Understanding the Socioeconomic Determinants of Racial/Ethnic Disparities in Obesity Using a Life Course Perspective

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ABSTRACT

Adult obesity is a major public health concern in the United States given the positive association between obesity a number of chronic diseases. Of equal importance are the stark social inequalities in obesity. Among women, blacks and Hispanics have a much higher risk of obesity compared to whites. This paper uses the 1995 Study of Midlife in United States to examine the extent to which socioeconomic status (SES) across the life course accounts for obesity disparities. Results show that early-life SES is negatively associated with adult obesity, net of adult factors, but that some of this effect operates via adult characteristics. Early-life SES accounts for some of the racial/ethnic gap in obesity. The gap is completely accounted for by adult SES, health behaviors, and family structure, factors that are themselves a product of early life conditions. Thus, early-life may be an important point of intervention to reduce population obesity.

Introduction

Adult obesity has become a major health concern in the United States due to the recent, rapid increase in prevalence rates and the positive association between obesity and a number of chronic health conditions, including three of the leading causes of death; diabetes, heart disease, and cancer (Kenchaiah et al. 2002; Mokdad et al., 2003; Must et al. 1999; Vischer and Seidell, 2001). Substantial inequalities in obesity exist in the United States, particularly between women of different racial and ethnic backgrounds. Among women, 53.9% of African Americans and 42.3% of Mexican American are classified as obese compared to just 30.6% of non-Hispanic white women (Ogden et al. 2006). Obesity rates for men, on the other hand, are quite similar at 34%, 31.6%, and 31.1% for African Americans, Mexican Americans, and non-Hispanic whites, respectively. Large racial/ethnic obesity disparities among women warrant investigation into the underlying causes of the observed racial/ethnic differences.

Racial disparities in obesity may reflect differential access to socioeconomic resources as well as differential exposure to disadvantage over the life course (Williams and Collins, 1995). Socioeconomic status (SES) shapes exposure to the experience of many behavioral and environmental factors that contribute to obesity (Gordon-Larsen et al., 2006). A large body of research has found a strong relationship between SES and obesity among women (Chang and Lauderdale, 2005; Kahn, Sobal and Martorell, 1997; Pawson, Martorell and Mendoza, 1991; Wardle et al., 2002). In addition, there is some empirical evidence that variation in SES accounts for some of the racial and ethnic disparities in obesity. However, few studies have actually examined the influence of SES on racial and ethnic disparities in obesity (Baltrus et al., 2007) and no studies have explored the pathways by which SES gives rise to the race/ethnic gap in obesity.

There is increasing evidence that the origins of poor adult health, and by extension adult health inequality, may lie in experiences earlier in life. Researchers are increasingly using a life course approach to understand the origins of adult health inequalities (Alwin and Wray, 2005). Both early and later life socioeconomic conditions are considered to be “fundamental causes” of adult health (Link and Phelan, 1995). According to the life course perspective of adult health, obesity is the long-term outcome of a range of early life conditions and experiences that begin in utero and continue into adulthood (Kuh and Ben Shlomo, 2004). An emerging body of research on adult obesity has identified a number of early life conditions that have long-term associations

with excess weight gain. These conditions include maternal and infant body weight (Curhan et al., 1996), perinatal nutritional surpluses and deficits (Owen et al., 2005), and parental socioeconomic achievement/childhood poverty (Greenlund et al., 1996; Langenberg et al., 2003, Power et al., 2005).

In this paper, I use a life course framework to examine how social and economic conditions in early life combine with adult achieved status to give rise to the women's race/ethnic gap in adult obesity. Because trajectories of weight gain and socioeconomic achievement often have their origin in childhood and adolescence, a life course model of obesity is particularly appropriate. While studies have examined the impact of early life conditions on adult obesity, none to my knowledge have examined the role of early life in generating racial and ethnic differences in adult obesity. I expect that early life SES puts individuals on a trajectory of weight gain and socioeconomic achievement that has implications for adult risk of obesity. To the extent that health-related early life resources and opportunities are distributed differentially by race/ethnicity, I expect that early life disadvantage helps to explain racial/ethnic disparities in adult obesity.

