Maternal English Language Proficiency and Obesity among Young Children of Immigrants

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Abstract

Past research indicates that children of immigrants may be an especially vulnerable group for unhealthy weight gain (Van Hook and Baker 2010), despite their advantage in early life factors associated with lower obesity (birth weight, breast feeding, exclusive parental care) and lower weight status of parents (Lara et al., 2005). Using the Early Childhood Longitudinal Study-Birth Cohort, we examine whether maternal English language proficiency is associated with child's weight status at 5 years old. Similar to past research, we find that children of low English-proficiency immigrants are the heaviest. However, children of high English-proficiency immigrants have a lower weight status than children of natives. Socioeconomic factors account for the higher weight status of children of low English-proficiency immigrants compared to high English-proficiency immigrants. Early life factors and maternal health habits account for the lower weight status of children of high English-proficiency immigrants compared to children of natives.

Past Literature and Theoretical Background

Immigrants tend to have much better health than the native born population on many health outcomes, especially in regards to infant health and pregnancy outcomes. Foreign born Hispanic mothers are more likely to breastfeed, have lower odds of infant mortality, are less likely to smoke, drink, or use illicit drugs during pregnancy, and less likely to have low birth weight or early gestational age children (Lara et al., 2005; Singh, Kogan, and Dee, 2007). Breast feeding, prenatal smoking, and low birth weight have all been identified as determinants of obesity (Bergmann et al., 2003). However, these better health behaviors and outcomes do not translate into lower weight status among their children. Past research on young children has consistently found that children of foreign born parents have higher prevalence of obesity and higher growth in BMI from childhood to adolescence, especially among the more recently arrived immigrants, and this remains significant after controlling for race/ethnicity, socioeconomic factors, and family characteristics (Van Hook and Baker 2010; Van Hook and Ballistreri 2007; Li et al., 2010; Van Hook et al., 2009).

Parental acculturation likely has both positive and negative effects on children's health. For example, past research suggests that children of immigrants may be especially vulnerable to developing unhealthy weight gain because immigrant mothers are more likely to view heavier child figures as ideal, more likely to underestimate their children's weight status, and less likely to view child obesity as a health concern (Crawford et al., 2004; Fuentes-Afflick and Hassel 2008; Sosa 2011; Bayles 2010; Ariza et al., 2004). Focus group interviews with immigrant mothers indicate they are more likely to view child thinness as a health concern rather than overweight. They associated thinness with malnutrition and intestinal infections (Crawford et al, 2004). These factors may result in children becoming heavier if

these mothers are exposed to environments with an abundance of cheap energy dense calories and greater sedentary activity, such as the one found in the US (Van Hook, Baker, and Balistreri 2009).

However, child obesity has garnered a lot of policy attention in the United States and is highly publicized as a national health concern (Ogden et al. 2010; Story, Sallis, and Orleans 2009). Increasing parental acculturation, especially English language proficiency, may result in changing norms, preferences, and increasing health knowledge hindering unhealthy weight gain among their children (Guendelman et al 2010). Indeed, past research has found that parental English language proficiency is negatively associated with child's weight status among children of immigrants and this difference is apparent by kindergarten (Van Hook and Baker, 2010). However, this research only examined children of immigrants, thus it is unclear whether immigrant parental English proficiency may help explain differences in weight status between children of immigrants and children of natives. Additionally, that study used the kindergarten cohort of the Early Child Longitudinal Study (ECLS-K), whose main focus is on developmental trajectories proceeding from the baseline kindergarten measures. The ECLS-B includes additional variables before kindergarten, including mother's pre-pregnancy weight and feeding practices, which are likely to affect children's weight gain in their early years.

