Extended Abstract for PAA 2010

Title: Neighborhood Context and Social Disparities in Waist Size and Body Mass Index

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In the research on neighborhood effects and health, analysts often use multilevel models to answer two types of questions. The first is whether neighborhood characteristics are associated with health outcomes after controlling for individual-level covariates that might otherwise confound the observed associations. The second is the extent to which neighborhood context can explain individual-level disparities in health (e.g., differences across groups defined by race, ethnicity, and socioeconomic status). There are now many studies addressing the first kind of question but not as many that attempt to document the connection between neighborhood context and individual-level health disparities. One reason for the relative lack of research on this second question (compared to the first) is that there are still not many large, representative samples of diverse populations, with relatively large sample sizes of (a) individuals within neighborhoods and (b) neighborhoods within a larger geographic region, to enable analysts to decompose health disparities into their within- and between-neighborhood components. Such a decomposition exercise asks how large group disparities would be if members of opposing groups lived in the same (or similar) neighborhoods, and what share of these disparities is attributable to the segregation of groups into different types of neighborhoods.

In this study, we attempt such a decomposition exercise on racial/ethnic and socioeconomic disparities in two outcomes related to obesity – waist size and body mass index (BMI) – using data from the Chicago Community Adult Health Study (CCAHS), a sample of 3105 adults aged 18 and over, living in the city of Chicago, IL and stratified into 343 neighborhood clusters. Face-to-face interviews with subjects were conducted between May 2001 and March 2003, and interviewers made direct physical measurements of height, weight, and waist size. All data and analyses are weighted to take account of different rates of sample selection (a set of 80 “focal” neighborhoods were sampled more intensively than others), different rates of subsampling for final intensive interview completion efforts, and differential coverage and nonresponse across NCs, as well as post-stratification adjustments that make the weighted

sample's age, racial/ethnic, and sex composition match that of the city of Chicago as estimated from the 2000 Census.

The analytical strategy is to estimate racial/ethnic and socioeconomic disparities in both waist size and BMI, first using OLS models (in one set of models that contain a smaller set of controls for sociodemographic characteristics and another set of models that contain a larger set of controls that also include health behaviors) and then using multilevel models with neighborhood random effects, in which all covariates have been centered around their neighborhood means.[1] The latter model yields "within-neighborhood" estimates of all individual-level covariates and can be compared to the OLS models with uncentered covariates to assess the extent to which neighborhoods account for individual-level disparities. We also estimate the association between neighborhood characteristics and both waist size and BMI using multilevel models.

Initial results from the decomposition of waist size disparities are presented in Table 2. Models 1 and 2 estimate racial/ethnic and socioeconomic disparities in waist size (measured in inches), controlling only for age, sex, and immigrant status. Model 1, estimated in OLS, shows that non-Hispanic blacks and Hispanics have significantly higher waist sizes than non-Hispanic whites. People with less than 12 years or exactly 12 years of education also have higher waist sizes compared to those with more than 12 years. Income, however, is not strongly related to waist size. We created a category of people who reported incomes of $5,000 or less after examining the data and finding that many of these very low-income cases are students living with their parents or other family members. Subjects in this group actually have lower waist sizes than those who report income of $50,000 or more (the reference group), but otherwise there were no significant associations between income and waist size. Model 2 displays the "within-neighborhood" effects of these same covariates. Within-neighborhood estimates of the black-white gap in waist size (1.97 inches, from model 2) are approximately 15 percent smaller than the total disparity

[1] The multilevel model with group-mean centered covariates is very similar to an OLS model that adds neighborhood fixed effects (i.e., dummy variables for each neighborhood). In fact, such a fixed effects model yields virtually identical results. A fuller discussion of the different approaches to estimating within-neighborhood disparities will be included in the final paper.

between blacks and whites (2.31 inches, from model 1), but racial disparities remain significant within neighborhoods. More noteworthy is the large decline in the size and significance of educational disparities in model 2 compared to model 1.

