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Race/Ethnic and Nativity Disparities in Child Overweight in the United States and England

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Abstract

Child overweight is a growing problem in wealthy countries. There is also evidence that child overweight varies by race/ethnicity and socioeconomic status. In this article, the authors use data from two recent birth cohort studies in the United States and England to address four questions: (1) Are race/ethnic and immigrant status associated with child overweight? (2) Is the association between socioeconomic status and child overweight similar across race/ethnic and nativity subgroups? (3) Does the age of immigrant mothers at migration moderate the association between immigrant status and child overweight? and (4) Does maternal obesity mediate the association between race/ethnicity and nativity and child overweight? Findings indicate that (1) race/ethnicity and immigrant status are risk factors for child overweight in both countries, (2) the influence of socioeconomic status differs by subgroup, (3) mother's age at migration does not moderate the association, and (4) mother's obesity mediates some of the race/ethnic disparities in child overweight.

Keywords

overweight; immigrant children; race and ethnicity; international comparisons; socioeconomic status

Child overweight and obesity are rapidly becoming serious health problems in wealthy countries (Sassi 2010). Overweight and obesity are associated with diabetes, hypertension, and high cholesterol during childhood (Daniels 2009) and with obesity and obesity-related diseases during adulthood (Whitaker et al. 1997; Dietz 1998; Nader et al. 2006). Compounding the seriousness of the trend in child obesity are stark disparities by race/ethnicity and socioeconomic status. In the United States, black and Hispanic children are much more likely to be obese than white children, and poor children are more likely to be obese than nonpoor children (Ogden et al. 2010). Similar disparities by socioeconomic status have been documented in other wealthy countries, and similar race/ethnic disparities have been documented in England (Jebb, Rennie, and Cole 2004; Wardle et al. 2006; Balakrishnan, Webster, and Sinclar 2008; Harding et al. 2008).

Child overweight may also vary by nativity status. Despite their relatively low economic status, Latino (adult) immigrants coming to the United States actually have lower rates of obesity than their native-born counterparts, though this advantage fades with time (Antecol and Bedard 2006). In the United States, the evidence is mixed as to whether the immigrant advantage extends to children of immigrants (Van Hook and Balistreri 2007; Balistreri and Van Hook 2009; Li et al. 2011; Van Hook and Baker 2010), and there is virtually no evidence about the influence of nativity status for child obesity in other countries.

This article addresses four questions. First, we ask whether disparities in child overweight exist for a broad set of race/ethnic and immigrant subgroups. Second, we ask whether the association between socioeconomic status and child overweight is similar for different race/ethnic and immigrant subgroups. Third, we ask whether mother's age at arrival in the host country moderates the association between immigrant status and child overweight. And finally, we ask whether maternal obesity mediates child's overweight.

We address these questions using data from the United States and England. Comparing the United States and England is useful for several reasons. First, England is similar to the United States in terms of culture, social inequality, and rapidly increasing overweight and obesity rates. Second, health differentials between ethnic groups and whites in England are of similar magnitude to those found in the United States for a variety of markers (Nazroo et al. 2007; Teitler et al. 2007). Third, England contains a much broader range of race/ethnic and immigrant subgroups than exists in the United States, which allows us to see if patterns observed in the United States can be generalized to a broader set of subgroups. Fourth, while immigrant groups in England (Asians, blacks, and whites) are very different from the Hispanic immigrant majority in the United States, in both countries immigrants tend to have lower socioeconomic status, in terms of both education and income. And finally, the role of nativity status in health—and child overweight in particular—is almost completely unexamined in England, largely because of data limitations.

Background

Race, ethnic, and nativity differences

Racial and ethnic disparities in childhood obesity are well documented in the United States, where both Hispanic and black children face much higher levels of obesity and overweight than do white children (Hamilton, Teitler, and Reichman 2011; Ogden et al. 2010; Kimbro, Brooks-Gunn, and McLanahan 2007). Similarly, a number of studies in England show that obesity is more prevalent among children of black Caribbean/black African ancestry and Asian ancestry (Pakistani, Bangladeshi, Indian) than among white children (Jebb, Rennie, and Cole 2004; Wardle et al. 2006; Balakrishnan, Webster, and Sinclar 2008; Harding et al. 2008). Unfortunately, none of the England-based studies uses nationally representative data.

In addition to a well-developed literature on race and ethnic disparities, a number of researchers have examined the association between obesity and nativity status. Foreign-born status appears to provide a protective effect against obesity for adults in the United States, either due to healthy immigrant selection or protective cultural practices, although the effect dissipates with duration of residence (Antecol and Bedard 2006). Having a foreign-born mother has also been found to protect against low birth weight among children (Landale, Oropesa, and Gorman 1999; Acevedo-Garcia, Soobader, and Berkman 2005; Bates and Teitler 2008). Finally, there is evidence in both countries that foreign-born mothers adhere to healthier behaviors than do native-born mothers, including higher rates of breastfeeding and lower rates of smoking (Jackson, McLanahan, and Kiernan 2009).