Previous Research

Adult Socioeconomic Status/Position and Obesity

In a seminal review of the literature on socioeconomic status (SES) and obesity, Sobal and Stunkard (1989) found consistent evidence that groups with lower levels of SES are at increased risk of becoming obese. Several studies have found a strong inverse relationship between SES and obesity in white women (Chang and Lauderdale, 2005; Wardle et al., 2002), with a slightly weaker relationship found in black women (Croft et al., 1992), and a much weaker relationship found in Mexican American women (Chang and Lauderdale, 2005; Kahn, Sobal and Martorell, 1997; Pawson, Martorell and Mendoza, 1991).

Despite the demonstrated association between SES and obesity, little research exists that investigates the influence of SES on racial and ethnic inequality in obesity. Furthermore, in the few studies that have examined the influence of SES on racial disparities, race differences are not fully accounted for using measures of adult SES. One study of cardiovascular risk factors in a non-probability sample of North Carolina women found that black women were nearly three times more likely to be obese than white women after controlling for education and income

(Harell and Gore, 1998). Similarly a community study of women between the ages of 42 and 52, Lewis et al. (2005) found persistent black-white differences in BMI after adjustment for education. There are no studies, to my knowledge, that examine the influence of SEP on differences between white and Hispanic women.

Prior research suggests that racial and ethnic disparities are not fully explained by differences in SES. However, the research is limited to adult measures of SES which may not adequately describe an individual's true socioeconomic position. Focusing only on adult socioeconomic attainment without attention to early life conditions and experiences ignores an important source of inequality that may have consequences for adult health disparities (Williams and Collins, 1995). To better understand the origins of the race/ethnic gap in obesity I examine ways in which early life conditions combine with adult conditions to generate obesity risks.

Early Life Origins of Socioeconomic Differences in Adult Obesity

The life course approach to adult health takes a 'long-term' perspective on development, emphasizing the importance of early-life experiences in determining later life outcomes (Elder 1995). Early-life social and economic conditions may influence adult weight either directly, via established weight trajectories or indirectly, through adult achievement processes and health behaviors. Early-life socioeconomic disadvantage increases childhood risk for overweight and obesity (Kimm et al., 2006; Miech et al., 2006; Strauss and Knight, 1999), thus increasing the risk of becoming obese as an adult (Whitaker et al., 1997). Early life socioeconomic disadvantage is related to poor diet and physical activity in children and adults (Lynch et al., 1997; Miech et al., 2006). Parental SES may determine what geographic area the child is raised in, which can have an effect on obesity and its antecedents. For instance, Gordon-Larsen and colleagues (2006) found that children living in low SES areas had access to fewer facilities for physical activity which in turn was associated with less physical activity and higher weight status. In addition to early life SES affecting children's weight status, some studies report persistent effects of early life socioeconomic conditions either net of, or combined with, the effects of adult SES (Greenlund et al., 1996; Langenberg et al., 2003, Power et al., 2005). Although there is evidence of direct effects of early-life experiences on adult obesity, there is also evidence that early-life SES operates through adult socioeconomic achievement and health behaviors to influence adult obesity.

While adult health inequalities reflect the influence of contemporaneous factors, they also reflect differential exposures across the life course. Black Americans' and Mexican Americans' persistent socioeconomic disadvantage from early to later life highlights the importance of examining the early-life origins of the race/ethnic gap in adult obesity. Early life shapes access to health-related resources and opportunities, creating a situation in which disadvantaged groups are exposed to health-compromising conditions across the life course with little opportunity to improve their health. In addition, differential exposure to early life circumstances may initiate "chains of risk" among certain groups that results in health inequalities in later adulthood (Kuh et al., 1997). Thus, the life course perspective is particularly useful for understanding the source of social inequalities in adult health. However, the life course mechanisms that give rise to the race/ethnicity gap in obesity have not yet been explored in the obesity literature.

In this study I assess the direct and indirect effects of early life conditions, as well as the extent to which early conditions combine with adult SES to create racial and ethnic inequality in obesity. I expect that African Americans and Mexican Americans experience greater social and economic disadvantage across the life course, leading to higher obesity rates compared to whites. Therefore, I hypothesize that early life social and economic conditions will have an effect on adult obesity net of, and combined with, adult characteristics. Furthermore, I hypothesize that early life conditions will account for some of the women's race/ethnic gap in obesity.