A larger set of individual-level controls is added in models 3 and 4, including measures of health behaviors (e.g., physical activity, walking, drinking, and smoking), health care, family structure, and pregnancy history (for women). Adding these variables to the model can potentially absorb much of the neighborhood variation in waist size, since neighborhood context may also predict many of these behavioral characteristics. Indeed, adding this larger set of controls reduces the black-white gap by roughly 20 percent, and the educational disparities are reduced to non-significance. Still, the multilevel model with group-mean centered covariates (model 4) reduces both the black-white and educational disparities by approximately the same percentage as it did before these additional controls were added to the model – the black-white gap declines by 18 percent between models 3 and 4, and the gap between the lowest and highest education groups declines by 62 percent.

It is unwise to consider racial/ethnic and socioeconomic disparities in obesity without considering how such disparities may differ by gender. We tried inserting interactions between gender and each of our individual-level covariates, and we include the interaction terms that were significant (when entered one-at-a-time to the model) in models 5 and 6. Of primary importance for the questions at hand, black-white disparities are significantly higher among women (2.70 inches, in model 5) compared to men (2.70-1.98=0.72 inches, in model 5), and educational disparities are also higher among women compared to men. In fact, educational disparities among women are significant even after controlling for the individual-level behavioral characteristics in model 5. In model 6, we assess whether neighborhood context explains any of the sex-specific racial/ethnic and educational disparities in waist size, after controlling for the full set of covariates. The results show that female black-white differences in waist size decline by an additional 12 percent in model 6 compared to model 5, while waist size differences between the highest and lowest education group decline by an additional 21.5 percent between models 5

and 6. Neighborhoods contribute little to either black-white or educational disparities among men, which are not significant even before adjusting for neighborhoods.

In Table 3 we estimate the same progression of models for BMI, and the results are very consistent with what we found in the analysis of waist size, although neighborhoods do not account for quite as large a share of either the black-white or educational disparities in BMI as they do in the case of waist size.

In Table 4, we estimate the associations between specific characteristics of neighborhoods and both waist size and BMI. In these models we used four measures derived from a principal factor analysis (conducted for a prior paper) with an orthogonal varimax rotation of 20 variables from the 2000 Census that include NC-level measures of racial/ethnic composition, socioeconomic status, age composition, family structure, owner-occupied housing, and residential stability. All of the resulting factor scores were standardized to have a mean of zero and a standard deviation of one. We interpret the first factor as representing socioeconomic disadvantage (low family incomes, high levels of poverty, public assistance, unemployment, female-headed families, never-married adults, and few owner-occupied homes), the second factor as neighborhood affluence and gentrification (concentrations of people with high education, people in professional/managerial occupations, and a residentially mobile population consisting of young adults and few children under the age of 18), the third factor as Hispanic/immigrant concentration, and the final factor captures as older age composition (especially people over 70 but also those between ages 50-69, and few young adults or people who have never married).

The results in Table 4 show that only one of these neighborhood characteristics, affluence/gentrification, is significantly associated with waist size and BMI, but this association remains significant across all model specifications. People living in more affluent neighborhoods tend to have lower waist sizes and lower BMI, net of all individual-level characteristics controlled in each model. Supplemental analysis revealed that there were no significant interactions between gender and neighborhood characteristics, so the protective effects of affluence pertain to both women and men. In the final draft of this paper, we will assess whether there are other characteristics of neighborhoods that

might explain why more affluent and gentrifying neighborhoods are associated with lower risks of obesity. We will also run models on categorical outcomes, including obesity categories, as defined by the CDC.

In sum, in this paper we document that neighborhood context accounts for a modest share of black-white differences in waist size and BMI, and a larger share of educational disparities in both outcomes. Both sets of disparities are more pronounced among women compared to men, and neighborhood context played a larger role in accounting for obesity-related disparities among women compared to men. Finally, we found that more affluent neighborhoods appear to provide some protection against obesity. Interestingly, neighborhood disadvantage, the focus of much of the literature on neighborhoods and health, was not significantly related to either waist size or BMI.