Given the health advantage associated with immigrant status, we might expect that having a foreign-born mother would be protective against child overweight and obesity, at least among children of similar race/ethnic backgrounds. However, studies that have examined body mass index (BMI) trajectories in the United States are decidedly mixed. One set of studies using the Early Childhood Longitudinal Study–Kindergarten Cohort (ECLS-K) and focusing on changes between kindergarten and fifth grade finds that children of immigrants are heavier and gain weight faster than children of native-born parents (Van Hook and Balistreri 2007; Balistreri and Van Hook 2009; Van Hook and Baker 2010). In contrast,Li et al. (2011), using data from the Early Childhood Longitudinal Study–Birth Cohort (ECLS-B)

and looking at cross-sectional rates of obesity at ages nine months and four years, find no difference between children of native-and foreign-born parents.

Whereas the evidence concerning the association between immigrant status and child overweight and obesity in the United States is mixed, no studies have examined nativity and body weight in England, largely due to a lack of data. Although England has exceptionally strong population-based cross-sectional and longitudinal surveys, until recently respondents were not asked about their country of birth. The Health Survey of England, a rich source for health studies, gathered data on country of birth for a small nonrepresentative subsample of ethnic minorities in the 2004 survey; thus, researchers have had to extrapolate from studies that look at ethnic differences in child obesity without considering nativity (Labree et al. 2011). The latest birth cohort study in the United Kingdom—the Millennium Cohort Study (MCS)—asks about mothers' country of birth and thus allows a comparison of obesity between children of native- and foreign-born mothers.

Based on the findings described above, we hypothesize that nonwhite minority children will have higher rates of overweight in both the United States and England. We also hypothesize that children of immigrant parents will have a lower risk for overweight than their native-born counterparts within each race/ethnicity.

The role of income and education

The relationship between child overweight and socioeconomic status is complicated. On one hand, higher income may result in more money available for high-quality food and a safe environment in which children can be physically active. On the other hand, higher income may lead to the purchase of excess calories, especially among immigrants from countries in which food is less abundant than in the United States. Specifically, parents from disadvantaged race/ethnic groups and parents with immigrant backgrounds may have different ideas about child overweight and may consider overweight to represent a healthy body type associated with economic success.

Likewise, maternal education could be either a protective factor or a risk factor for child overweight. In general, high maternal education should lead to more knowledge about healthy food and activity choices, in which case we would expect children of educated mothers to be at lower risk of overweight. For some ethnic minority groups, however, and particularly for immigrant mothers, low education may result in the adherence to more traditional cultural practices, including food preparation, that are actually protective against overweight. Moreover, for immigrant mothers who were educated in a different country, education may not have the same relationship to diet and exercise behaviors as it has for mothers educated in the United States or England.

With respect to the empirical evidence, for the general population in both the United States and England, high income and education appear to be protective against child overweight. Evidence from the National Health and Nutrition Examination Survey (NHANES) demonstrates clear income and education gradients in obesity for white children in the United States, with higher income and education being protective against obesity. However, this is not the case for black and Hispanic children (Ogden et al. 2010). The gradient for these children is muted and in some cases nonexistent. Likewise, children of immigrant parents with higher income and education levels appear to be at higher risk for overweight, especially if their mothers were born in an economically underdeveloped country (Van Hook and Balistreri 2007). Balistreri and Van Hook (2009) find a positive gradient among children of Hispanic immigrants where higher income translates into faster increases in body weight. These researchers find no subgroup education gradient for children of immigrants.

To date, socioeconomic differences in either BMI or obesity within race/ethnic and nativity status subgroups have not been explored in England.

Based on the findings described above, we hypothesize that low education and low income will be risk factors for child overweight for native-born white children but less so for nonwhite children. We also hypothesize that low income and low education may actually be protective against overweight for children of immigrant mothers.

Mother's age at migration

According to assimilation theory, the longer immigrants live in the host country, the more similar they become to the local population in terms of their attitudes and behaviors. Thus, any advantages that immigrant parents bring with them in terms of their health and health behavior will be stronger for children whose mothers arrived in the United States or England more recently. They also should be stronger for children whose mothers migrated as adults (compared with those whose mothers migrated during childhood) insofar as the latter are expected to assimilate more quickly to local culture than the former. Those who migrate as adults should also be more likely to be healthy based on "healthy immigrant selection." Prior studies indicate that immigrants are healthier, on average, than those who do not migrate.

Mother's age at arrival and duration in country of residence have been examined only recently in the United States, and there are no studies on this topic in England. Van Hook and Balistreri (2007) found that immigrant mothers' generation status, measured as those who arrived either before or after the age of 12, was associated with child BMI trajectories, but the relationship varied according to the level of economic development of the country of origin. Among children of immigrant parents from less developed countries, having a mother who migrated after age 12 was protective against weight gain, but only for those who were of low socioeconomic status in the United States. In contrast, Van Hook and Baker (2010) found that boys of mothers who immigrated after age 12 were heavier than boys of mothers who immigrated earlier in childhood. In short, the evidence on the influence of mother's age at migration on child overweight is mixed.

Based on the findings cited above, we hypothesize that the protective effect of immigrant status will be stronger for children whose mothers migrate at later ages. We believe that using adulthood is the appropriate cutoff point to measure these differences.

