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## Immigrant-Native Differences in Child Health: Does Maternal Education Narrow or Widen the Gap?

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### Abstract

Abundant US research documents an “immigrant advantage” in children’s physical health. This article extends consideration to the United Kingdom, permitting examination of a broader group of immigrants from disparate regions of the world and different socioeconomic backgrounds. Drawing on birth cohort data (ages 0–5) from both countries (N=4,139 and N=13,381), the analysis considers whether the children of immigrants have a physical and mental health advantage around the beginning of elementary school, and whether advantage is more pronounced among low-educated populations. Findings indicate that the children of immigrants are not uniformly healthier than those in native-born families. Rather, there is heterogeneity in the immigrant advantage across outcomes, and evidence of both greater advantage and disadvantage among children in low-educated immigrant families.

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Abundant research in the United States documents striking advantages in birth outcomes and infant health among the children of foreign-born mothers, sometimes despite a greater likelihood of socioeconomic disadvantage (Hummer et al. 1999; Landale, Oropesa and Gorman 1999). We use two nationally representative samples of children born in the United States and United Kingdom to make several contributions to the literature. First, we extend analysis to the United Kingdom, which allows us to determine how broadly the immigrant health advantage is observed. Second, we examine whether the immigrant health advantage varies across educational groups, and whether it is stronger among low-educated populations. Third, we focus on children’s health at age five, around the time they begin elementary school. The transition to elementary school is an important period in child development, given the lasting influence of child health on academic achievement and educational attainment (Jackson 2010). Though nativity differences in birth outcomes are large, we know less about whether this advantage extends into later childhood. Finally, we examine both mental and physical health. Though children’s mental health is known to be associated with academic achievement (Currie and Stabile 2006), this dimension of health has received less attention than physical health in research on immigrant-native differences.

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## BACKGROUND

### The Immigrant Paradox in Children's Physical and Mental Health

Researchers have used the word “paradox” to describe favorable health outcomes among the children of immigrants despite their greater likelihood of socioeconomic disadvantage. Early descriptions of the paradox focused on the health of Hispanic immigrants in the Southwestern United States, whose birth outcomes were more similar to those of more advantaged non-Hispanic whites than to disadvantaged blacks (Markides and Coreil 1986).

Although the initial formulation of the paradox simultaneously considered nativity and socioeconomic status, the term “paradox” is now more broadly used to describe favorable outcomes among immigrant families and their children, regardless of socioeconomic status (e.g., Palacios, Guttmannova and Chase-Lansdale 2008). This body of research, which examines the main effect of parents' immigrant status on children's development, has produced important findings that are more compelling for physical health than for mental health. Net of socioeconomic status, nativity differences in birth outcomes are large in the U.S. Foreign-born Hispanic mothers are more likely than native-born mothers to breastfeed and to fully immunize their children (Anderson et al. 1997; Kimbro et al. 2008). Similarly, the occurrence of infant mortality and low birth weight is significantly lower among foreign-born, Hispanic mothers (Hummer et al. 1999). A smaller literature on later childhood suggests that children of foreign-born parents have fewer acute and chronic health conditions (Kandula, Kersie and Lurie 2004) than children of native-born parents. Research on adolescents also finds a lower likelihood of overweight and obesity among foreign-born and second-generation youth (Gordon-Larsen et al. 2003). Evidence for mental health is more mixed. Whereas some research demonstrates higher levels of psychological well-being among first- and second-generation children and adolescents (e.g., Crosnoe 2006; Goodman et al. 2008), other studies find no differences (Fuligni, Yip and Tseng 2002), or even poorer psychological outcomes among children with migration backgrounds (Sam et al. 2008).

We examine how the immigrant advantage varies across educational groups in a manner analogous to the original identification of the paradox; that is, we consider whether the benefits associated with parents' immigrant status are moderated by their level of education. Given the high levels of education possessed by many contemporary migrants to Western nations, jointly examining nativity and education distinguishes among three possible patterns: 1) a universal “healthy immigrant” pattern whereby all children in immigrant families have healthier outcomes than natives, on average; 2) an immigrant advantage driven by children in low-educated immigrant families; and 3) an immigrant advantage driven by children in highly educated immigrant families.

