Nativity Differences in Mothers' Health Behaviors: A Cross-National and Longitudinal Lens

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Abstract: Nativity differences in birth outcomes in the United States are well documented, with more favorable outcomes among children of foreign-born parents than those of native-born parents. Using longitudinal data on mothers from the United States Fragile Families Study (N~4,000) and the United Kingdom Millennium Cohort Study (N~15,000), we provide a comparative and longitudinal perspective on nativity differences in mothers' health behaviors. First, we ask whether healthier behaviors observed among Hispanic immigrants in the United States extend to foreign-born mothers in the United Kingdom., including South Asian, black African and Caribbean, and East Asian immigrants. Second, we consider the persistence of differences throughout early childhood. The findings demonstrate healthier behaviors among foreign-born mothers in both the United States and the United Kingdom, including both socioeconomically disadvantaged and advantaged mothers. These differences are stable over early childhood, suggesting a "universality" of healthier behaviors among foreign-born mothers—spanning racial/ethnic and socioeconomic groups, time, and two different policy contexts.

Keywords: nativity; immigrant integration; health; children; inequality

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Introduction

There are striking advantages in birth outcomes and infant health among the children of foreign-born mothers (Hummer et al. 1999; Landale, Oropesa and Gorman 1999). Similarly, the occurrence of infant mortality and low birth weight is significantly lower among foreign-born, Hispanic mothers than would be expected on the basis of their socioeconomic resources (Hummer et al. 1999). This evidence has led to hypotheses about an "immigrant paradox," complementing evidence of a "Latino mortality paradox" among adults, whereby Latino adults experience lower rates of many diseases than non-Latino whites, as well as higher life expectancy (Abraido-Lanza et al. 1999).

Most research on the health behavior of immigrant mothers comes from work in the United States, particularly among Latin-American populations. The benefits of existing research notwithstanding, an examination of one ethnic group or country of origin cannot highlight ethnic stratification in the degree of immigrant families' advantage. In addition, much existing work uses cross-sectional data and focuses on the period around birth, prohibiting an adequate test of the theory of unhealthy acculturation. In this article we extend existing research by asking 1) whether the advantage in immigrant mothers' health behavior extends to immigrant mothers in several ethnic groups in the United Kingdom, and 2) whether the advantage persists beyond infancy. Focusing on mothers' health behaviors, we compare immigrant mothers to their native-born ethnic counterparts as well as to native-born whites, using data from two large, longitudinal birth cohort surveys—the U.S. Fragile Families Study and the U.K. Millennium Cohort Study. These data are particularly well suited for studying immigrant mothers over time because of their diverse samples, high response rates and longitudinal designs. Revealing the early origins of inequality in the health environments of immigrant and native-born families is an important step

toward identifying critical periods of investment, especially as children in immigrant families comprise an increasing proportion of all children and adolescents (Hernandez 2004).

Background

Is the immigrant advantage universal?

A large body of research, carried out mostly in the United States, documents healthier behaviors among foreign-born mothers, who are more likely than native-born mothers to fully immunize and breastfeed their children (Anderson et al. 1997; Kimbro et al. 2008), and less likely to smoke and drink during pregnancy (Harley and Eskezani 2006; Landale, Oropesa and Gorman 2000). Most research on the health behavior of immigrant mothers has focused on Latin-American populations, which comprise the majority of immigrants to the U.S.[1] Consequently, foreign-born mothers' behavioral advantage has often been framed as a feature of the migration decisions or cultural practices of Latin-American families (Abraido-Lanza, Chao and Florez 2006; Markides and Coreil 1986). Contemporary immigrant families are increasingly diverse on a number of dimensions, however, including their country of origin, level of education, the quality of their schooling, their reasons for migration, and skin color, among other factors (Alba and Nee 2003; Zhou 1997). It is therefore unsafe to assume that patterns observed among the Latin-American population are representative of the broader immigrant experience.

In this study we turn the lens on the United Kingdom, which allows us to examine whether patterns observed in the United States extend to other foreign-born populations with very different regional origins, including Europe, South Asia (India, Pakistan and Bangladesh), Africa and the Caribbean. We know very little about immigrant/native differences in mothers' health behavior in the United Kingdom despite the presence of a sizable foreign-born population

in that country. One U.K. study that combines all ethnic groups finds that immigrant mothers have healthier smoking behavior than native-born mothers, suggesting that immigrant/native differences may be similar in the United Kingdom and the United States (Hawkins et al. 2008). Similarly, a larger literature on ethnic differences documents a positive influence of ethnically dense neighborhoods on maternal depression (Pickett et al. 2009), an ethnic minority advantage in smoking behavior (Kelly et al. 2009)[2], and lower levels of asthma among the children of Bangladeshi mothers (Panico et al. 2007). Most studies, however, do not distinguish between ethnicity and nativity, primarily because of data limitations (see Labree et al. 2011). In this study we examine whether the immigrant advantage extends to mothers in the United Kingdom, while distinguishing between ethnicity and nativity.