Method

Sample

The data used in this analysis are from the 1995 survey of Midlife in the United States (MIDUS), a nationally representative survey of non-institutionalized adults aged 25 to 75, with oversampling of men and older adults. MIDUS is based on a random-digit dial sample of individuals who completed phone interviews and self-administered questionnaires (783 individuals were excluded from analysis because they only completed the phone interview). The overall response rate for completion of the phone and self-administered interview is estimated to be 60.8%. All analyses are weighted to account for differential probability of selection and non-response. Although the sample weight includes a post-stratification adjustment, the sample

slightly under-represents African Americans and those with a high school education or less[1]. Analyses are conducted on 1,440 non-Hispanic white, non-Hispanic black, and Mexican women.

Measures

Assessment of Obesity Risk. Obesity is measured using Body Mass Index (BMI), calculated as squared height in meters divided by weight in kilograms. BMI is commonly accepted as a reliable method for assessing obesity prevalence in the general population. Self-reported measures of height and weight were used to calculate respondents' BMI in 1995 and retrospective weight reports were used to calculate respondents' BMI at age 21. Although BMI is obtained from self-reported measures of height and weight, the estimates are still useful. Self-reports of height and weight are subject to reporting error but the error is sufficiently low that self-reports are considered to be reliable estimates of BMI (Bolton-Smith et al. 2000; Nawaz et al. 2001; Palta et al. 1982; Willett, Dietz and Colditz, 1999). Individuals with a BMI of 25.0-29.9 are considered overweight, and individuals with a BMI greater than 29.9 are considered obese (NHLBI, 2000). For this analysis, obesity is defined to include those individuals whose BMI falls in the obese category and also those individuals who are most at risk of becoming obese, and so is categorized using a BMI of 27.5 or higher. There is evidence to suggest that women's self-reports of weight are biased downwards, resulting in misclassification of obesity status (Kuczmarski et al. 2001; Palta et al., 1982; Rowland, 1990; Stewart, 1982). In addition, many women with high amounts of lean body mass are classified as being overweight using the BMI. Using a cut-point of 27.5 should decrease misclassification due to error in the BMI measure as well as error inherent to self-reports of weight.

Demographics. Respondents are assigned to birth cohorts to account for the effect of age. Four birth cohorts are used that represent respondents aged 25-44 (the reference category), 45-54, 55-64, and 65-75. Race is measured using dummy variables for non-Hispanic white (the reference), non-Hispanic black, and Mexican. Non-Hispanic whites and Non-Hispanic blacks are referred to hereafter as whites and blacks, respectively, for parsimony. A variable for nativity (coded 1 if foreign-born and 0 otherwise) is included because individuals born outside of the U.S. tend to weigh less on average than individuals born in the U.S. (Goel et al., 2004).

[1] Based on a comparison with the Current Population Survey (CPS, 1995).

Early Life Conditions. Respondents were asked questions about their family when they were growing up. Information about socioeconomic conditions includes the male household head's educational attainment (dummy-coded less than high school, high school or GED, some college, and college degree or higher, or missing on education, with college degree or higher used as the reference), and household head's occupation (professional, executive/administrative vs. non-professional/executive occupations, dummy-coded using professional as the reference. A variable indicating missing is included). Information about the male head of household was used except in cases where that information was not provided, in which case information about the female head of household was used. Respondents also reported whether they grew up in the suburbs, the city, a rural area, a medium sized town, or a small town, or that they moved around a lot as a child. These responses are dummy-coded with suburbs treated as the reference.

Adult Characteristics. Respondents reported on socioeconomic status including educational attainment (dummy-coded less than high school, high school or GED, some college, and college degree or higher with less than high school as the reference), household income (logged), and ability to pay bills. Ability to pay bills is measured using dummy variables indicating whether the respondent finds it "not at all", "not very", "somewhat", or "very" difficult to pay their bills, with no difficulty treated as the reference.

Marital status and number of biological children are included because it is theorized that they affect the ability to convert adult socioeconomic attainment into weight maintenance or weight loss. Marital status is measured using dummy variables indicating currently married (the reference), divorced/separated or widowed, and never married or single. Number of biological children is measured using dummy variables for no children, one child, two children, and three or more children, with no children treated as the omitted category.