Maternal obesity

Mother's BMI and obesity status are expected to be associated with child overweight because of genetic factors as well as cultural attitudes and practices. We also know that maternal obesity varies significantly by race/ethnicity and nativity status. Thus, mother's obesity is a potential mediator of the association between race/ethnicity and nativity status and child overweight. In the United States, mother's obesity is a predictor of child overweight and strongly associated with child obesity at age three for Hispanics, blacks, and whites (Kimbro, Brooks-Gunn, and McLanahan 2007). In England, there is also evidence that maternal obesity is associated with child overweight, though differences by subgroup have not been examined (Hawkins et al. 2009). Maternal obesity has not been explored as an explanation for nativity differences in child overweight. Based on these findings, we hypothesize that maternal obesity should be highly related to child overweight for all subgroups and should mediate race/ethnic and nativity differences in child overweight.

Data and Methods

Data

This study relies on two national birth cohort studies that follow children from birth to middle childhood: the Fragile Families and Child Wellbeing Study (FFS) for the United States and the Millennium Cohort Study (MCS) for England. Both studies are based on probability samples and both contain rich longitudinal information on children and their families. In addition, these studies are particularly well suited for comparison due to the sampling time frames and the consistency of age at follow-up. The FFS follows 4,898 children born in large U.S. cities between 1998 and 2000 and is representative of urban births. The FFS oversamples nonmarital births and includes a large number of race and ethnic minorities. Mothers and fathers were interviewed in the hospital soon after birth, and follow-up interviews were conducted when children were ages one, three, five, and nine. The FFS sample of immigrant and native-born mothers is similar to the national population as reported in vital statistics. The FFS sample size used here is 2,930.

The MCS is a nationally representative sample of 18,818 children born in the United Kingdom between 2000 and 2002. The first interview was conducted when the child was nine months old, and follow-up interviews were conducted at ages three, five, and seven. The data include oversamples from disadvantaged areas and areas with a high proportion of ethnic minority residents. For this article, we exclude Scotland, Wales, and Northern Ireland from the sample, as these countries combined have fewer than 150 nonwhite respondents. We also restrict the sample to children whose biological mothers are the respondents in each wave, to be consistent with the FFS. Because the first wave of the MCS is at nine months (rather than at birth as in the FFS), the biological mother is not the primary respondent in a small proportion of the sample. We end up with a sample of 6,816 children.

Measures

Overweight—BMI is calculated from weight and height measurements for children at ages three and nine in the United States and ages three and seven in England. BMI is categorized by age in months and gender percentiles according to the Centers for Disease Control and Prevention (CDC) guidelines. We use the CDC 85th percentile to designate children that are overweight. We use this cutoff point rather than the International Obesity Task Force (IOTF) cutoff points normed on countries such as the United States and United Kingdom because the former contains more age categories than the latter. The results are not sensitive to the overweight measure used.

Nativity status and race/ethnic subgroups—In both the MCS and the FFS data, all children are born within England or the United States, respectively. We use mother's country of birth to determine whether the mother is native-born or foreign-born. We combine mother's nativity status with ethnicity to create four separate nativity/race/ethnicity categories in the United States and six separate categories in England. In the United States, the groups are white native-born, black native-born, Hispanic native-born, and Hispanic foreign-born. The sample size was too small to include categories for foreign-born whites, foreign-born blacks, and Asians. In England, the categories include native- and foreign-born mothers for the following race and ethnic groups: white, Asian (Pakistani, Bangladeshi, and Indian), and black (Caribbean and African).

Age at arrival—In both datasets questions are asked about when immigrant mothers came to the United States or England. We use these measures to distinguish between mothers who arrived at age 17 or younger and those who arrived at age 18 or later. We chose age 18 as the cutoff point to best estimate differences for immigrants who came as dependents versus

those who selected to come as adults. Those who migrated at or after age 18 are more likely to be healthy based on both selection and cultural health behaviors. Additionally, the results are not sensitive to other cutoff points, such as using age 12 as the cutoff rather than age 18, which has been done in previous research looking at acculturation and child BMI growth (Balistreri and Van Hook 2009).

Socioeconomic status—We use family income and mother's education to measure socioeconomic status. To measure education, we use a dichotomous indicator to distinguish between mothers with high and low education. In the United States, "low education" equals having a high school diploma or less, and "high education" equals having some college or more. In England, the measure picks up a similar level of skill by categorizing mothers who have completed their O-levels or less as "low education," and those who have completed A-levels or the vocational equivalent or higher as "high education." Ordinary (O-) levels are the exams that students take when they leave high school. A-levels are the exams that students take when they are preparing to enter college. A-levels require additional years of study, and thus they are equivalent to "some college" in the United States (Jackson, McLanahan, and Kiernan 2009).

For income, we use an indicator of whether the family is poor, which we categorize as being in the bottom 30 percent of the income distribution in either the United States or England, which matches up closely with the 50-percent-of-median-income measure commonly used for international comparisons of poverty. The measure is adjusted for family size. We conducted sensitivity analyses using continuous measures of education and income, and the results are robust to these specifications.

Control variables—Our analysis controls for several variables that are expected to be associated with child's overweight as well as race, ethnicity, and nativity. These include gender, mother's marital status, child's age in months, mother's age at child's birth, parity (the number of times a woman has given birth), and whether the child was low birth weight (less than 2,500 grams). We estimated additional models that included a number of other typical child obesity model covariates, such as breastfeeding and maternal employment,[1] but these did not impact the findings.