Table 1. Descriptive Statistics of Outcome and Independent Variables

Variable	N	Mean	Std. Dev.	Min	Max
Outcome Variables					
Waist Size	3105	36.73	6.39	21.26	68.90
BMI	3105	28.19	6.49	11.29	64.83
Independent Variables					
Male	3105	0.47	0.50	0	1
Age					
30-39 yrs	3105	0.23	0.42	0	1
40-49 yrs	3105	0.19	0.39	0	1
50-59 yrs	3105	0.13	0.34	0	1
60-69 yrs	3105	0.09	0.29	0	1
70+ yrs	3105	0.09	0.29	0	1
Race					
Non-Hisp Black	3105	0.32	0.47	0	1
Hisp	3105	0.26	0.44	0	1
Non-Hisp Other	3105	0.04	0.19	0	1
Immigrant Status					
1st generation	3105	0.27	0.44	0	1
2nd generation	3105	0.14	0.34	0	1
Educational Attainment					
0-11 yrs educ	3105	0.23	0.42	0	1
12-15 yrs educ	3105	0.49	0.50	0	1
Income Category					
LT $5K	3105	0.03	0.17	0	1
$5K - LT$10K	3105	0.07	0.26	0	1
$10K-LT$30K	3105	0.26	0.44	0	1
$30K-LT$50K	3105	0.18	0.39	0	1
Income missing	3105	0.19	0.39	0	1
Marital Status/Family					
Married	3105	0.42	0.49	0	1
Separated	3105	0.04	0.20	0	1
Divorced	3105	0.11	0.31	0	1
Widowed	3105	0.07	0.25	0	1
Has no kids	3105	0.60	0.49	0	1
Healthcare					
Has health insurance	3094	0.80	0.40	0	1
Has regular doctor	3105	2.01	1.74	1	5
Physical Activity					
Confined to Bed, Chair	3105	0.04	0.19	0	1
Never-light/moderate exercise	3105	0.17	0.37	0	1

Light exercise	3105	0.16	0.36	0	1
Light moderate exercise	3105	0.20	0.40	0	1
Never walks 20 min	3105	0.14	0.34	0	1
Walks 20 min once a week	3105	0.15	0.35	0	1
Walks 20 min 2-5x / wk	3105	0.34	0.48	0	1
Alcohol/Tobacco Use					
0-13 drinks / mo	3105	0.36	0.48	0	1
14-89 drinks / mo	3105	0.23	0.42	0	1
90 + drinks / mo	3105	0.03	0.18	0	1
Former Smoker	3105	0.20	0.40	0	1
Current Smoker	3105	0.25	0.43	0	1
Parity					
# of live births for female	3105	1.15	1.90	0	15
birth data missing	3105	0.04	0.19	0	1
Census Characteristics					
Disadvantage	3105	-0.16	0.91	-2.33	3.29
Affluence	3105	0.22	1.14	-1.36	3.00
% Hisp/Foreign Born	3105	0.11	0.95	-1.87	2.40
% Elderly	3105	0.01	1.08	-3.18	3.37

