

Appendix A. Sensitivity analyses examining overweight or obesity (BMI \geq 85%)

Compared to non-Hispanic white children, odds of overweight or obesity were 30% higher for non-Hispanic black children (OR: 1.3, 95% CI: 1.2-1.5) and 60% higher for Mexican-American children (OR: 1.6, 95% CI: 1.4-1.8) in models adjusting only for survey cycle, sex, and age (Supplementary Table 1). Model 2b adjusted for individual-level SES, and ORs were attenuated by 42% and 21%, respectively. In model 3b, adjusted for individual-level SES, tract-level deprivation, and the interaction between these two factors, the odds of overweight or obesity were no longer significantly higher for non-Hispanic black children compared to non-Hispanic white children (OR: 1.1, 95% CI: 0.9-1.2), and were attenuated by 82% over the estimate from the unadjusted model. The odds of overweight or obesity for Mexican-American children were attenuated by 39%, however they remained significantly higher than that observed for non-Hispanic white children (OR: 1.3, 95% CI: 1.2-1.5).

Supplementary Table 1. Results of multi-level models examining race and ethnicity and odds of overweight and obesity. Estimates are ORs (95% CI).

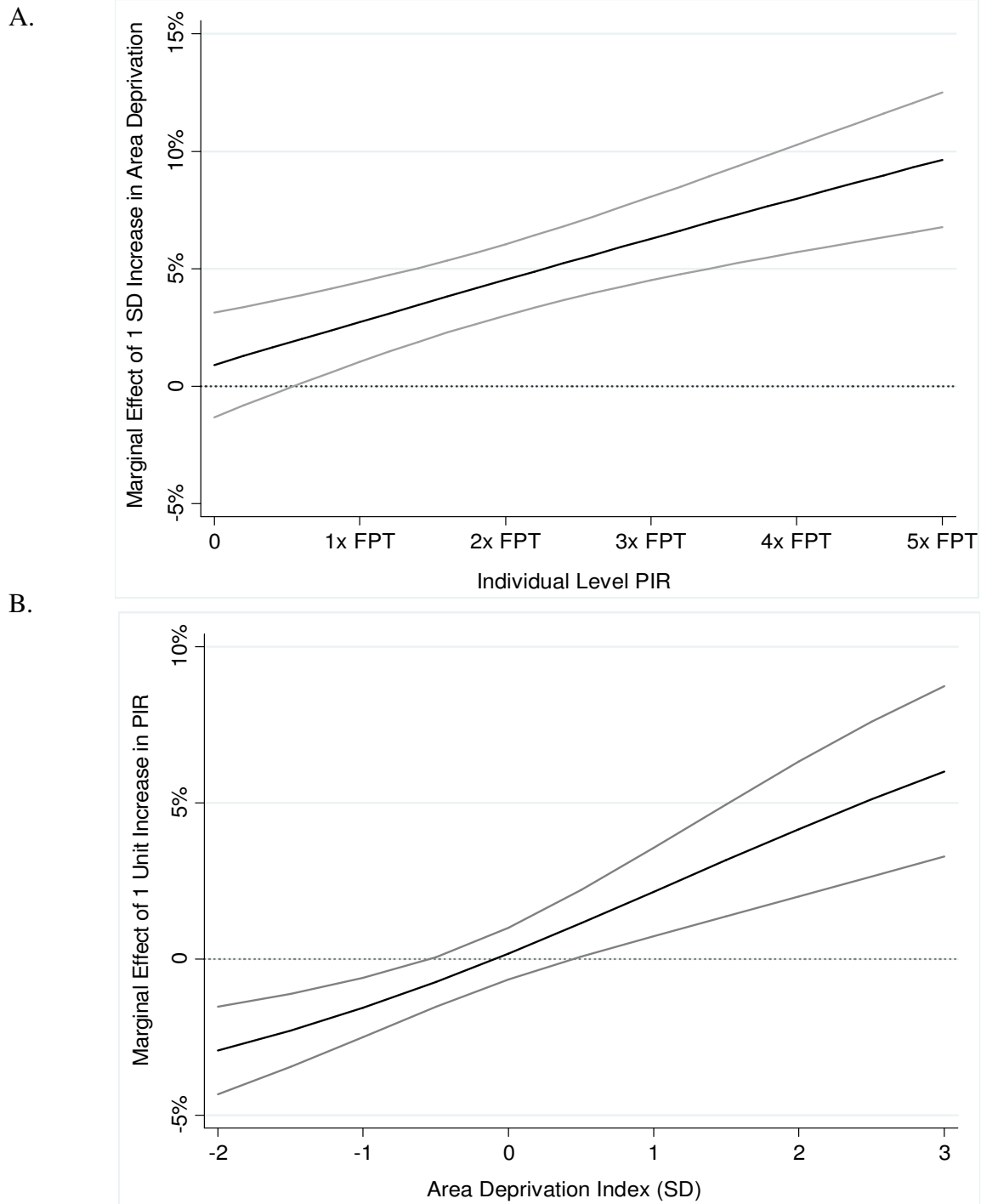
	Model 1b Race Only OR (95% CI)	Model 2b Individual Characteristics OR (95% CI)	Model 3b Model 2b + Deprivation Index + Interaction OR (95% CI)
Race or Ethnicity			
Non-Hispanic white	Reference	Reference	Reference
Non-Hispanic black	1.3 (1.2-1.5)	1.2 (1.1-1.3)	1.1 (0.9-1.2)
Mexican-American	1.6 (1.4-1.8)	1.4 (1.3-1.6)	1.3 (1.2-1.5)
% change in black-white OR from Model 1		-41.6%	-81.7%
% change in MA-white OR from Model 1		-21.0%	-39.2%
ICC	0.09	0.09	0.08
PCV	8.1%	8.6%	15.9%
-2LL	18605.5	18311.3	18265.0
BIC	18654.2	18457.5	18430.6

