very good ^a			0.68***	0.66***
Good ^a			1.85***	1.84***
Fair ^a			3.08***	3.07***
Poor ^a			4.26***	4.21***
Current weight management (do nothing)				
Trying to lose weight			−1.15***	−1.16***
Trying to gain weight			4.99***	4.99***
Trying to maintain weight			0.60**	0.60**
Interactions				
Mobility×active lifestyle scale				0.46**
Mobility×sedentary behavior scale				−0.01
Constant	15.62***	15.42***	12.82***	13.07***
−2 Log pseudolikelihood	41,664,550	39,077,352	14,492,695	14,489,753
Wald χ^2	1,907.93***	2,015.94***	2,823.39***	2,998.95***

National Longitudinal Study of Adult Health, waves 1–4. Contrast categories are in parentheses

^aIndicates the variable is time-varying

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

weight management, those who are trying to lose weight have BMI scores that are 1.2 points lower. Those who are trying to gain weight have BMI scores that are 5 points higher, while individuals who are trying to maintain their current weight have BMI scores that are 0.6 points higher compared to those who are doing nothing about their weight (the omitted category).

In the last model of Table 2, interaction terms are added to explore if the relationship between mobility and BMI over time varies based on the levels of active and sedentary behavior, net of sociodemographic characteristics. Model 4 suggests no change in the statistical significance or direction of the covariates presented in the previous model, with the exception that the active lifestyle scale is no longer significant. However, the interaction between active lifestyle scale and mobility is significant. Figure 1 shows the estimated BMI trajectory for the interaction of mobility and active lifestyle. At lower levels of activity (i.e., when activity levels are at 0), BMI is higher among those individuals who are residentially stable and lower for individuals who experience residential mobility. However, at high levels of physical activity, the relationship is reversed. Thus, for respondents who are not

FIG. 1 Predicted BMI score trajectory for mobile and non-mobile respondents at all levels of activity.

residentially mobile, increases in activity are associated with a linear decline in BMI over time. However, for individuals who move residences, increases in activity are associated with a sharp increase in BMI.

A stratified analysis by urbanicity is presented in Table 3. In auxiliary analyses, a dichotomous variable for urban neighborhood was entered into the model as well as interaction terms with that urban variable. The model maintained its statistical significance, but the main effect of living in an urban area was not significant, and only some interactions were significant. Further, a variation of the Chow test⁴² was performed to see if the interaction terms as a collective were significant. The *p* value for this test was 0.051, suggesting only minimal differences across urban and non-urban settings. Nonetheless, stratified models were created to see if individuals in urban and non-urban locales yield different results.

Most of the covariates are similar across the full model for urban and non-urban residents. Yet, four important differences should be noted. First, in non-urban contexts, being Hispanic or a member of the other racial/ethnic category is associated with higher BMIs relative to whites; being Hispanic increases BMI by 1 point while being from another racial/ethnic minority is associated with a 2.0-point increase in BMI in non-urban locales. Second, the relationship between number of children in the household and BMI over time is driven by those individuals who live in urban areas. That is, additional children in the household have no effect on BMI in non-urban contexts, but each additional child is associated with a 0.2-point decline in BMI for urban residents. Third, the higher BMI trajectory for individuals who are trying to maintain weight relative to individuals who are doing nothing about their weight is also an urban effect. To elaborate, BMI increases by 0.6 for urban individuals who are trying to maintain their weight relative to those who are intentionally doing nothing about their current weight. The BMI trajectory remains the same for non-urban individuals who are trying to maintain their weight and those who are doing nothing about their current weight.

Lastly, while the interaction between mobility and active lifestyle for urban and non-urban residents remains the same in Table 3, a new interaction emerges as

TABLE 3 Stratified linear mixed-effects growth curve models predicting BMI over time for urban and non-urban residents

	Urban	Non-urban
Time (measured by age in years) ^a	0.41***	0.45***
Mobility ^a	−0.73**	−0.56*
Health behaviors		
Active lifestyle scale ^a	−0.04	−0.07
Sedentary behavior scale ^a	0.01*	0.01***
Sociodemographic characteristics		
Male	1.59***	2.04***
Race/ethnicity (white)		
Black	1.30***	1.63***
Hispanic	0.39	0.99*
Other	−0.45	2.03*
Socioeconomic index	−0.06	−0.07
Number of children in household	−0.23***	0.14
Self-reported health (excellent)		
Very good ^a	0.66***	0.62***
Good ^a	1.84***	1.91***
Fair ^a	3.07***	3.66***
Poor ^a	4.21***	3.32***
Current weight management (doing nothing)		
Trying to lose weight	−1.16***	−2.01***
Trying to gain weight	4.99***	4.26***
Trying to maintain weight	0.60*	0.17
Interactions		
Mobility×active lifestyle scale	0.46**	0.45***
Mobility×sedentary behavior scale	−0.01	−0.01*
Constant	13.07***	12.16***
−2 Log pseudolikelihood	14,489,753	22,729,434
Wald χ^2	2,998.95***	9,718.11***

National Longitudinal Study of Adult Health, waves 1–4. Contrast categories are in parentheses

^aIndicates the variable is time-varying

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

statistically significant for those living in non-urban areas: the effect that mobility has on BMI is also dependent on the level of sedentary behavior that the respondent exhibits over time. Figure 2 shows the estimated BMI trajectory for the interaction between these two measures to illustrate how the effect operates. For those individuals in non-urban areas who are residentially mobile, there is no change in the BMI over time with increasing sedentary behavior. However, for those who maintain their residence, the BMI trajectory increases linearly as sedentary behavior increases. For this group in non-urban areas, more time spent engaging in inaction corresponds to a linear increase in BMI over time.