This research adds to this literature by examining how variation in English language proficiency among immigrant mothers contributes to differences in weight status between children of immigrants and natives. The heterogeneity among immigrant parents may mask the relationship between the healthier parental attributes and early life factors found among this group and the higher weight status of their children compared to children of natives. Also, we explore two potential mechanisms linking mother's nativity and English proficiency to child's weight status; socioeconomic factors and mother's health and early life experiences. Children of low English-proficiency immigrant parents may be at a higher risk for developing overweight due to their low socioeconomic status. Additionally, past research has consistently indicated that foreign born mothers have attributes that are associated with lower child obesity, such as breastfeeding, healthy birth weight, and lower maternal BMI. However, it is unclear whether these beneficial factors compensate for the risks that immigrant parents face and whether this varies by English proficiency. Also, among immigrant parents, past research is unclear concerning the extent that these protective factors vary by English language proficiency among immigrant parents (Sundquist and Winkleby 2000; Callister and Birkhead 2002) or has not examined whether nativity accounted for the effects of English language use (Gibson et al 2005). Children of low English-proficiency immigrants may represent a particularly vulnerable group. Cultural orientations that view heavier children as healthier or ideal or limited knowledge of child obesity as a health concern may mitigate the beneficial impact of foreign born mothers' healthier behaviors or attributes. However, high English-proficiency immigrants may be more integrated into the US in ways that positively influence their child's health. Higher English language proficiency may results in greater health literacy, ability to navigate US institutions, and greater integration may result in changing norms concerning healthy weight status for children. Examining whether children of high English-proficiency immigrants differ from children of low English-proficiency immigrants could increase our understanding of the disconnect between foreign born mothers healthier behaviors and attributes, but higher levels of child obesity.

Data and Methods

This project uses data from the Early Childhood Longitudinal Study-Birth cohort (ECLS-B). ECLS-B is a nationally representative sample of children born in 2001 to mothers who are at least 15 years old and who are still alive and residing in the United States at 9 months old, children are assessed at 9 months, 2 years, 4 years, and 5 years. This research utilizes the final wave, when children are 5 years

old, to examine the relationship between mother's nativity and English language proficiency and child's weight status.

Dependent variable: We estimate percentile BMI and a dichotomous indicator of overweight using measured height and weight data. We use CDC guidelines (Kuczmaski et al., 2002), recommended by the World Health Organization, to assign children age- and sex-specific BMI percentiles and to use these percentiles to classify children as overweight (= 1 if BMI percentile ≥ 85th).

Independent Variables: Mothers are identified as foreign born if they were born outside of the United States or its territories. Mother's English language proficiency is identified using four measures that ask parents to identify their ability to read, write, understand, and speak English, ranging from 1=not well at all to 4=very well. These measures are summed and averaged to obtain our scale of English language proficiency. Mothers who scored lower than 2.5 (44%) are identified as low English-proficiency while mothers who scored 2.5 or higher are identified as high English-proficiency. This information is used to create a three category variable: child has low English-proficiency immigrant mother, high English-proficiency immigrant mother, and child's mother is native born. Children with high English-proficiency immigrant mothers are the reference group.

Mediators: Socioeconomic factors included as potential mediators entail: mother's education (measured as less than high school, high school, some college, and college), family income at the first wave (measured as less than $25, 000, $25-000 to 40,000, $40,001-60,000, and greater than $60,000), child has private health insurance (measured in wave 3), and mother perceives her neighborhood as safe (measured in wave 2). Variables capturing early life factors and mother's health behaviors entail: breastfeeding, mother's pre-pregnancy weight status (normal weight, overweight, or obese), birth weight (high, low, and normal), early gestational age, exclusive parental care (measured at wave 1), mother's age at birth (less than 25, 25-29, 30-34, and 35 or higher), solids before the age of 4 months, and whether the child took a bottle to bed in waves 1 and 2.

Controls: Mother's race and ethnicity (white, black, Hispanic, Asian, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander).

Analyses: This project uses nested logistic and multivariate regression techniques. The first model includes mother's nativity/English language proficiency and controls for race/ethnicity to identify the extent that children of natives and children of low English-proficiency immigrants differ from children of high English-proficiency immigrants. The second model includes the socioeconomic variables to examine whether differences is socioeconomic variables contribute to differences between high and low English-proficiency immigrants. The third model includes the variables for mother's attributes and early life factors. This allows me to examine whether poorer health habits among children of natives earlier in life influence differences between children of immigrants and natives and allow me to examine whether these factors account for differences between high and low English-proficiency immigrants. All analyses are weighted using the complex survey weights to correct for survey design.