Note: Model 1b adjusts for age, age-squared, survey cycle, and sex. Models 2b-3b add caregiver education, caregiver marital status and PIR. Model 3b adds the tract deprivation index and the PIR by deprivation index interaction. % change in the race/ethnicity coefficients (β) are calculated on the logit scale using Model 1b coefficients as the reference.

ICC: intraclass correlation coefficient; PCV: percent change in variance; -2LL: -2 log likelihood; BIC: Bayesian Information Criterion; PIR: Income-to-Poverty Ratio

The interaction between tract-level deprivation and individual PIR was significant. The differential effect of individual SES by tract deprivation can be seen in Supplementary Figure 1. These figures depict the marginal effects of increasing individual PIR across levels of area deprivation (and vice versa), where effects refer to the discrete change in predicted marginal probability of BMI \geq 85% and not to odds. Similar to the results for obesity, there was a positive association between area deprivation and probability of BMI \geq 85% among children with incomes greater than 50% of the poverty threshold. Although only a small proportion of non-Hispanic white children fall below this level of income (4%), 18% of non-Hispanic black children and 14% of Mexican-American children were within this very low-income category. The marginal increase in probability of BMI \geq 85% associated with a 1 standard deviation increase in tract-level deprivation was larger with higher income (Supplementary Figure 1a). For example, among children at the poverty threshold, the marginal increase in probability of BMI \geq 85% associated with a 1 SD increase in area deprivation was less than 5%; however, this increase in probability was nearly 10% for the highest-income children (500% FPT). Area deprivation was not significantly associated with probability of BMI \geq 85% among children below 50% FPT. Put a different way, there was a protective effect of individual-income for children living in lower-deprivation (i.e., high SES) neighborhoods, but an inverse association between income and overweight or obesity among children living in higher-deprivation neighborhoods (Supplementary Figure 1b).

Supplementary Figure 1. Interaction between individual-level poverty and tract-level deprivation in models of overweight and obesity. Marginal effects are the marginal increase in probability of BMI \geq 85% associated with a one-unit increase in PIR or area deprivation.



Note: Marginal effects were obtained using the margins, dydx command in Stata following svy logistic regression procedures which produces the discrete change in probability of the outcome with respect to the interaction terms.