Health Behaviors. Smoking status and physical activity are included due to the strong association between these health behaviors and weight gain. Individuals who smoke and those who engage in physical activity generally weigh less. Smoking status is treated as three-category dummy variable indicating if the respondent is a current smoker (reference), a former smoker, or has never smoked. Physical activity is measured using a scale consisting of the following 4

questions: 1)“during the summer, how often do you engage in vigorous physical activity long enough to work up a sweat”, 2)“during the winter, how often do you engage in vigorous activity long enough to work up a sweat”, 3) during the summer how often do you engage in moderate activity”, and 4) during the winter how often do you engage in moderate activity”. Response categories ranged from never to several times a week or more. The scale has high reliability (α = 0.821).

Analytic Strategy

Logistic regression models are used to examine the ways in which early life conditions contribute to the race/ethnic gap in obesity among women. I asses the role of early and adult socioeconomic conditions by comparing changes in the coefficients for black and Mexican women across models. The analysis is conducted in two stages in order to disentangle the independent and combined effects of early and adult conditions. First, I regress the risk of obesity on each early life conditions separately. Next, I estimate a series of nested models that regress the risk of obesity on all of the early life conditions in addition to adult socioeconomic characteristics and health behaviors. Finally, I assess the life course pathways that account for the race/ethnic gap in obesity by comparing coefficients for early life conditions and adult socioeconomic characteristics across models. All analyses were conducted in Stata 10.

Results

Weighted sample means and percents are presented in Table 1 to examine the degree to which early life conditions and adult characteristics differ between race/ethnic groups in the sample. As would be expected from prior research, white women have the lowest prevalence of obesity, while black women have the highest prevalence. Also, obesity prevalence is higher among Mexican women compared to white women, though the difference is only marginally significant. Overall, black women report growing up in slightly more disadvantaged social and economic environments than white women. Mexican women are not significantly different from white women on indicators of early life disadvantage, though they are more likely to have grown up in the city versus suburbs than white women.

The Effect of Early Life Socioeconomic Status on the Race/Ethnic Gap in Obesity

The effects of early life social and economic conditions on the odds of being obese are shown in Table 2. Model 1 is a baseline estimate of obesity adjusting for age, race, and nativity. The odds of being obese are over two times higher for black women compared to white women (exp .884). The race gap is much lower between white and Mexican women for whom the odds of obesity are about 1.7 times higher [exp(0.507)] than for white women. Models 2-4 estimate the log odds of being obese associated with different early life conditions while model 5 presents the net effects of early life conditions on obesity.

As shown in model 2, the educational attainment of the male household head (HH) has an influence on adult obesity. Compared to those with at least an undergraduate degree, the odds of being obese among individuals whose HH attended college but did not get a degree are twice as high [exp(0.728) = 2.07]. Individuals whose HH did not obtain a high school degree also have higher odds of being obese. Including HH's education reduces the Mexican-white gap slightly but surprisingly increases the black-white gap. This indicates that if black women were to have the same distribution as white women on HH's education, black women would be even more disadvantaged on obesity.

Adding occupational status of HH in model 3 reduces the odds of being obese for Mexican women, with a slight reduction in the odds for black women. Individuals whose HH was not in the professional or executive class of occupations have a slightly higher odds (1.35 odds ratio) of being obese, though the effect is only marginally significant.

Model 4 incorporates the area where the respondent grew up. Compared to growing up in the suburbs, growing up in the city, rural areas, or small towns results in higher odds of being obese. This set of early life conditions has the largest effect on race/ethnic differences. The black coefficient is reduced from 0.884 (model 1) to 0.752 and the Hispanic-white difference is no longer significant.

When all of the early life conditions are included in the model simultaneously (model 5) the odds of being obese for black women decreases by 8.6 percent [((0.884-0.808)/0.884)100 = 8.59]. For Mexican women the odds decrease by about 13.0 percent [((0.507-0.441)/.507)100= 13.02] and are not significantly different from white women. Controlling for other early life conditions slightly reduces the effect of HH educational attainment and area where raised (except for the coefficient for 'city'). The effect of HH occupational status is not significant in the final model, likely because it is operating through area raised.