### Extending Examination to the United Kingdom

Most research on nativity and child development has been conducted in the United States. In this study we turn the lens on the U.K. to examine whether patterns among U.S. migrant groups—largely from Latin American countries—extend to foreign-born populations from different regions, including Europe, South Asia (India, Pakistan and Bangladesh), Africa and the Caribbean (White 2002). Despite a longstanding interest in U.K. migrant health (Marmot 1993), research has been limited until recently by a lack of suitable data (Hawkins et al. 2008).

In addition to the varying geographic origins of their immigrants, the U.S. and U.K. differ in several other ways that might contribute to varying outcomes between the children of immigrants and natives. First, differences in geography and immigration policies have resulted in a much smaller undocumented foreign-born population in the U.K. than in the U.S., where 29% of immigrants are estimated to be undocumented (Van Hook, Bean and

Passel 2005). U.S. immigrants are also more likely to migrate for family reunification reasons than U.K. immigrants, and U.K. immigrants are more likely to come from high income countries (Hernandez et al 2009). Secondly, despite having broadly similar patterns of family formation (Kiernan et al. 2011) and income inequality (Wilkinson and Pickett 2009), the two countries' health care and social welfare systems differ substantially. The U.K. provides more universal health services than the U.S., including free health care through the British National Health Service, home visits for new mothers, priority in scheduling medical appointments for children, and child care centers. U.K. welfare state policies are also more generous surrounding family cash assistance, childcare and social housing (Gornick and Myers 2005; Hills 2007).

Multiple differences in immigrant composition and policy make it difficult to attribute any cross-national nativity differences to a particular source. However, evidence of similar patterns across countries would provide support for a "universal" pattern of immigrant-native differences in child development.

## DATA AND METHODS

### Data

We analyze two national birth cohort studies well suited to studying immigrant-native differences in child development: the U.S. *Fragile Families and Child Wellbeing Study* (FFS) and the U.K. *Millennium Cohort Study* (MCS). The FFS follows approximately 5,000 children born in large U.S. cities between 1998 and 2000. Mothers, and most fathers, were interviewed in the hospital soon after birth, with additional interviews at ages one, three, five and nine years. When weighted, FFS data are representative of births in cities with populations over 200,000. The MCS is the fourth of Britain's nationally representative birth cohort studies. The first wave (2001–2002) included 18,818 children (18,552 families) born in the U.K. between 2000–2002. Information was first collected from parents when children were nine months old, with follow-up interviews at ages three, five and seven.

### Measures

**Child Health**—We examine two indicators of children's physical health at age five: whether a child has ever been diagnosed with asthma, and whether the child is overweight or obese. We also examine two mental health indicators: the frequency of internalizing (withdrawn, sad) and externalizing (aggressive, angry) behaviors. U.S. measures are derived from the Child Behavior Checklist (Achenbach 1992), and U.K. measures are derived from the Strength and Difficulties Questionnaire (Goodman 1997), which is highly correlated with the Child Behavior Checklist (Goodman and Scott 1999). We convert internalizing and externalizing scales to z-scores to provide a relative and comparable measure of mental health.

**Nativity, Race and Ethnicity**—All FFS and MCS children are native-born, but parents can be foreign-born. Children of immigrant mothers are combined into a single group to maintain adequate sample sizes for examining the immigrant paradox. In the U.S., this group is composed of Hispanic, Asian and other (European and Middle Eastern) immigrants. In the U.K., it includes South Asian (Indian, Pakistani, Bangladeshi), black (African, Caribbean), white and other foreign-born mothers. We control for race and ethnicity (reference category in both countries is native-born whites).

**Maternal Education**—Our U.S. measure of maternal education distinguishes between mothers with less than a high school diploma and those with some college or higher. We use a comparable U.K. measure, separating mothers with no qualifications or O-level exams

from those completing A-level college entrance exams and vocational equivalents or with a university degree. In both samples, the reference category is higher-educated mothers. We also test the sensitivity of the findings to a measure of family income in place of maternal education, to capture another marker of parental resources—the results are substantively identical.