Method

Table 1 presents percentages of overweight and all covariates for the total sample in the United States and England and for each race/ethnic and nativity subgroup. Tables 2 and 3 present estimates from multivariate logistic regression models that examine the association between race/ethnicity and nativity status and child overweight at age nine in the United States (see Table 2) and age seven in England (see Table 3). These tables include models that interact socioeconomic status by race/ethnic and immigrant status, first by income and then by education, to determine whether the association between socioeconomic status and race/ethnicity and nativity status is similar across all subgroups. We estimated models that divided the foreign-born race/ethnic groups into those whose mothers migrated at or after age 18 and those whose mothers migrated before age 18. Because we did not see any differences by mother's age, results from these models are reported in appendix Table A3. Finally, the tables include models that test the extent to which mother's body weight accounts for differences in child overweight. Each of these models is estimated for children at ages three and seven/nine; since the patterns for younger children were less significant than those for school-age children, the former are reported in appendix Tables A1 (United States) and A2 (England). Stata/SE version 11 software was used to conduct all analyses.

[1]Available on request.

Results

As shown in Table 1, there is noteworthy subgroup variation by race/ethnicity and nativity on overweight in both the United States and England. In the United States at age three, black children have the same risk of being overweight as white children. Hispanic children with native-born mothers are much more likely to be overweight than white children, as are Hispanic children with foreign-born mothers. At age nine, both blacks and Hispanics are more likely to be overweight than white children, and there is very little difference within the Hispanic group by maternal nativity status.

In England, we find that at age three, all Asians are less likely to be overweight than whites, whereas black children with foreign-born mothers are much heavier than all the other subgroups. At age seven, the patterns are slightly different. Asians are similar to whites, though native-born Asian children are slightly heavier than whites. Black children with native-born mothers are also more likely than whites to be overweight, but, again, black children with foreign-born mothers are the heaviest of all the groups.

Maternal obesity also varies by both race/ethnicity and nativity status in the United States. Native-born black and Hispanic mothers are more likely to be obese than native-born white mothers, but the difference between whites and foreign-born Hispanics is much smaller, especially at the year nine wave. At wave nine, foreign-born Hispanics are much less likely to be obese than native-born Hispanics. In England, there is less variation in maternal obesity, except for blacks, who are heavier than other groups. Among blacks, foreign-born mothers are more likely to be obese than native-born mothers.

When we break down the foreign-born groups into those who arrived before versus after age 18, we find a fairly equal mix of U.S. Hispanics and English Asians in each category. However, black immigrants in England are much more likely to have arrived as adults. In fact, we are unable to conduct the multivariate analyses by mother's age for blacks in England due to these sample size restrictions.

The subgroups also differ with respect to the control variables. In the United States, white mothers are more likely to be married than nonwhite mothers. In England, regardless of immigration status, Asian mothers are more likely to be married and black mothers are less likely to be married than white mothers. We also find clear race/ethnic/nativity differentials in low birth weight in both countries. Black children are more likely than white children to be of low birth weight in the United States, and both black children and Asian children are more likely to be of low birth weight in England.

All foreign-born groups are more likely to be poor than native-born groups, with the exception of whites in England. The same patterns by race/ethnicity and nativity status can be seen for low maternal education in the United States, but the pattern is less clear in England, where native-born Asians and native-born blacks actually have levels of education that are similar to those of whites. In both countries, foreign-born minorities—Hispanics in the United States and blacks and Asians in England—are more likely to have low education than their native-born counterparts.

Multivariate analyses

Our first question asked whether race/ethnicity and nativity status are associated with child overweight. We hypothesized that nonwhite minority children would have a higher risk of overweight in both the United States and England. We also hypothesized that children of immigrant parents would have a lower risk for overweight than children of native-born whites and children of similar race/ethnic groups. The results for middle childhood are

presented in Tables 2 (United States) and 3 (England), using logistic regression models.[2] Looking first at the results for the United States, model 1 indicates that blacks and native-born Hispanics are significantly more likely to be overweight at age nine than are whites (see Table 2). In England (see Table 3), there is also evidence that children of native-born race/ethnic minorities are more likely to be overweight at age seven, although the coefficients are not always statistically significant. With respect to nativity status, the children of Hispanic immigrants have a higher risk of overweight than the children of native-born whites and the same risk as children of native-born Hispanics. In England, the children of foreign-born black mothers have a higher risk of overweight than native-born white and native-born blacks. Children of foreign-born Asians are no different from children of native-born whites (or native-born Asians).

Our second research question asked whether the influence of socioeconomic status is similar across different race/ethnic and nativity subgroups. We hypothesized that low education and low income would be risk factors for child overweight for native-born white children but less so for nonwhite children. We also hypothesized that low income and low education would be protective against overweight among children of immigrant mothers. As shown in model 2 of Table 2, low income appears to be slightly protective overall against overweight (though significant at only the .10 level), whereas low maternal education is a risk factor. Poor children are not statistically different from nonpoor children, and children of parents with low education levels are more likely to be overweight than children of more educated parents. When both income and education are added to the model, the race/ethnic differences in overweight do not change.