A Life Course Model of Socioeconomic Status and Race/Ethnic Differences in Obesity

The life course paradigm suggests that adult inequality is the product of a lifetime of differential access to health-promoting resources and opportunities. Obesity disparities observed in adulthood may have some origin in early life. The analyses in Table 2 confirmed that at least some of the race/ethnic gap in adult obesity originates in early life. However, it is unclear how early life conditions combine with or operate through other factors experienced in adulthood. Table 3 examines the independent and combined effects of social and economic conditions across the life course, and the specific pathways by which early life conditions affect adult obesity, using a series of nested models that add adult socioeconomic characteristics in sequential order. This allows me to assess changes in coefficients for both race/ethnicity and for early life conditions. The model numbering is consecutive from Table 2 to Table 3 to facilitate comparisons.

Model 5 is included to facilitate comparison of early life effects across models that add adult characteristics. Model 6 estimates the log odds of being obese as a function of early life conditions and adult educational attainment. The reduction in the coefficients for early life conditions means that early life conditions operate indirectly on obesity partly via adult educational attainment. However, adult education also has a small effect on the race/ethnic gap, net of early life measures. The odds of being obese for black women are reduced from 0.808 to 0.804, a reduction of less than a half percent. Also, though the difference is not significant, the odds of being obese are also reduced in Mexican women. Given how little the odds are reduces after adding adult education, adult educational attainment does seem not explain the black/white differences over and above childhood SES.

The next model incorporates measures of respondent's financial situation, total household income and ability to pay bills. Model 7 provides further evidence that early life conditions affect adult obesity indirectly through adult SES. However, early life conditions still exert an effect on obesity independent of adult SES. Accounting for variations in financial situation explains the link between adult educational attainment and obesity, reducing the coefficients to non-significance. Increased difficulty paying bills is associated with higher odds of being obese. Including financial situation reduces the remaining black-white disparity not explained by childhood SES by 13 percent [((0.808-0.703)/0.808)100 = 13.0].

Early life social conditions may also affect adult obesity via other adult circumstances such as marital status, number of children, and health behaviors. Model 8 estimates the odds of obesity as a function of early and adult socioeconomic conditions and marital status and number of children. The black-white gap and the effects of adult socioeconomic conditions are reduced when accounting for marital status and number of children, suggesting that marital status and family size are pathways whereby adult and child SES influence the race/ethnic gap in obesity. Surprisingly, the coefficients for early life conditions increase (except city residence) suggesting larger early life effects on the obesity gap among people with similar family arrangements.

Model 9 incorporates health behaviors as an additional pathway through which SES can operate on the race/ethnic gap in obesity. Including smoking status and physical activity reduces the coefficients for adult SES indicating that health behaviors are an important pathway through which SES affects obesity risk. Furthermore, accounting for health behaviors and adult SES fully explains the persistent black-white gap in obesity. Both early and adult socioeconomic conditions have effects on obesity net of health behaviors.

Model 10 estimates the odds of being obese as a function of just one's adult SES by including all adult SES characteristics simultaneously. It is clear that adult SES accounts for more of the race/ethnic gap in obesity that early life conditions, as one might expect. Parameter estimates for adult SES characteristics are fairly consistent whether operating alone or with early life conditions (model 6 vs. model 10). This indicates that traditional adult attainment models do not overestimate the effects of adult SES factors.

Additional analyses (not shown) indicate that adult characteristics and health behaviors can account for the black-white gap in obesity. However, it is important to note that early life conditions resulted in a considerable reduction in the odds of being obese for both black and Mexican women. Although model 10 indicates that the absence of early life conditions does not bias the affect of adult SES on obesity, adult socioeconomic attainment models ignore the importance of early life in establishing trajectories of socioeconomic attainment. The adult socioeconomic characteristics and health behaviors that explain the race/ethnic gap in women's obesity risk are themselves the result of differential early life experiences. For example, in analysis not shown here the adult SES measures were regressed on the full set early life measures, controlling for cohort and race. The early life indicators explained between 82 and 90 percent of the variance in adult SES attainment. A more complete conceptualization of the ways

in which social and economic inequality gives rise to health inequality can be obtained by incorporating early life conditions in analysis of the influence of SES on racial and ethnic disparities in obesity.