Table 2. OLS and Hierarchical Linear Models of Waist Size

Independent Variables	(1)[a] Coef	(SE)		(2)[b] Coef	(SE)		(3)[a] Coef	(SE)		(4)[b] Coef	(SE)		(5)[a] Coef	(SE)		(6)[b] Coef	(SE)	
Male	2.26	(0.27)	***	2.20	(0.28)	***	3.35	(0.34)	***	3.28	(0.35)	***	3.42	(0.80)	***	3.57	(0.86)	***
Age (ref. 18-29 year olds)																		
30-39 yrs	1.56	(0.35)	***	1.19	(0.38)	**	1.18	(0.38)	**	0.93	(0.40)	*	1.22	(0.37)	***	1.02	(0.39)	**
40-49 yrs	2.87	(0.42)	***	2.33	(0.45)	***	2.13	(0.44)	***	1.81	(0.45)	***	2.13	(0.43)	***	1.86	(0.44)	***
50-59 yrs	3.98	(0.48)	***	3.68	(0.48)	***	3.19	(0.50)	***	3.06	(0.50)	***	3.18	(0.50)	***	3.09	(0.50)	***
60-69 yrs	4.40	(0.51)	***	3.98	(0.53)	***	3.34	(0.60)	***	3.12	(0.63)	***	3.36	(0.61)	***	3.24	(0.63)	***
70+ yrs	3.93	(0.51)	***	3.74	(0.52)	***	2.61	(0.60)	***	2.48	(0.61)	***	2.08	(0.78)	**	1.72	(0.77)	*
Race/Ethnicity (ref. non-Hisp White																		
Non Hisp Black	2.31	(0.37)	***	1.97	(0.63)	**	1.83	(0.38)	***	1.49	(0.61)	*	2.70	(0.45)	***	2.38	(0.65)	***
Hisp	2.18	(0.39)	***	2.16	(0.44)	***	1.63	(0.40)	***	1.73	(0.45)	***	1.73	(0.40)	***	1.90	(0.44)	***
Non-Hisp Other	-1.06	(0.51)	*	-0.39	(0.63)		-1.21	(0.53)	*	-0.63	(0.64)		-1.33	(0.50)	**	-0.79	(0.62)	
Immigrant Status (ref. 3rd gen or later)																		
1st gen imm.	-0.94	(0.37)	**	-1.24	(0.41)	**	-1.13	(0.37)	**	-1.45	(0.41)	***	-1.14	(0.37)	**	-1.53	(0.40)	***
2nd gen imm.	0.41	(0.46)		0.07	(0.49)		0.37	(0.44)		0.02	(0.46)		0.41	(0.44)		0.01	(0.46)	
Education (ref. 16+ yrs educ)																		
0-11 yrs educ	1.15	(0.42)	**	0.49	(0.46)		0.74	(0.45)		0.28	(0.46)		1.83	(0.55)	***	1.43	(0.56)	*
12-15 yrs educ	0.86	(0.34)	*	0.28	(0.37)		0.63	(0.35)	^	0.21	(0.36)		1.50	(0.44)	***	1.08	(0.46)	*
Income (ref. $50K +)																		
LT $5K	-2.44	(0.64)	***	-2.68	(0.75)	***	-1.92	(0.64)	**	-2.03	(0.73)	**	-1.81	(0.63)	**	-1.95	(0.72)	**
$5K-LT$10K	0.50	(0.63)		0.23	(0.64)		0.56	(0.65)		0.35	(0.66)		0.65	(0.62)		0.40	(0.65)	
$10K-LT$30K	0.36	(0.41)		0.27	(0.43)		0.55	(0.41)		0.53	(0.44)		0.47	(0.41)		0.44	(0.43)	
$30K-LT$50K	-0.39	(0.40)		-0.36	(0.43)		-0.17	(0.38)		-0.08	(0.40)		-0.08	(0.38)		-0.06	(0.40)	
Income missing	-0.53	(0.41)		-0.85	(0.45)	^	-0.48	(0.42)		-0.68	(0.46)		-0.40	(0.41)		-0.64	(0.46)	
Healthcare Status																		
Has a regular doctor							-0.10	(0.08)		-0.10	(0.08)		-0.07	(0.08)		-0.06	(0.08)	
Has health insurance							0.21	(0.32)		0.21	(0.32)		0.16	(0.31)		0.14	(0.32)	