In model 3 of Table 2, we see that while low income is not significantly associated with overweight for white children (if anything, low income increases the likelihood of overweight), low income reduces the risk of overweight for nonwhite children. The interaction with low income is statistically significant only for black children, but the overall pattern is similar for all nonwhite groups. When we interact the race/ethnic and nativity subgroups with education in model 4, we see a similar pattern: having a mother with low education reduces the risk for child overweight. Though the interaction is not significant, we can see that for children of foreign-born Hispanic mothers, low education is associated with a higher risk of overweight. Interestingly, these patterns are not as apparent for toddlers in the models examining overweight at age three (see appendix Table A1).

For England (models 3 and 4 of Table 3), we see that, except for whites, the coefficients for children of nonwhite native- and foreign-born mothers are negative, suggesting that low socioeconomic status is protective for minorities in this country. The coefficients are not always statistically significant, and the significance levels change depending on whether we use income or education, but the overall pattern is consistent with a lower risk of overweight. White immigrants are an exception. Here we see that for children born to white immigrant mothers, low income and low education are associated with an increase in the risk of overweight.

Our third question asked whether the timing of mother's arrival in the host country is associated with overweight among immigrant children. We hypothesized that the protective effect of immigration status would be greater among children whose mothers immigrated to the United States and England as adults (see appendix Table A3). These results are not presented in Tables 2 and 3 because none of the differences were significant. We estimated alternative models that used age 12 as a cutoff point and a continuous measure of years in the host country as well, but neither of these specifications changed the results.

[2]All models were also estimated using linear models, and the results are robust to either specification.

Our fourth research question asked whether mother's obesity mediates child's risk of being overweight. In model 5, mother's obesity is added to the income interaction model, and in model 6 it is added to the education interaction model. As expected, maternal obesity is significantly associated with child overweight. Moreover, adding mother's obesity to the models explains some of the increased risk for child overweight among children of native-born blacks and native-born Hispanics in the United States. It does not mediate disparities for foreign-born Hispanics who are overweight despite the fact that their mothers have obesity levels on par with whites. Unlike in the United States, adding mother's obesity status to the models does not mediate subgroup disparities in England.

Sensitivity tests

We conducted a number of sensitivity analyses, and our results were robust to a variety of different specifications. Specifically, we ran all results using continuous measures of income and education to ensure that our results were not sensitive to the cutoff points used. We also ran all results separately for boys, as a previous study by Van Hook and Baker (2010) found that generational differences in child BMI growth patterns among children of immigrants were stronger for boys than for girls. We find that while the patterns were slightly stronger for boys, gender differences were not statistically significant. Finally, we ran models including a variety of other control variables, such as breastfeeding and maternal employment, that may play a role in socioeconomic and generational status differences in child overweight. Adding these measures to the models did not change the results.

Conclusion

This study extends our understanding of race/ethnic and nativity differences in child overweight, both for toddlers and for school-age children in the United States and England, by (1) examining disparities by race/ethnic and nativity subgroup differences in child overweight in the United States and England, (2) exploring differences in the role of socioeconomic status by race/ethnic/nativity status, (3) examining differences among the foreign-born based on mother's age at arrival in the host country, and (4) examining the role of maternal obesity as a mediator of child overweight.

With respect to our first question—whether child overweight is associated with minority status and immigrant status—we find that for most subgroups, minority status is associated with a higher risk of overweight. In the United States, both Hispanic and black children of native-born mothers have a higher risk of overweight than children of native-born whites. In England, children of native-born black mothers have a higher risk of overweight, and in some models, children of native-born Asian mothers have a higher risk. These findings are consistent with our original hypothesis about minority status being a risk factor for child overweight. The picture for immigrant status is different. Whereas we hypothesized that immigrant status would be protective of child overweight, our findings indicate otherwise. Indeed, the children of foreign-born black mothers in England show an increased risk of overweight as compared with children of native-born black mothers.

Regarding our second question—whether socioeconomic status influences child overweight and whether the association is the same across different race/ethnic and immigrant groups—we find some support for the argument that socioeconomic status operates differently for minorities compared with whites. In the United States, low income and low education are protective for children of black mothers. The pattern is similar (though not statistically significant) for Hispanic children in the United States and for all minority groups in England. Our results are consistent with the previous literature for the United States that shows a strong negative socioeconomic gradient in child overweight and obesity for white children but less so for nonwhite children (Wang and Zhang 2006; Ogden et al. 2010). It is

worth noting that in their study of the socioeconomic gradient in BMI trajectories among Hispanics, Balistreri and Van Hook (2009) found a negative gradient for children of native-born Hispanics (much like that of white children), but a positive gradient for children of foreign-born Hispanics. There is evidence that the traditional, negative gradient in obesity has been fading with time in the United States (Wang and Zhang 2006), so perhaps the difference in our results is due to the fact that the children in our samples were born about eight years after the children in the Balistreri and Van Hook study. Alternatively, high maternal income and education levels might not be as protective for children whose mothers grew up in families with lower income and education, and the intergenerational transmission of socioeconomic status likely varies by race/ethnic and nativity group.