Conclusion

The purpose of this study was to explore the effect of early life conditions on women's race/ethnic gap in obesity. I hypothesized that early life conditions would account for some of the gap. The analysis show that early life conditions do in fact account for some of the race/ethnic gap in women's obesity. I also hypothesized that these effects would persist even after including adult socioeconomic attainment factors. Early life measures continued to have an effect independent of all adult characteristics included in the models. Finally, I hypothesized that the effect of early life conditions would operate indirectly via adult characteristics. In general I found support for this hypothesis. The effect of early life social and economic conditions was mediated partially by adult socioeconomic factors.

This study illustrates the importance of including measures of early life in research on health inequalities. Research on obesity determinants and disparities could benefit from applications of life course theory. Operating within a life course paradigm has the advantage of producing research focused on key points for intervention across the individual life course. For instance, this study suggests that efforts to reduce population obesity should be directed at those groups who experience the most social and economic disadvantage in early life. Intervening in early life has the advantage of altering both the individual's trajectory of weight gain risk as well as improving the individual's future socioeconomic attainment.

While this study highlights the importance of early life in understanding adult disparities in obesity among women, more work should be done to explore how early life conditions such as area of residence comes to exert an influence on later adult weight status. In addition, efforts to reduce population obesity would benefit from research that identifies 'critical periods' of exposure. Disadvantage may increase weight gain risks differentially depending on when the disadvantage is experienced and how long the exposure lasts.

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Tables

Table 1. Early Life and Adult Socioeconomic Characteristics of Women by Race/Ethnicity, National Survey of Midlife in the United States (1995), Weighted Means (±sd) and Percents, *n = 1,440*

Demographic Characteristics	White	Black	Hispanic	*Adult Characteristics*	White	Black	Hispanic
R Obese[a]	0.47	0.76	0.54	Education			
				College Degree	0.20	0.15	0.20
Cohort				Some College	0.26	0.25	0.28
1951-1970	0.50	0.62	0.61	High School	0.42	0.38	0.31
1941-1950	0.19	0.13	0.15	Less than High School	0.11	0.22	0.21
1931-1940	0.18	0.20	0.12	Financial Situation[b]			
1921-1930	0.13	0.05	0.12	HH Income (in 1000's)	48.79	29.06	40.42
					(±42.03)	(±27.89)	(±28.09)
R Foreign-Born	0.03	0.03	0.25	Difficulty Paying Bills			
				Not at all Difficult	0.23	0.12	0.13
Early Life Conditions				Not Very Difficult	0.37	0.31	0.35
HH Education				Somewhat Difficult	0.32	0.37	0.39
College Degree	**0.14**	0.03	0.08	Very Difficult	0.08	0.19	0.14
Some College	0.08	0.05	**0.11**	Marital Status			
High School	**0.28**	0.21	0.17	Married	0.67	0.44	0.64
Less than High School	**0.36**	0.33	0.37	Divorced/Sep, Widowed	0.25	0.28	0.26
Missing	0.13	**0.38**	0.27	Never Married	0.08	0.28	0.10
HH Occupation				Number of Biological Children			
Professional/Executive	**0.22**	0.07	0.19	No children	0.17	0.16	0.16
Non professional/executive	0.73	**0.79**	0.71	1 child	0.17	0.17	0.19
Missing	0.05	0.14	0.10	2 children	0.51	0.44	0.44
Area Raised				3+ children	0.15	0.24	0.20
Suburbs	**0.16**	0.04	0.04	Smoking Status			
City	0.15	**0.32**	**0.38**	Current Smoker	0.25	0.21	0.19
Rural	0.24	0.27	0.26	Never Smoked	0.50	0.59	0.60
Small Town	0.27	0.28	0.20	Former Smoker	0.26	0.20	0.21
Med. Size Town	0.12	0.08	0.12	Level of Physical Avitivty[c]	4.51	3.91	4.25
Moved Around	0.07	0.00	0.01	*[Scale Range: 1-6]*	(±1.19)	(±1.35)	(±1.47)

Note: R = respondent. All variables are dummy-coded and may be interpreted as percents, unless otherwise noted.