**Other Controls**—We control for mothers' age at birth and children's sex. Inclusion of several potentially endogenous measures—family income, family structure and the language spoken at home—does not alter the findings.

### Analytic Procedure

Ordinary least squares or binary logistic regression models are used to predict children's health. We use multiple imputation to fill in missing values on independent and dependent variables from theoretically relevant predictor variables (Allison 2002). We first examine the main effects of nativity and maternal education to establish baseline differences across average children in immigrant vs. native families. Next, interactions between nativity and maternal education test whether the immigrant advantage varies across educational groups. There is the potential for bias when examining group differences in a logistic regression model with interactions (Williams 2009). Sensitivity tests that compare logistic regression results to results from a heterogeneous choice model do not provide substantively different findings. To ease interpretation, we calculate adjusted predicted values from our parameter estimates to compare across nativity groups, maternal education, and countries. A pattern of healthier outcomes among children of low-educated immigrants than among children of low-educated natives would suggest that low-low-educated families drive the immigrant advantage. Conversely, a pattern of healthier outcomes among the children of highly educated immigrants relative to those of highly educated natives would suggest that higher-resource families produce the immigrant advantage.

## FINDINGS

Table 1 presents weighted sample characteristics by nativity. Consistent with national estimates, 25% of U.S. births (representative of large cities) and 10% of U.K. births are to foreign-born mothers. U.S. foreign-born mothers are more likely to be poorly educated than native-born mothers (70% vs. 55%)—a difference driven by Hispanic immigrant mothers. U.K. foreign-born mothers have about the same level of education as their native-born peers, on average (47% vs. 49%), with South Asian mothers the most poorly educated group. Table 1 also documents both advantages and disadvantages in child health in immigrant families. Children of foreign-born mothers are less likely to have been diagnosed with asthma than children of natives. Overweight and obesity do not follow this pattern, however, with no U.K. immigrant-native differences and a disadvantage for the children of U.S. immigrants. In both countries, there is an internalizing behavior disadvantage (higher z-score) among the children of immigrants, and an externalizing behavior advantage.

### Assessing Immigrant-Native Differences

Table 2 presents estimates from multivariate models of nativity differences in children's physical and mental health. The first columns present physical health differences. In both countries, the odds of having asthma are significantly lower for children of immigrant mothers, compared with children of native-born mothers—45% ( $e^{-0.579}$ ) in the U.S. and 22% ( $e^{-0.247}$ ) in the U.K. Immigrant-native differences in overweight and obesity are insignificant. Findings are more mixed for children's mental health. Children of U.S. foreign-born mothers have significantly fewer externalizing behaviors than children of native-born mothers, while in the U.K. this pattern is negligible in magnitude and

insignificant. Conversely, children of immigrant mothers in both countries have significantly more internalizing behaviors than those of native-born mothers.

### Testing Immigrant-Native Differences across Educational Groups

Table 3 shows an interaction between nativity and maternal education, revealing whether the immigrant advantage is driven by low or high-education families, or if there is a universal "healthy immigrant" effect. As expected, there is no meaningful pattern for overweight and obesity. For asthma, however, the immigrant advantage is *stronger* among children of low-educated mothers in both the U.S. and the U.K. Coefficient equality tests (shown below coefficient estimates) indicate that the differences between children of low-educated immigrant and native mothers are significant in both countries.

These patterns are more easily understood as predicted values, shown in Table 4 across maternal educational groups. The predicted probability of asthma is 29% lower among U.S. children of low-educated foreign-born mothers than among children of low-educated natives (0.220 vs. 0.310), whereas the difference between children in highly educated immigrant and native families is small and insignificant (0.330 vs. 0.310). The pattern is similar in the U.K., with a 30% lower probability of asthma among children of low-educated immigrant mothers vs. children of low-educated natives (0.117 vs. 0.167), and a negligible (and conversely patterned) difference between children in highly educated immigrant vs. native families (0.123 vs. 0.128).