Marital Status and Family (ref. never married)												
Married	0.48	(0.35)		0.46	(0.37)		-0.26	(0.44)		-0.20	(0.47)	
Separated	0.47	(0.64)		-0.09	(0.68)		0.32	(0.65)		-0.28	(0.70)	
Divorced	1.06	(0.49)	*	0.83	(0.51)		0.23	(0.65)		-0.11	(0.66)	
Widowed	-0.34	(0.61)		-0.38	(0.62)		-0.47	(0.59)		-0.44	(0.62)	
Has no kids	-0.57	(0.31)	^	-0.43	(0.34)		-0.94	(0.40)	*	-0.69	(0.41)	^
Phyiscal Activity (ref. moderate-heavy exercise)												
Confined to Bed, Chair	1.68	(1.08)		1.20	(1.11)		3.83	(1.32)	**	2.74	(1.36)	*
Never-light/moderate exercise	0.45	(0.43)		0.42	(0.44)		0.36	(0.42)		0.28	(0.44)	
Light exercise	0.97	(0.38)	*	1.17	(0.41)	**	0.89	(0.38)	*	1.09	(0.40)	**
Light moderate exercise	0.21	(0.29)		0.26	(0.32)		0.19	(0.29)		0.27	(0.32)	
Walking (ref. walks 20 min a day)												
Never walks 20 min	0.54	(0.46)		0.80	(0.51)		0.63	(0.46)		0.87	(0.51)	^
Walks 20 min once a week	1.02	(0.38)	**	1.07	(0.41)	**	0.97	(0.38)	*	0.98	(0.41)	*
Walks 20 min 2-5x / wk	-0.22	(0.28)		-0.10	(0.30)		-0.18	(0.27)		-0.07	(0.29)	
Drinking (ref. not a current drinker)												
0-13 drinks / mo	-0.99	(0.33)	**	-0.95	(0.34)	**	-0.92	(0.33)	**	-0.88	(0.34)	**
14-89 drinks / mo	-0.65	(0.39)	^	-0.64	(0.41)		-0.65	(0.38)	^	-0.60	(0.40)	
90 + drinks / mo	-1.06	(0.76)		-1.62	(0.83)	^	-0.72	(0.76)		-1.26	(0.82)	
Smoking (ref. never smoked)												
Former Smoker	0.11	(0.32)		0.17	(0.34)		0.06	(0.32)		0.11	(0.33)	
Current Smoker	-0.87	(0.31)	**	-0.92	(0.31)	**	-0.79	(0.31)	*	-0.87	(0.32)	**
Parity												
# of live births for female	0.33	(0.08)	***	0.31	(0.09)	***	0.26	(0.10)	**	0.26	(0.10)	*
birth data missing	0.87	(0.68)		0.95	(0.71)		1.05	(0.66)		1.12	(0.69)	
Gender interactions												
male x 70+ yrs							1.27	(0.83)		1.98	(0.81)	*
male x nhblack							-1.98	(0.58)	***	-1.61	(0.61)	**
male x 0-11 yrs educ							-2.11	(0.75)	**	-2.42	(0.83)	**

male x 12-15 yrs educ													-1.76	(0.65)	**	-1.94	(0.71)	**
male x married													1.82	(0.56)	***	1.49	(0.60)	*
male x divorced													2.18	(1.02)	*	2.30	(1.07)	*
male x no kids													1.00	(0.60)	^	0.73	(0.65)	
male x in bed, chair													-4.46	(1.67)	**	-3.09	(1.72)	^
male x waist size missing													2.39	(1.12)	*	2.83	(1.19)	*
Imputation flag for waist size	-0.19	(0.59)		0.01	(0.64)		-0.44	(0.62)		-0.34	(0.67)		-1.73	(0.62)	**	-1.68	(0.69)	*
Constant	31.88	(0.42)	***	36.60	(0.18)	***	32.29	(0.72)	***	36.56	(0.18)	***	31.98	(0.79)	***	36.58	(0.18)	***