Results

Table 1 displays descriptive statistics for the whole sample and by mother's nativity/English proficiency. Children of low English-proficiency immigrants have especially high prevalence of overweight (28.8%) and a higher mean BMI percentile (75.2) compared to children of high English-proficiency immigrants (overweight= 15% and BMI percentile =67.2) or children of natives (overweight= 16% and BMI percentile =67.8). Additionally, rather than higher levels of overweight or mean BMI percentile that previous studies have found for children of immigrants, children of high English-

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proficiency immigrants actually have a lower mean BMI percentile and prevalence of overweight compared to children of natives. Additionally, while both children of high and low English-proficiency immigrants have worse socioeconomic characteristics relative to children of natives, this appears to be especially true among children of low English-proficiency immigrants. Lastly, children of immigrants have more favorable mother's health and early life factors relative to natives, but this relationship is stronger for children whose mothers are more English proficient.

Table 2 examines these relationships using multivariate regression models. Model 1 confirms the descriptive findings. Children of high English-proficiency immigrants have the lowest odds of overweight compared to children of low English-proficiency immigrants or children of natives. Children of low English-proficiency immigrants have a mean BMI percentile that is 4.92 higher than children of high English-proficiency immigrants and have 80% greater odds of overweight compared to children of high English-proficiency immigrants. Children of natives have 48% greater odds of overweight compared to children of high English-proficiency immigrants, but differences in the mean BMI percentiles between these two groups are not statistically significant. Model 3 includes the socioeconomic factors. Including these factors reduces the effect of low English proficiency to marginal significance ($p<0.1$). This suggests that the higher odds of overweight and higher mean BMI percentile of this group relative to children of high English-proficiency immigrants is accounted for by their lower socioeconomic status. However, including the socioeconomic factors does not account for the higher odds of overweight for children of natives compared to children of high-English proficiency immigrants. The third model includes mother's attributes and early life factors. Including these variables accounts for the greater odds of overweight of children of natives compared to children of high English-proficiency immigrants. This suggests that the beneficial attributes and early life factors found for immigrant parents does translate into better health for their children, but only among high English-proficiency immigrants.

Plans for future analyses

For final presentation we plan on incorporating the longitudinal dimensions of the ECLS-B, in which weight and height are measured also at 9 months, 2 years, and 4 years, to examine at what ages the differences between children of immigrants and parental English proficiency arise. Additionally, we will follow up on the weaker results in Table 2 for the continuous BMI measure than for the discrete outcome of overweight or obese versus not overweight by using quantile regression (Koenker and Hallock 2001). This method will allow us to examine how strongly English-language proficiency and other independent variables are associated with BMI at different quantiles of percentile BMI.

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Table 1. Percentages by Mother's English Proficiency and Nativity for the Analytic Variables

	High English Foreign Born Mother (n=400)[1]	Low English Foreign Born Mother (n=500)[1]		Native Born Mother (n=4900)[1]		Total Sample
BMI % (Means)	67.2	75.2	a, b	67.8		68.4
Overweight/Obese	15.0	28.8	a, b	16.0		17.1
High English Foreign Born Mother	---	---		---		7.0
Low English Foreign Born Mother	---	---		---		9.0
Native Born Mother	---	---		---		84.0
Race/Ethnicity						
Hispanic	52.0	76.2	a, b	9.1	a	19.1
Black	8.6	2.6	a, b	16.1	a	14.3
American Indian/Alaskan Native[2]	---	---		---		0.7
Asian	20.3	11.6	a, b	0.6	a	2.5
Native Hawaiian Pacific Islander[2]	---	---		---		0.2
White	18.7	8.5	a, b	73.1	a	63.2
Family Income (9 mos.)						
Less than $25,000	43.5	75.0	a, b	38.5		42.1
$25,000-40,000	21.7	20.1		21.2		21.1
$40,001-$60,000	13.8	3.7	a, b	17.4		15.9
Greater than $60,000	20.9	1.2	a, b	23.0		20.9
Mother's Education						
Less than High School	22.9	59.7	a, b	15.1	a	19.7
High School	28.7	23.7	b	32.1		31.1
Some College	19.1	8.5	a, b	24.2		22.4
College	27.8	4.9	a, b	27.9		25.8
Safe Neighborhood (4 y.o.)	56.2	38.9	a, b	53.2		52.1
Private Insurance (4 y. o.)	57.5	29.3	a, b	66.0	a	62.1
Parental Care (9 mos.)	55.7	69.7	a, b	46.6	a	49.4
Low Birth Weight	5.8	5.6	b	7.5		7.2
High Birth Weight	5.1	9.0		10.1	a	9.6
Normal Birth Weight	89.1	85.4		82.4	a	83.2
Early Gestational Age	6.2	5.8		5.2		5.4
Mother's Pre-Pregnancy Weight Status						
Normal Weight	70.4	56.8	a	59.5	a	60.0
Overweight	22.2	32.2	b	24.6		25.2
Obese	7.4	11.1	b	15.8	a	14.8
Mother's Age at Birth						
Less than 25	26.0	30.5	b	37.1	a	35.7
25-29	32.1	34.1	b	26.1		27.2
30-34	25.4	23.3		23.3		23.4
35 or higher	16.6	12.1		13.6		13.6
Solids before age 4 mo	15.1	19.0	b	24.8	a	23.6
Bottle to bed (9 mos. - 2 y. o.)	15.0	20.2	b	8.1	a	9.7