[a] Defined as BMI >= 27.5

[b] Mean, 1995 dollars

[c] Mean value of scale.

Table 2. Effects of Early Life Conditions on Adult Obesity, Log Odds.

	Model 1	Model 2	Model 3	Model 4	Model 5
Socio-Demographic Characteristics					
Race (NHWhite)					
NHBlack	0.884***	0.914***	0.883***	0.752**	0.808***
	(0.232)	(0.240)	(0.237)	(0.234)	(0.242)
Hispanic	0.507+	0.491+	0.516+	0.431	0.441
	(0.265)	(0.279)	(0.264)	(0.270)	(0.277)
Cohort (1951-1970)					
1941-1950	0.549***	0.507**	0.540***	0.500**	0.485**
	(0.161)	(0.162)	(0.162)	(0.164)	(0.164)
1931-1940	0.882***	0.810***	0.860***	0.790***	0.750***
	(0.168)	(0.175)	(0.170)	(0.172)	(0.178)
1921-1930	0.474*	0.407+	0.443*	0.404+	0.374
	(0.214)	(0.223)	(0.215)	(0.222)	(0.228)
Foreign-Born	-0.640+	-0.603+	-0.620+	-0.621+	-0.592+
	(0.338)	(0.346)	(0.336)	(0.343)	(0.346)
Early Life SES Characteristics					
HH Education (College Degree)					
Some College		**0.728****			**0.642***
		(0.281)			(0.292)
High School		0.245			0.083
		(0.228)			(0.253)
< High School		**0.537***			0.306
		(0.221)			(0.252)
Missing		0.123			-0.012
		(0.262)			(0.295)
HH Occupation (Prof/Exec)					
Non professional/executive			**0.298+**		0.175
			(0.163)		(0.191)
Missing			-0.167		-0.128
			(0.304)		(0.332)
Area Raised (Suburbs)					
City				**0.621****	**0.625***
				(0.238)	(0.244)
Rural				**0.723****	**0.646****
				(0.231)	(0.238)
Small Town				**0.474***	**0.438+**
				(0.224)	(0.227)
Med. Size Town				0.316	0.339
				(0.269)	(0.273)
Moved Around				0.089	0.133
				(0.347)	(0.355)
Constant	-1.083***	-1.404***	-1.288***	-1.493***	-1.776***
	(0.104)	(0.192)	(0.159)	(0.193)	(0.256)
N	1440	1440	1440	1426	1426
Psuedo R-Squared	0.036	0.044	0.040	0.045	0.052
Log Likelihood	-894.64	-887.05	-891.17	-879.28	-872.00

Note: Coefficients are expressed as log odds of being obese; numbers in parentheses are standard errors.

+ p<0.10,* p<0.05, ** p<0.01, ***p<0.001

Table 3. Effects of Early Life Conditions and Adult Characteristics on Adult Obesity, Log Odds.