[a] OLS model

[b] Hierarchical linear model with neighborhood random effect

Table 3. OLS and Hierarchical Linear Models of Body Mass Index

Independent	(1)[a]			(2)[b]			(3)[a]			(4)[b]			(5)[a]			(6)[b]		
Variables	Coef	(SE)		Coef	(SE)		Coef	(SE)		Coef	(SE)		Coef	(SE)		Coef	(SE)	
Male	-0.39	(0.27)		-0.40	(0.28)		0.95	(0.35)	**	0.88	(0.35)	*	2.59	(0.46)	***	2.38	(0.48)	***
Age (ref. 18-29 year olds)																		
30-39 yrs	1.52	(0.36)	***	1.16	(0.39)	**	1.18	(0.39)	**	0.98	(0.41)	*	1.28	(0.38)	***	1.09	(0.40)	**
40-49 yrs	2.35	(0.44)	***	1.90	(0.46)	***	1.68	(0.44)	***	1.48	(0.46)	**	1.74	(0.44)	***	1.59	(0.46)	***
50-59 yrs	2.83	(0.51)	***	2.37	(0.50)	***	2.12	(0.54)	***	1.93	(0.53)	***	2.26	(0.53)	***	2.09	(0.52)	***
60-69 yrs	2.80	(0.51)	***	2.28	(0.54)	***	1.74	(0.57)	**	1.56	(0.61)	*	1.88	(0.57)	***	1.80	(0.61)	**
70+ yrs	1.64	(0.50)	***	1.38	(0.53)	**	0.29	(0.61)		0.26	(0.63)		0.58	(0.61)		0.62	(0.63)	
Race/Ethnicity (ref. non-Hisp White)																		
Non Hisp Black	2.77	(0.40)	***	2.65	(0.62)	***	2.22	(0.41)	***	2.11	(0.59)	***	3.41	(0.51)	***	3.18	(0.67)	***
Hisp	3.03	(0.40)	***	2.98	(0.47)	***	2.42	(0.41)	***	2.48	(0.47)	***	2.50	(0.41)	***	2.58	(0.47)	***
Non-Hisp Other	-0.41	(0.53)		0.74	(0.64)		-0.59	(0.52)		0.42	(0.64)		-0.63	(0.49)		0.25	(0.62)	
Immigrant Status (ref. 3rd gen or later)																		
1st gen imm.	-0.75	(0.37)	*	-1.12	(0.42)	**	-0.99	(0.38)	**	-1.33	(0.43)	**	-1.05	(0.38)	**	-1.39	(0.43)	***
2nd gen imm.	0.34	(0.46)		-0.03	(0.49)		0.30	(0.43)		-0.06	(0.46)		0.30	(0.43)		-0.06	(0.47)	
Education (ref. 16+ yrs educ)																		
0-11 yrs educ	1.15	(0.44)	**	0.70	(0.49)		0.80	(0.46)	^	0.52	(0.49)		1.97	(0.60)	***	1.66	(0.63)	**
12-15 yrs educ	0.76	(0.35)	*	0.31	(0.39)		0.55	(0.36)		0.26	(0.38)		1.17	(0.46)	*	0.84	(0.49)	^
Income (ref. $50K +)																		
LT $5K	-2.78	(0.68)	***	-2.96	(0.81)	***	-2.11	(0.68)	**	-2.24	(0.79)	**	-1.85	(0.70)	**	-2.03	(0.79)	**
$5K-LT$10K	-0.20	(0.70)		-0.34	(0.69)		-0.08	(0.70)		-0.26	(0.70)		0.05	(0.66)		-0.21	(0.68)	
$10K-LT$30K	-0.01	(0.43)		-0.16	(0.44)		0.26	(0.43)		0.13	(0.45)		0.31	(0.42)		0.18	(0.45)	
$30K-LT$50K	-0.82	(0.42)	*	-0.73	(0.43)	^	-0.54	(0.40)		-0.44	(0.42)		-0.36	(0.40)		-0.31	(0.42)	
Income missing	-0.74	(0.43)	^	-1.12	(0.47)	*	-0.68	(0.44)		-0.96	(0.48)	*	-0.53	(0.44)		-0.86	(0.48)	^
Healthcare Status																		
Has a regular doctor							-0.12	(0.08)		-0.09	(0.08)		-0.11	(0.08)		-0.09	(0.08)	
Has health insurance							0.32	(0.32)		0.32	(0.32)		0.33	(0.31)		0.31	(0.32)	
Marital Status and Family (ref. never married)																		
Married							0.28	(0.35)		0.13	(0.38)		0.53	(0.35)		0.32	(0.38)	
Separated							0.09	(0.63)		-0.50	(0.66)		0.18	(0.62)		-0.46	(0.65)	
Divorced							0.93	(0.49)	^	0.60	(0.51)		1.05	(0.49)	*	0.65	(0.51)	