DISCUSSION

This study addressed three interrelated questions regarding residential mobility and the trajectories of body mass index (BMI) among urban and non-urban adolescents and young adults. First, how does residential mobility affect weight gain over time?

FIG. 2 Predicted BMI score trajectory for mobile and non-mobile respondents at all levels of sedentary behavior among non-urban residents.

Results from this study are inconsistent with prior research suggesting that mobility is associated with poor health outcomes. Instead, mobility for this sample of adolescents is associated with declines in BMI over time. One explanation could lie in the time span measured in this study. By the most recent wave of data collection, the respondents were in their mid-20s to early 30s. Thus, movement could correspond to life cycle changes such as moving out of the childhood home to attend college, to start a family, or to buy one’s first home. These life transitions may place individuals in areas with better or more convenient amenities that are more conducive to a healthy lifestyle. Similarly, it could be that residential mobility is indicative of socioeconomic advancement for the average individual in this study, which is in turn associated with low BMI and weight loss in other studies.^{43,44} Thus, instead of mobility being considered a negative event, it could be that for this group, mobility is indicative of an increase in resources.

Second, does mobility have an effect on weight gain because individuals who relocate also engage in negative health behaviors? The results suggest that, net of social and demographic characteristics, being physically active has a different effect depending upon whether one is residentially mobile or not. For those who are not mobile, being physically active decreases BMI. However, for those who are residentially mobile, being physically active increases BMI. Thus, residential stability and high levels of physical activity are protective against weight gain. Mobility effects, in this case, are inconsistent and counterintuitive to a negative association between healthy behaviors and BMI; it seems likely that some unmeasured effect is at work, such as mobility in tandem with the absence of an active lifestyle being associated with food insecurity.

Third, does the trajectory of weight gain differ among urban and non-urban residents? The results of this research suggest that there are few differences in the effects on BMI in urban and non-urban locales. However, important distinctions found are that minority differences in BMI are context-dependent, and sedentary behavior affects BMI differently among those who are residentially mobile. The racial/ethnic minority composition of non-urban places is increasing,⁴⁵ and the effect of being a minority on BMI over time is more salient in these areas. Future research should explore the mechanisms that affect BMI over time among minorities in non-urban areas.

In addition, sedentary behaviors have different effects depending on whether an individual is residentially mobile or not *in non-urban areas*. That is, residentially-mobile persons have the same level of BMI over time regardless of increases in sedentary behavior. However, for non-mobile persons, there is a stark increase in the BMI with increasing sedentary behavior. While this effect is intuitive, future research should tease out the mechanisms to explain why this relationship exists in non-urban areas and not in urban areas.

Research is increasingly focused on understanding the behavioral and individual causes of obesity and weight gain, with some discussion around the role of place.⁴⁶ The present research adds a different understanding of how individual and behavioral characteristics play a role in BMI over time and place. Structural forces that may force families to move (such as gentrification, neighborhood revitalization, and foreclosures) may increase sedentary behaviors and lessen activity. Conversely, moves that are beneficial (such as the Moving to Opportunity program) or moves based on socioeconomic increases in the household may increase activity, particularly if the neighborhood has places that facilitate active lifestyles. This research attempted to show the complexity in the effect that mobility has on BMI through the differences in the levels of activity and sedentary behavior, thus providing a future research opportunity to explore the synergy between reasons for moving, movement itself, and changes in behaviors in determining weight gain over time. To further develop this approach, future research could replicate this study on “predisposed” mobile populations (such as college students, children in military families, or children in the foster care system) to see if the results of this research hold in other samples.

Limitations

There are several limitations to the study that could be addressed in future research. First, while residential mobility is clearly measured in this research, the measure does not account for the amount of time that the respondent spent at each address. Where moves are short-term, it is possible that mobility may not be protective for BMI. Second, because the majority of the individuals interviewed in this sample reside in urban areas, residential mobility and neighborhood resources could not be compared across suburban and rural locales; relevant information on neighborhood amenities could be useful for future studies. Third, height and weight measurements as well as information on activities and time spent engaging in sedentary behavior are self-reported. Ideally, the anthropomorphic characteristics captured through self-report should be measured by the interviewer to reduce any possible effects of social desirability bias. Fourth, many of the covariates that could have helped explain BMI over time were not time-varying (such as socioeconomic status). The inclusion of more time-varying predictors could strengthen the inferences of future studies.

Despite these limitations, the results of this research adds to the current understanding of mobility and health by suggesting that both behavioral (active and sedentary lifestyles) and situational (movement between places) factors are integral to understanding and predicting weight-related outcomes, particularly for adolescents and young adults. In some ways, mobility can be protective against increases in weight, but in other ways, mobility can be a detrimental but perhaps modifiable force that can impede other physical and mental health outcomes among a young, vulnerable population.

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