Patterns for mental health are more mixed. The U.S. immigrant advantage in children's externalizing behaviors is stronger in lower-educated families, while the immigrant disadvantage in internalizing behaviors is similar for both educational groups. The U.K. immigrant disadvantage in internalizing behavior is stronger among lower-educated families. We also see an immigrant disadvantage in children's externalizing behaviors among low-educated families; patterns among highly educated families are similar to the U.S. but not statistically meaningful. Table 4 shows these results as predicted values. U.S. children of lower-educated immigrant mothers have fewer predicted externalizing behaviors—more negative z-scores—than children of low-educated native-born mothers (−0.190 vs. 0.117). Similarly, children of highly educated immigrant mothers have fewer externalizing behaviors than children of highly educated native-born mothers (−0.221 vs. −0.123), though the gap is less pronounced among the higher-education group. In contrast, among children of low-educated mothers, children of immigrants have higher predicted internalizing z-scores than those of natives (0.247 vs. 0.099 in the U.K and 0.244 vs. 0.078 in the U.S.). This pattern is similar, though less pronounced and insignificant, for externalizing behaviors in the U.K.

## DISCUSSION

We examine differences in children's physical and mental health between immigrant and native-born families, asking whether these patterns vary by mothers' education. Analyzing immigrant-native differences in the U.K. provides a needed extension of U.S. research, which has informed much of our understanding about child development in the context of immigration. Our analysis reveals whether the immigrant health advantage is "paradoxical," i.e., stronger among children whose parents have less education, or whether it is universal, i.e., equally strong across educational groups—an important consideration in two countries with great diversity in the educational and economic profiles of their immigrant population.

Because of small sample sizes when jointly examining nativity and education, we cannot account for the substantial ethnic diversity that exists among immigrant families. In addition, because we cannot assess (or control for) the degree of selective migration among

immigrant families, any immigrant advantage (or disadvantage) we observe should be interpreted as an upper (or lower) bound. Finally, the differences in population composition and policy across the U.S. and U.K. limits our ability to explain cross-national variation.

These limitations notwithstanding, the findings show that the immigrant advantage in child health is not equally strong across all educational groups and is not observed for all markers of physical and mental health. There is an immigrant advantage in asthma in both countries, no immigrant-native difference in overweight and obesity in either country, an immigrant advantage in externalizing behavior in the U.S. only, and an immigrant *disadvantage* in internalizing behavior in both countries. Further examination reveals that lower-educated families drive nativity differences in child health. The asthma advantage among children of immigrants in both countries is stronger among less-educated families, consistent with the original identification of the paradox. In the U.S., a similar pattern is observed for externalizing behaviors, with the children of low-educated immigrants having more favorable outcomes than the children of comparable natives. In the U.K. we find evidence of an immigrant *disadvantage* in internalizing behavior, with the children of less educated mothers at a greater disadvantage than other children. The fact that we observe largely similar patterns across the U.S. and U.K. for physical health is striking given differences in immigrants' regional origins and reasons for migration, and differences in the policy structure of the host countries.

Our findings suggest that caution is warranted when characterizing the health outcomes of children in immigrant families as uniformly favorable. Instead, there is heterogeneity across physical and mental health outcomes and evidence for both advantage and disadvantage, which is most pronounced among low-educated families. There are a number of possible explanations for the lower-educated immigrant advantage in children's asthma, with the two primary explanations focusing on a) cultural variation between immigrants and natives and b) selection processes influencing who migrates. Cultural explanations center on the fact that the beliefs and practices that immigrant parents bring with them from their country of origin are healthier than those in the host-country (Abraido-Lanza et al. 1999). Over time, families may alter their health behaviors over time (Hawkins et al. 2008) because of shifts in kin networks and networks in neighborhoods and the workplace.

Selection processes are equally plausible as an explanation for the "paradox" in physical health. Foreign-born mothers who migrate may have healthier lifestyles than mothers who stay in the home country. If foreign-born families represent the healthiest of their sending populations, and if this selection process is strongest among low educated immigrants, then the degree of difference between immigrant and native-born families and their children may appear larger than it would otherwise. Who migrants are and how representative they are of their sending populations should therefore be considered alongside cultural variation.