Widowed							-0.13	(0.62)		-0.33	(0.65)		-0.18	(0.60)		-0.36	(0.64)	
Has no kids							-0.72	(0.29)	*	-0.67	(0.32)	*	-0.70	(0.29)	*	-0.68	(0.31)	*
Phyiscal Activity (ref. moderate-heavy exercise)																		
Confined to Bed, Chair							0.45	(1.12)		0.40	(1.14)		1.95	(1.48)		1.35	(1.54)	
Never-light/moderate exercise							0.50	(0.45)		0.47	(0.45)		0.49	(0.44)		0.44	(0.45)	
Light exercise							1.03	(0.41)	*	1.17	(0.43)	**	1.01	(0.40)	*	1.15	(0.43)	**
Light moderate exercise							0.17	(0.28)		0.15	(0.30)		0.22	(0.28)		0.22	(0.30)	
Walking (ref. walks 20 min a day)																		
Never walks 20 min							0.91	(0.47)	^	0.92	(0.52)	^	0.93	(0.47)	*	0.93	(0.52)	^
Walks 20 min once a week							1.30	(0.41)	**	1.17	(0.44)	**	1.18	(0.41)	**	1.06	(0.44)	*
Walks 20 min 2-5x / wk							-0.11	(0.27)		0.01	(0.30)		-0.09	(0.27)		0.02	(0.30)	
Drinking (ref. not a current drinker)																		
0-13 drinks / mo							-0.59	(0.33)	^	-0.50	(0.34)		-0.53	(0.33)		-0.45	(0.34)	
14-89 drinks / mo							-0.75	(0.38)	*	-0.70	(0.39)	^	-0.80	(0.37)	*	-0.72	(0.39)	^
90 + drinks / mo							-0.91	(0.70)		-1.51	(0.80)	^	-0.68	(0.72)		-1.24	(0.81)	
Smoking (ref. never smoked)																		
Former Smoker							0.11	(0.33)		0.14	(0.35)		0.14	(0.33)		0.17	(0.35)	
Current Smoker							-1.15	(0.33)	***	-1.11	(0.33)	***	-1.11	(0.32)	***	-1.09	(0.33)	***
Parity																		
# of live births for female							0.38	(0.10)	***	0.36	(0.10)	***	0.23	(0.11)	*	0.22	(0.11)	*
birth data missing							1.08	(0.76)		1.16	(0.85)		1.32	(0.75)	^	1.35	(0.83)	
Gender interactions																		
male x nhblack													-2.52	(0.56)	***	-2.01	(0.57)	***
male x 0-11 yrs educ													-2.22	(0.67)	***	-2.36	(0.73)	**
male x 12-15 yrs educ													-1.16	(0.58)	*	-1.19	(0.62)	^
male x confined in bed, chair													-3.23	(1.89)	^	-2.02	(2.01)	
male x height missing													8.87	(2.26)	***	9.57	(3.63)	**
Imputation flag for weight	2.20	(1.03)	*	2.02	(1.21)	^	2.30	(1.00)	*	2.15	(1.17)	^	2.04	(0.99)	*	1.90	(1.13)	^
Imputation flag for height	1.33	(1.63)		1.46	(1.94)		1.09	(1.74)		1.22	(1.99)		-1.54	(1.40)		-1.49	(1.55)	
Constant	25.02	(0.43)	***	28.20	(0.18)	***	25.15	(0.72)	***	28.17	(0.19)	***	24.06	(0.75)	***	28.17	(0.19)	***

[a] OLS model

[b] Hierarchical linear model with neighborhood random effect

Table 4. Neighborhood-Level Coefficients from Hierarchical Linear Models of Waist Size and BMI

	Waist Size									BMI								
	(1)			(2)			(3)			(1)			(2)			(3)		
Neighborhood Factor	Coef.	(SE)		Coef.	(SE)		Coef.	(SE)		Coef.	(SE)		Coef.	(SE)		Coef.	(SE)	
Disadvantage	0.11	(0.19)		0.16	(0.19)		0.08	(0.19)		-0.18	(0.18)		-0.10	(0.18)		-0.09	(0.18)	
Affluence	-0.61	(0.15)	***	-0.49	(0.16)	**	-0.48	(0.16)	**	-0.56	(0.16)	***	-0.43	(0.16)	**	-0.44	(0.16)	**
Hispanic/Foreign Born	-0.21	(0.23)		-0.21	(0.23)		-0.14	(0.22)		-0.18	(0.22)		-0.19	(0.22)		-0.17	(0.21)	
Elderly Composition	0.09	(0.13)		0.09	(0.13)		0.09	(0.12)		0.05	(0.13)		0.01	(0.14)		0.02	(0.13)	
<u>Individual-Level Controls</u>																		
Age, sex, race/ethnicity, immigration, and income	√			√			√			√			√			√		
Marital status, living with kids, pregnancy history, health insurance, regular source of medical care, physical activity, walking, drinking, smoking				√			√						√			√		
Interactions with gender (same interactions used in Tables 2 and 3)							√									√		