Overall, the PCV suggests that approximately 16% of the tract-level variation in odds of BMI \geq 85% was attributable to individual-level characteristics (including race/ethnicity and SES), tract-level deprivation, and the cross-level interaction term included in the model (Supplementary Table 1).

Appendix B. Sensitivity analyses using alternate weighting methods.

Two methods were used to scale the sampling weights for use in multilevel models, as described in Rabe-Hesketh & Skrondal (2006):

Method A

$$w_{ij}^* = w_{ij} \left(\frac{n_j}{\sum_i w_{ij}} \right)$$

Method B

$$w_{ij}^* = w_{ij} \left(\frac{\sum_i w_{ij}}{\sum_i w_{ij}^2} \right)$$

For both, w_{ij}^* represents the scaled weight for individual i in cluster j , w_{ij} the unscaled weight for individual i in cluster j , and n_j the number of sample units in cluster j .

The MEC sample weights were scaled using the following procedures in Stata 12SE:

```
gen sqw = MEC_WT^2
egen sumsqw = sum(sqw), by(TRACT)
egen sumw = sum(MEC_WT), by(TRACT)
egen nj = count(SEQN), by(TRACT)
gen bw1 = MEC_WT *(sumw/sumsqw)
gen aw1 = MEC_WT *(nj/sumw)
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Models using method B are described in the paper, results from models using method A are depicted below.

Supplementary Table 2. Results of multi-level models examining race and ethnicity and odds of obesity using weight scaling method A. Estimates are ORs (95% CI).

	Model 1c Race Only OR (95% CI)	Model 2c Individual Characteristics OR (95% CI)	Model 3c Model 2c + Deprivation Index + Interaction OR (95% CI)
Race or Ethnicity			
Non-Hispanic white	Reference	Reference	Reference
Non-Hispanic black	1.5 (1.3-1.7)	1.3 (1.1-1.5)	1.1 (1.0-1.4)
Mexican-American	1.7 (1.4-1.9)	1.5 (1.3-1.7)	1.3 (1.1-1.6)
% change in black-white β from Model 1		-31.9%	-65.8%
% change in MA-white β from Model 1		-24.0%	-42.7%
ICC	0.19	0.19	0.18
PCV	5.5%	7.7%	10.7%
-2LL	17556.6	17276.1	17629.6
BIC	17605.3	17422.3	17863.5

Note: Model 1c adjusts for age, age-squared, survey cycle, and sex. Models 2c-3c add caregiver education, caregiver marital status, and PIR. % change in the race/ethnicity coefficients (β) are calculated on the logit scale using Model 1c coefficients as the reference. ICC: intraclass correlation coefficient; PCV: percent change in variance; -2LL: -2 log likelihood; BIC: Bayesian Information Criterion; PIR: Income-to-Poverty Ratio

Supplementary Table 3. Results of multi-level models examining race and ethnicity and odds of overweight and obesity using weight scaling method B. Estimates are ORs (95% CI).

	Model 1d Race Only OR (95% CI)	Model 2d Individual Characteristics OR (95% CI)	Model 3d Model 2d + Deprivation Index + Interaction OR (95% CI)
Race or Ethnicity			
Non-Hispanic white	Reference	Reference	Reference
Non-Hispanic black	1.3 (1.2-1.5)	1.2 (1.1-1.4)	1.1 (0.9-1.2)
Mexican-American	1.6 (1.4-1.8)	1.5 (1.3-1.7)	1.4 (1.2-1.6)
% change in black-white OR from Model 1		-38.4%	-73.6%
% change in MA-white OR from Model 1		-19.2%	-34.4%
ICC	0.16	0.16	0.16
PCV	5.0%	7.1%	9.4%
-2LL	23512.0	23165.3	23118.0
BIC	23560.8	23311.5	23283.7

Note: Model 1d adjusts for age, age-squared, survey cycle, and sex. Models 2d-3d add caregiver education, caregiver marital status, and PIR. % change in the race/ethnicity coefficients (β) are calculated on the logit scale using Model 1 coefficients as the reference. ICC: intraclass correlation coefficient; PCV: percent change in variance; -2LL: -2 log likelihood; BIC: Bayesian Information Criterion