	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Socio-Demographic Characteristics						
Race (NHWhite)						
NHBlack	0.808***	0.804**	0.703**	0.573*	0.402	0.699**
	(0.242)	(0.246)	(0.258)	(0.254)	(0.263)	(0.249)
Hispanic	0.441	0.426	0.406	0.379	0.301	0.428
	(0.277)	(0.276)	(0.279)	(0.286)	(0.297)	(0.268)
Cohort (1951-1970)						
1941-1950	0.485**	0.504**	0.596***	0.627***	0.502**	0.614***
	(0.164)	(0.166)	(0.170)	(0.180)	(0.185)	(0.167)
1931-1940	0.750***	0.742***	0.872***	0.829***	0.661***	0.930***
	(0.178)	(0.178)	(0.182)	(0.191)	(0.197)	(0.174)
1921-1930	0.374	0.319	0.406+	0.397	0.079	0.392+
	(0.228)	(0.229)	(0.242)	(0.245)	(0.260)	(0.234)
Foreign-Born	-0.592+	-0.580+	-0.776+	-0.790+	-0.897*	-0.829*
	(0.346)	(0.338)	(0.407)	(0.418)	(0.455)	(0.394)
Early Life Conditions						
HH Education (College Degree)						
Some College	**0.642***	**0.597***	**0.584+**	**0.630***	**0.664***	
	(0.292)	(0.295)	(0.299)	(0.305)	(0.306)	
High School	0.083	-0.010	-0.004	0.025	-0.010	
	(0.253)	(0.255)	(0.258)	(0.262)	(0.263)	
< High School	0.306	0.164	0.152	0.202	0.212	
	(0.252)	(0.258)	(0.263)	(0.268)	(0.269)	
Missing	-0.012	-0.185	-0.294	-0.234	-0.237	
	(0.295)	(0.301)	(0.311)	(0.318)	(0.324)	
HH Occupation (Prof/Exec)						
Non professional/executive	0.175	0.144	0.139	0.120	0.131	
	(0.191)	(0.195)	(0.196)	(0.199)	(0.197)	
Missing	-0.128	-0.162	-0.179	-0.238	-0.307	
	(0.332)	(0.338)	(0.337)	(0.345)	(0.362)	
Area Raised (Suburbs)						
City	**0.625***	**0.601***	**0.477+**	**0.471+**	**0.467+**	
	(0.244)	(0.245)	(0.251)	(0.250)	(0.254)	
Rural	**0.646****	**0.597***	**0.503***	**0.520***	**0.567***	
	(0.238)	(0.241)	(0.246)	(0.249)	(0.248)	
Small Town	**0.438+**	**0.389+**	0.321	0.372	**0.395+**	
	(0.227)	(0.230)	(0.235)	(0.234)	(0.234)	
Med. Size Town	0.339	0.318	0.285	0.389	0.421	
	(0.273)	(0.275)	(0.280)	(0.278)	(0.279)	
Moved Around	0.133	0.076	-0.091	-0.134	-0.065	
	(0.355)	(0.357)	(0.373)	(0.381)	(0.385)	
Adult Characteristics						
Education (College Degree)						
Some College		**0.343+**	0.233	0.205	0.222	0.267
		(0.183)	(0.188)	(0.194)	(0.201)	(0.176)
High School		0.295	0.147	0.126	0.130	0.183
		(0.191)	(0.199)	(0.207)	(0.216)	(0.179)
< High School		**0.585***	0.298	0.206	0.228	0.308
		(0.267)	(0.287)	(0.301)	(0.313)	(0.265)
Financial Situation						
HH Income (logged)			-0.115	-0.143	-0.118	-0.119
			(0.080)	(0.090)	(0.092)	(0.079)
Difficulty Paying Bills (Not at All						
Not Very Difficult			0.029	0.007	-0.02	0.05
			(0.178)	(0.178)	(0.179)	(0.176)
Somewhat Difficult			**0.330+**	**0.342+**	**0.329+**	**0.308+**
			(0.185)	(0.187)	(0.190)	(0.182)
Very Difficult			**0.807****	**0.782****	**0.746***	**0.731****
			(0.277)	(0.278)	(0.291)	(0.272)

(Continued on next page)

Table 3. (Continued)

	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Marital Status (Married)						
Divorced/Sep, Widowed				**-0.370***	**-0.307+**	
				(0.177)	(0.180)	
Never Married				**0.570+**	**0.619***	
				(0.293)	(0.299)	
Number of Biological Children (None)						
1 child				0.238	0.192	
				0.254	0.26	
2 children				0.132	0.088	
				(0.226)	(0.232)	
3+ children				**0.648***	**0.559***	
				(0.267)	(0.272)	
Adult Health Behaviors						
Smoking Status (Current)						
Never Smoked					**0.470***	
					(0.187)	
Former Smoker					**0.488***	
					(0.211)	
Level of Physical Avitivty					**-0.219*****	
					(0.060)	
Constant	-1.776***	-1.894***	-0.719	-0.612	-0.155	-0.227
	0.256	0.263	0.938	1.079	1.173	0.897
N	1426	1426	1394	1394	1392	1408
Psuedo R-Squared	0.052	0.056	0.066	0.080	0.093	0.051
Log Likelihood	-872.00	-868.55	-836.28	-824.04	-809.86	-857.23

Note: Coefficients are expressed as log odds of being obese; numbers in parentheses are standard errors.

+ p<0.10,* p<0.05, ** p<0.01, ***p<0.001