Source: Early Child Longitudinal Survey-Birth Cohort

a=significantly different from children with High English Foreign Born mothers (p<0.05)

b=significantly different from children with Native Born Mothers (p<0.05)

[1] n's rounded to the nearest 50

[2] Cells contain too few cases, information suppressed due to NCES guidelines

Table 2. Weighted OLS and Logistic Regression of Weight Status at age 5 by Mother's Nativity and English Language Proficiency

	Overweight or Obese (Odds Ratios)			BMI Percentile (Regression Coefficients)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	---	---	---	66.42 ***	69.46 ***	68.63 ***
Low English Foreign Born Mother	1.80 *	1.62 †	1.59 †	4.92 †	4.11	4.06
Native Born Mother	1.48 *	1.47 *	1.19	0.77	0.73	-1.66
(High English Foreign Born Mother)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Race/Ethnicity						
Hispanic	2.27 ***	1.93 ***	1.65 **	4.74 **	3.57 *	1.66
Black	1.60 **	1.26	1.17	0.82	-0.95	-1.28
American Indian/Alaskan Native	1.79 **	1.48 †	1.37	5.45 **	3.96 *	3.01
Asian	0.86	0.88	0.92	-8.06 ***	-7.52 ***	-7.10 ***
Native Hawaiian Pacific Islander	1.89	1.65	1.80	-2.11	-3.15	-1.92
(White)						
Family Income (9 mos.)						
(Less than $25,000)						
$25,000-40,000		0.85	0.79		-2.96 *	-3.17 *
$40,001-$60,000		0.67 †	0.61 *		-1.10	-1.30
Greater than $60,000		0.79	0.75		-1.13	-1.36
Mother's Education						
(Less than High School)						
High School		1.13	1.10		0.78	0.65
Some College		1.18	1.14		0.88	1.13
College		0.96	1.03		-1.98	-0.28
Less than High School						
Private Insurance (4 y. o.)		0.79 *	0.78 *		-1.77	-2.20 †
Safe Neighborhood (4 y. o.)		0.86	0.93		-0.46	-3.69 **
Parental Care (9 mos.)			0.71 **			-11.01 ***
Low Birth Weight			0.54 **			5.94 ***
High Birth Weight			1.76 **			-1.61
Early Gestational Age			1.11			5.95 ***
Mother's Pre-Pregnancy Weight Status						
(Normal Weight)						
Overweight			1.63 ***			1.62
Obese			2.89 ***			11.84 ***
Mother's Age at Birth						
less than 24			0.90			0.07
(25-29)						
30-34			0.90			0.79
35 or higher			0.83			0.30
Solids before age 4 months			1.22			2.83 *
Bottle to bed (9 mos. - 4 y. o.)			1.45 *			3.53 *

† p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Source: Early Child Longitudinal Survey-Birth Cohort

n=5,700 (n rounded to the nearest 50)