Regarding our third question—whether mother's age at migration moderates the influence of immigrant status—we find no support in either country for our hypothesis that having a mother who immigrated after age 18 would be protective of child overweight. This finding holds regardless of where we set the cutoff point for mother's age. Finally, regarding our fourth question—whether mother's obesity mediates the association between minority status and child overweight—we find limited support for our hypothesis. Mother's obesity accounts for between 20 and 30 percent of the higher risk of overweight among native-born black and Hispanic children in the United States and for about 10 percent of the higher risk among foreign-born black children in England. It does not mediate any of the risk among Hispanic immigrants in the United States or among Asian immigrants in England.

Interestingly, the influence of maternal obesity and family socioeconomic status are stronger for school-age children than for toddlers in both the United States and England. This finding is contrary to what we might expect, as it seemed likely that the influence of maternal obesity (whether by genetics or diet) and socioeconomic status by income or education would be stronger when children are younger and less likely to be influenced by outside forces. Note, however, for most race/ethnic groups, disparities in overweight are simply larger at older ages, which could explain why the effects of maternal obesity and socioeconomic status appear stronger.

In sum, we find significant race/ethnic and nativity differences in child overweight, but not always in the expected directions. The fact that socioeconomic status is not a primary risk factor for nonwhite children compounds the complicated nature of overweight disparities in both the United States and England. Having a foreignborn mother does not have a protective effect for the children of immigrants, and for blacks in England, it increases the risk of overweight dramatically. Race/ethnic disparities and socioeconomic disparities in child overweight and obesity appear to be driven by different mechanisms, and future research must investigate these differences moving forward to identify public health and policy interventions.

Biographies

Melissa L. Martinson is a postdoctoral research fellow at the Office of Population Research at Princeton University. Her research interests include health disparities, international comparisons of health, and the well-being of immigrant children and their families.

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Jeanne Brooks-Gunn is the Virginia and Leonard Marx Professor of Child Development at Columbia University's Teachers College and the College of Physicians and Surgeons. A developmental psychologist, she directs the National Center for Children and Families and her research focuses on the health and well-being of children, youths, and families from research, policy, and program perspectives.

APPENDIX

TABLE A1

Logistic Regressions of Overweight at Age Three, United States

	(1)	(2)	(3)	(4)	(5)	(6)
Native-born black	−0.11	−0.08	0.04	0.16	−0.05	0.07
Native-born Hispanic	0.56***	0.57***	0.53***	0.46*	0.48**	0.40
Foreign-born Hispanic	0.52***	0.56***	0.52**	0.82**	0.51**	0.82**
Boy	−0.06	−0.06	−0.06	−0.06	−0.06	−0.05
Age in months	0.04*	0.04*	0.04*	0.04*	0.04**	0.05**
Mother age at birth	0.01	0.01	0.01	0.01	0.01	0.01
Married at birth	−0.23*	−0.26*	−0.25*	−0.24*	−0.23*	−0.22
First birth	−0.02	−0.04	−0.04	−0.03	−0.01	0.00
Low birth weight	−0.47***	−0.45**	−0.45**	−0.46**	−0.40**	−0.41**
Low income Y3		−0.15	0.12	−0.13	0.11	−0.13
Low mother education		0.00	0.00	0.24	−0.03	0.19
Native-born black × Low income Y3			−0.44		−0.42	
Native-born Hispanic × Low income Y3			0.00		−0.01	
Foreign-born Hispanic × Low income Y3			−0.09		−0.08	
Native-born black × Low mother education				−0.42		−0.40
Native-born Hispanic × Low mother education				0.08		0.10
Foreign-born Hispanic × Low mother education				−0.43		−0.44
Mother obese Y3					0.41***	0.42***
Intercept	−2.29***	−2.22***	−2.27***	−2.39***	−2.54***	−2.66***

SOURCE: FFS.

*$p < .10$.

**$p < .05$.

***$p < .01$.

TABLE A2

Logistic Regressions of Overweight at Age Three, England

	(1)	(2)	(3)	(4)	(5)	(6)
Foreign-born white	0.18	0.18	0.06	−0.10	0.07	−0.07
Native-born Asian	−0.21	−0.17	−0.57*	−0.51*	−0.54*	−0.51*
Foreign-born Asian	−0.42**	−0.37**	−0.52	−0.31	−0.49	−0.33
Native-born black	0.11	0.13	0.05	0.33	0.03	0.27
Foreign-born black	0.45*	0.51*	0.04	0.14	−0.01	0.09
Boy	0.12*	0.12*	0.12*	0.12*	0.12*	0.12*
Age in months	0.02	0.03	0.03	0.03*	0.02	0.02
Mother age at birth	0.01**	0.01	0.01	0.01	0.01	0.01
Married at birth	−0.11	−0.14*	−0.15*	−0.15*	−0.16*	−0.16*
First birth	−0.09	−0.11	−0.11	−0.11	−0.12	−0.11
Low birth weight	−0.51***	−0.49***	−0.51***	−0.50***	−0.50***	−0.49***
Low income Y3		−0.17**	−0.24***	−0.19**	−0.26***	−0.21***
Low mother education		0.02	0.01	−0.02	−0.02	−0.05
Foreign-born white × Low income Y3			0.66		0.66	
Native-born Asian × Low income Y3			0.83**		0.76**	
Foreign-born Asian × Low income Y3			0.32		0.27	
Native-born black × Low income Y73			0.20		0.20	
Foreign-born black × Low income Y3			0.83		0.86*	
Foreign-born white × Low mothereducation				0.74**		0.70**
Native-born Asian × Low mother education				0.74**		0.73*
Foreign-born Asian × Low mother education				−0.08		−0.06
Native-born black × Low mother education				−0.46		−0.38
Foreign-born black × Low mother education				0.67		0.69
Mother obese Y3					0.49***	0.49***
Intercept	−1.91***	−1.77***	−1.73***	−1.77***	−1.72***	−1.75***

SOURCE: MCS.