In future research it will be important to consider how both cultural and selection processes influence the health of children with migration backgrounds and their health relative to the children of natives. In the case of asthma, for example, that the children of immigrant mothers are less likely to be exposed to secondhand smoke points to the importance of cultural factors that are independent of socioeconomic resources. Supplementary analyses of mothers' smoking behavior confirm that, across both countries and all ethnic groups—with the exception of foreign-born whites in the U.K.—immigrant mothers are less likely to smoke than native-born mothers, suggesting a behavior imported from their country of origin that is beneficial for children. In contrast, the lack of immigrant-native differences observed for children's weight suggests that immigrant status does not always have the same protective effect for low-resource children. In the same vein, for aspects of mental health that are closely tied to parenting behavior, children of low-educated mothers may be less

likely to be exposed to behaviors that the host society perceives as important for healthy psychological development. Indeed, supplementary analyses of warm and harsh parenting behavior show patterns consistent with the internalizing and externalizing behaviors examined here.

It is worth noting that the findings for mental health are reversed when comparing across educational groups *within* the foreign-born—children of low-educated immigrant mothers are at a *disadvantage* compared to children of higher-educated immigrants with respect to internalizing behavior. This finding will be important to investigate in future research, as it suggests that for some outcomes, immigrant children may experience a “double jeopardy” that comes from the combination of migrant status and socioeconomic disadvantage. Taken as a whole, our findings suggest that the development of children in immigrant families is neither strictly favorable nor uniformly unfavorable. Accordingly, future research should compare children in immigrant and native-born families in ways that are theoretically informed about how parental resources condition the extent to which immigrant status is beneficial or detrimental to children’s healthy development.

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Table 1

Weighted Characteristics of U.S. FFS and U.K. MCS Samples

Variable	U.S. FFS			U.K. MCS		
	Children of For. Born (N=844)	Children of Native Born (N=2,598)	Total Sample (N=3,442)	Children of For. Born (N=1,637)	Children of Native Born (N=14,171)	Total Sample (N=15,808)
Nativity	25	75	100	10	90	100
<b>Race/Ethnicity</b>						
Hispanic	62	21	32	12	2	3
Black	8	27	23	33	2	5
NHW	7	49	37	13	1	2
Other	23	3	8	42	95	90
<b>Maternal Education</b>						
Mother Low Education	70	55	59	47	49	48
<b>Child Development</b>						
<i>Physical Health</i>						
Asthma	9	15	13	11	14	14
Overweight/Obese	33	22	24	20	21	20
<i>Mental Health</i>						
Mean Internalizing Z-Score	0.202	-0.039	0	0.121	-0.068	0
Mean Externalizing Z-Score	-0.198	-0.002	0	-0.083	-0.054	0

Note Cells show percentages, unless otherwise indicated

**Table 2**

Regression of Nativity Differences in Child Physical and Mental Health, Age 5

U.S.	Physical Health		Mental Health	
	Asthma	Overweight	Externalizing Z-Score	Internalizing Z-Score
Foreign-Born	-0.579** (0.14)	0.124 (0.17)	-0.237** (0.06)	0.120 <sup>†</sup> (0.06)
Mother Low Education	0.0591 (0.09)	0.128 (0.11)	0.215** (0.04)	0.279** (0.04)
Intercept	-1.906** (0.24)	-1.305** (0.29)	0.371** (0.09)	0.194* (0.09)
Model Type	L	L	OLS	OLS
N	4139	3023	3023	3023
U.K.	Physical Health		Mental Health	
	Asthma	Overweight	Externalizing Z-Score	Internalizing Z-Score
Foreign-Born	-0.247* (0.10)	-0.075 (0.08)	-0.008 (0.03)	0.108** (0.03)
Mother Low Education	0.276** (0.05)	0.137** (0.04)	0.315** (0.02)	0.238** (0.02)
Intercept	-0.395** (0.15)	-1.634** (0.14)	0.916** (0.05)	0.313** (0.05)
Model Type	L	L	OLS	OLS
N	13381	13381	13381	13381

*Note:*<sup>†</sup>  
p<0.10,\*  
p<0.05,\*\*  
p<0.01

All covariates measured contemporaneously. Models also control for race/ethnicity, child sex and mother's age at birth. Separate models controlling for family structure and household income do not differ in findings. Reference categories are: for nativity, native born non-Hispanics (US) and native-born white (UK); for education, mother HS or less (US), no qualifications or O-levels only (UK). L=binary logit regression; OLS = ordinary least squares regression.