*$p < .10$.

**$p < .05$.

***$p < .01$.

TABLE A3

Logistic Regressions of Childhood Overweight by Age of Arrival for School-Age Children, United States and England

			United States		
England	**(1)**	**(2)**		**(3)**	**(4)**
White arrival age ≤ 17	0.03	−0.10	Native-born black	0.51***	0.64***
White arrival age ≥ 18	−0.01	−0.07	Native-born Hispanic	0.50***	0.51**
Native-born Asian	0.65**	0.43	Hispanic arrival age ≤ 17	0.53**	0.25
Asian arrival age ≤ 17	−0.02	0.09	Hispanic arrival age ≥ 18	0.46*	0.18
Asian arrival age ≥ 18	0.26	0.31	Boy	−0.16*	−0.16*
Native-born black	0.69	0.89**	Age in months	0.01	0.01
Foreign-born black	1.42***	1.31***	Mother age at birth	0.02***	0.02***
Boy	−0.01	−0.01	Married at birth	−0.34***	−0.34***
Age in months	−0.01	−0.01	First birth	0.03	0.02
Mother age at birth	0.02***	0.02***	Low birth weight	−0.48***	−0.49***
Married at birth	−0.23***	−0.23***	Low income at Y9	0.26	−0.18*
First birth	−0.02	−0.02	Mother low education	0.24**	0.48**
Low birth weight	−0.41**	−0.42**	NB black × Low income Y9	−0.60**	
Low income Y7	0.18*	0.13	NB Hispanic × Low income Y9	−0.30	
Low mother education	0.18**	0.21**	Hispanic arrival age ≤ 17 × Low income Y9	−0.86	
White arrival age ≤ 17 × Low income Y7	0.94		Hispanic arrival age ≥ 18 × Low income Y9	−0.01	
White arrival age ≥ 18 × Low income Y7	−0.17		NB black × Low m education		−0.45*
NB Asian × Low income Y7	−0.80**		NB Hispanic × Low m education		−0.14
Asian arrival age ≤ 17 × Low income Y7	−0.37		Hispanic arrival age ≤ 17 × Low m education		0.03
Asian arrival age ≥ 18 × Low income Y7	−0.42		Hispanic arrival age ≥ 18 × Low m education		0.33
NB black ×Low income Y7	−0.66				
FB black × Low income Y7	−0.86*				
White Arrival Age ≤ 17 ×Low M Education		0.72*			
White Arrival Age ≥ 18 ×Low M Education		0.11			
NB Asian × Low M Education		−0.21			
Asian Arrival Age ≤ 17 × Low M Education		−0.60			
Asian 1.0 × Low M Education		−0.36			
NB Black × Low M Education		−0.99**			
FB Black × Low M Education		−0.50			
Intercept	−0.84	−0.91	Intercept	−2.24*	−2.30**

SOURCE: FFS for United States. MCS for England. NB = native-born; FB = foreign-born.

*$p < .10$.

** $p < .05$.

*** $p < .01$.

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TABLE 1

Descriptive Statistics as Percentages, United States and England

		United States (FFS)				England (MCS)						
Variables	**Total (*n* = 2,930)**	**Native-Born White (21.8)**	**Native-Born Black (51.5)**	**Native-Born Hispanic (16.1)**	**Foreign-Born Hispanic (10.6)**	**Total (*n* = 6,816)**	**Native-Born White (80.9)**	**Native-Born Asian (4.1)**	**Native-Born Black (2.2)**	**Foreign-Born White (4.2)**	**Foreign-Born Asian (6.8)**	**Foreign-Born Black (1.9)**
Child overweight Y3	35.6	32.5	31.5	46.6	46.6	33.4	33.5	27.6	36.0	38.1	24.1	45.3
Child overweight Y9[a]	42.1	33.1	43.5	46.0	48.3	21.3	20.7	24.0	29.6	22.6	19.2	44.0
Mother obese Y3	41.5	28.9	47.0	43.4	35.0	14.5	14.0	15.3	25.1	11.1	16.4	29.3
Mother obese Y9[a]	51.2	38.4	57.2	57.1	39.7	16.8	16.3	20.5	26.4	12.6	19.0	32.7
Generation status												
Native-born	89.6	100.0	100.0	100.0	0.0	90.6	100.0	100.0	100.0	0.0	0.0	0.0
Arrival age ≤ 17	4.8	0.0	0.0	0.0	45.9	4.1	0.0	0.0	0.0	51.3	44.1	20.3
Arrival age ≥ 18	5.6	0.0	0.0	0.0	54.1	5.3	0.0	0.0	0.0	48.7	55.9	79.7
Girl	48.0	48.3	47.9	47.0	48.7	50.3	50.1	48.4	51.3	51.0	55.2	50.4
Mother age at birth[b]	24.9	27.0	24.1	23.4	26.7	29.0	29.0	26.4	28.7	31.1	28.4	31.3
Married at birth	22.3	48.1	11.4	16.3	31.6	60.6	58.8	88.3	32.7	70.7	92.0	37.1
Low birth weight	9.4	6.7	12.4	6.8	3.9	6.0	5.6	14.2	8.2	3.8	9.9	10.2
First birth	38.2	46.2	33.6	42.6	37.7	49.9	50.6	50.0	49.3	53.9	34.5	38.2
Low mother education	65.6	43.3	70.5	70.1	80.6	52.8	52.8	49.0	49.7	38.7	64.8	63.3
Low income Y3	34.2	12.8	42.1	35.3	38.0	29.4	27.7	50.7	45.9	18.0	54.5	59.7
Low income Y9[a]	30.7	14.2	37.6	30.8	31.5	28.5	26.1	46.5	49.1	18.2	57.6	52.9