**Table 3**

Regression of Nativity, Maternal Education and Child Physical and Mental Health, Age 5

U.S.	Physical Health		Mental Health	
	Asthma	Overweight	Externalizing Z-Score	Internalizing Z-Score
Mother Foreign-Born	0.054 (0.42)	-0.083 (0.32)	-0.098 (0.08)	0.029 (0.10)
Mother Low Education	-0.008 (0.25)	0.081 (0.18)	0.241 ** (0.04)	0.262 ** (0.43)
Foreign-Born*Mother Low Ed.	-0.562 * (0.26)	0.190 (0.33)	-0.209 * (0.10)	0.136 (0.10)
Constant	-1.948 ** (0.24)	-1.289 ** (0.29)	0.140 (0.10)	-0.074 (0.10)
Model Type	L	L	OLS	OLS
<i>Tests of Coefficient Equality</i>				
NB Low-Ed. Vs. FB Low-Ed.				
$\chi^2$ (1)	3.38	0.01	10.68	0.84
$p > \chi^2$	0.05	0.92	0.00	0.36
N	4139	3023	3023	3023
U.K.	Asthma	Overweight	Externalizing Z-Score	Internalizing Z-Score
Mother Foreign-Born	-0.055 (0.13)	-0.040 (0.11)	-0.025 (0.04)	0.075 † (0.04)
Mother Low Education	0.311 ** (0.05)	0.144 ** (0.05)	0.310 ** (0.02)	0.231 ** (0.02)
Foreign-Born*Mother Low Ed.	-0.359 * (0.16)	-0.071 (0.14)	0.033 (0.05)	0.072 † (0.04)
Constant	-0.422 ** (0.15)	-1.640 ** (0.13)	0.918 ** (0.05)	0.318 ** (0.05)
Model Type	L	L	OLS	OLS
<i>Tests of Coefficient Equality</i>				
NB Low-Ed. Vs. FB Low-Ed.				
$\chi^2$ (1)	11.80	1.75	19.82	5.27
$p > \chi^2$	0.00	0.18	0.00	0.02
N	13381	13381	13381	13381

Note:

†  
p<0.10,\*  
p<0.05,\*\*  
p<0.01

All covariates measured contemporaneously. Models also control for race/ethnicity, child sex and mother's age at birth. Separate models controlling for family structure and household income do not differ in findings. Reference categories are: for nativity, native born non-Hispanics (US) and native-born white (UK); for education, mother HS or less (US), no qualifications or O-levels only (UK). L= binary logit regression; OLS = ordinary least squares regression.

**Table 4**

Predicted Outcomes by Nativity and Maternal Education: U.S. and U.K.

	Physical Health		Mental Health	
	Asthma Probability	Overweight Probability	Predicted Externalizing Z-Score	Predicted Internalizing Z-Score
<b>U.S.</b>				
FB Low Education	0.220	0.400	-0.190	0.244
U.S. Born Low Education	0.310	0.370	0.117	0.078
FB High Education	0.330	0.340	-0.221	-0.155
U.S. Born High Education	0.310	0.360	-0.123	-0.185
<b>U.K.</b>				
FB Low Education	0.117	0.207	0.136	0.247
U.K. Born Low Education	0.167	0.226	0.127	0.099
FB High Education	0.123	0.195	-0.208	-0.056
U.K. Born High Education	0.128	0.202	-0.184	-0.131

*Note:* Probabilities computed from parameters shown in Table 3. All other covariates held constant at their means.