SOURCE: Fragile Families Study (FFS) for United States; Millennium Cohort Study (MCS) for England.

a. Age nine for United States and age seven for England.

b. Age in years.

TABLE 2

Logistic Regressions of Overweight at Age Nine, United States

	(1)	(2)	(3)	(4)	(5)	(6)
Native-born black	0.38***	0.38***	0.51***	0.64***	0.36***	0.50***
Native-born Hispanic	0.48***	0.47***	0.50***	0.52**	0.38**	0.36
Foreign-born Hispanic	0.51***	0.46***	0.49***	0.22	0.52***	0.24
Boy	−0.15*	−0.16*	−0.16*	−0.16*	−0.15*	−0.14
Age in months	0.01	0.01	0.01	0.01	0.01	0.01
Mother age at birth	0.02**	0.02***	0.02***	0.02***	0.02***	0.02***
Married at birth	−0.39***	−0.37***	−0.34***	−0.34***	−0.32***	−0.32***
First birth	0.00	0.02	0.03	0.03	0.07	0.07
Low birth weight	−0.48***	−0.48***	−0.48***	−0.49***	−0.43***	−0.44***
Low income Y9		−0.19*	0.26	−0.17*	0.12	−0.22**
Low mother education		0.23**	0.24**	0.49**	0.20**	0.41**
Native-born black × Low income Y9			−0.60**		−0.47	
Native-born Hispanic × Low income Y9			−0.30		−0.25	
Foreign-born Hispanic × Low income Y9			−0.33		−0.23	
Native-born black × Low mother education				−0.45**		−0.41*
Native-born Hispanic × Low mother education				−0.15		−0.08
Foreign-born Hispanic × Low mother education				0.19		0.24
Mother obese Y9					0.87***	0.87***
Intercept	−1.89*	−2.08*	−2.27**	−2.30**	−3.04***	−3.08***

SOURCE: FFS.

*$p < .10$.

**$p < .05$.

***$p < .01$.

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TABLE 3

Logistic Regressions of Overweight at Age Seven, England

	(1)	(2)	(3)	(4)	(5)	(6)
Foreign-born white	0.11	0.13	−0.02	−0.09	0.01	−0.04
Native-born Asian	0.35	0.33	0.60*	0.43	0.56*	0.41
Foreign-born Asian	0.02	−0.05	0.27	0.20	0.31	0.19
Native-born black	0.41*	0.42*	0.72	0.89**	0.71	0.82**
Foreign-born black	1.03***	0.99***	1.55***	1.31***	1.47***	1.18***
Boy	−0.02	−0.02	0.03	−0.01	0.05	0.01
Age in months	−0.01	−0.01	−0.01	−0.01	−0.02	−0.01
Mother age at birth	0.02**	0.02***	0.02**	0.02***	0.02**	0.02***
Married at birth	−0.30***	−0.24***	−0.22**	−0.23***	−0.21**	−0.23***
First birth	−0.06	−0.02	−0.04	−0.01	−0.03	0.00
Low birth weight	−0.39**	−0.42**	−0.38**	−0.42**	−0.32*	−0.37**
Low income Y7		0.11	0.15	0.12	0.1	0.07
Low mother education		0.18**	0.19**	0.21**	0.16*	0.18**
Foreign-born white × Low income Y7			0.69*		0.66	
Native-born Asian × Low income Y7			−0.88**		−0.87**	
Foreign-born Asian × Low income Y7			−0.38		−0.50	
Native-born black × Low income Y7			−0.61		−0.71	
Foreign-born black × Low income Y7			−1.08*		−1.13*	
Foreign-born white × Low mother education				0.50		0.46
Native-born Asian × Low mother education				−0.21		−0.22
Foreign-born Asian × Low mother education				−0.40		−0.40
Native-born black × Low mother education				−0.99***		−1.02***
Foreign-born black × Low mother education				−0.50		−0.45
Mother obese Y7					0.85***	0.85***
Intercept	−0.58	−0.87	−0.62	−0.92	−0.57	−0.91

SOURCE: MCS.

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* $p < .10$.

** $p < .05$.

*** $p < .01$.