Does the advantage in immigrant mothers' health behavior persist beyond infancy?

Theory is ambiguous with respect to whether the healthy behavior of foreign-born mothers is expected to persist over time. The theory of unhealthy acculturation suggests that the advantage of foreign-born mothers will decline as mothers adapt to their new residential and socioeconomic conditions and become more similar to their native-born peers (e.g, Arcia et al. 2001; Guendelman, Cheryan and Monin 2011). Consistent with the unhealthy-acculturation argument, most empirical evidence shows that immigrant adults' health advantage is more pronounced among recent immigrants (Harley and Eskenazi 2006, Hawkins et al. 2008). Harley and Eskenazi (2006), for example, find that Mexican mothers who migrate to the U.S. in childhood are more likely to smoke and practice poor dietary habits during pregnancy than mothers who arrive in adolescence and adulthood. A parallel body of evidence on adults suggests that, while immigrant mothers and children should exhibit healthier outcomes than their peers from later generations (Gordon-Larsen, Adair and Popkin 2003; Popkin and Udry 1998), this

advantage should decline over the life cycle, producing convergence between generational groups (e.g, Akresh 2007; Antecol and Bedard 2006; Franzini et al. 2001; Marmot and Syme 1976). Unhealthy-acculturation theory motivates the first hypothesis we test: *1) that the decline in healthy behavior should be faster among foreign-born mothers than among second-, third-, and higher-generation mothers, producing a decreasing immigrant/native gap as children age.*

The dominant explanation put forth for potential health decline with time in immigrant families emphasizes changing social relationships—deteriorating kin and non-kin environments (e.g., Finch, Frank and Vega 2004). There is little evidence to confirm or dispute this possibility, with most research relying on markers such as English language ability or years in the United States to proxy for social and cultural change (see Lara et al. 2005 for a review). It is possible, however, that the negative effects of changing social relationships may be offset by family-level gains in financial capital. Research on earnings growth and social mobility among immigrants suggests that second-generation children should experience improved economic resources over time; in fact, there is evidence of earnings growth among foreign-born adults with increasing time in the United States (Akresh 2008; Akresh 2011; Duleep and Dowhan 2002). To the extent that immigrant families experience economic mobility as children age, an alternative hypothesis is: *2) that immigrant mothers may maintain healthier behaviors as their children age, resulting in stable immigrant/native differences, or increasing differences if native-born mothers also experience a decline in healthy behavior.* We examine the persistence of immigrant/native behavioral differences within the same mothers over time. Though it is beyond the scope of our investigation to evaluate whether changes in families' composition and economic resources explain the temporal patterns we observe, we hope to provide a baseline understanding on which future research will build.

Finally, race and ethnicity may produce stratification in the pace or direction of the emergence of a gradient among the second generation, for a combination of socioeconomic and behavioral reasons. In the United States, for example, black and Hispanic families are the most likely to attend schools without gyms or recess, and to live in neighborhoods with high crime rates and few opportunities for exercise (Gordon-Larsen, McMurray and Popkin 2000; Hofferth and Sandberg 2001). Jackson (2011) finds that the health advantage of Hispanic adolescents in immigrant families weakens as they age, while it remains stable for children in East Asian immigrant families. Observing ethnic groups from diverse socioeconomic circumstances will allow us to test a third hypothesis: *3) that any decline in healthy behavior should be faster among mothers in socioeconomically disadvantaged ethnic groups.*

A note about cross-national comparisons

The increased compositional breadth gained by a cross-national approach is an important benefit of our study. At the same time, it is important to emphasize that any differences we observe across countries cannot be attributed to a single factor; the United States and United Kingdom differ on several dimensions, all of which could contribute to cross-national differences in the health integration of immigrant mothers. First, the two countries differ in terms of the cultural traditions and socioeconomic profiles of their immigrant populations. The United Kingdom has a higher proportion of immigrant families from high-income countries: 37percent in the United Kingdom vs. 24percent in the United States (Hernandez et al. 2009). Within the United Kingdom, black Caribbean migrants have lower education and occupational qualifications than native-born whites, on average, whereas South and East Asian migrants are more bimodally distributed, with strong representation in high-qualification categories (Modood 2003). U.S. research demonstrates similar nativity differences in socioeconomic status.

Immigrants from Latin American countries earn less than U.S.-born whites and their U.S.-born ethnic peers (Allensworth 1997), and these patterns changed little between 1970 and 1990 (Snipp and Hirschmann 2005). In contrast, other foreign-born adults are clustered at both ends of the socioeconomic hierarchy and have been more successful than Hispanics, on average, in converting education into economic and occupational success (Iceland 1999; Niedert and Farley 1985).

Second, immigration policies differ by country. For example, the United Kingdom has a much smaller undocumented foreign-born population than the United States, where 29percent of immigrants are estimated to be undocumented (Van Hook, Bean and Passel 2005). Finally, the two countries have very different health care and social welfare systems, despite similar patterns of family formation (Kiernan et al 2011) and income inequality (Banks et al. 2003; Wilkinson and Pickett 2009). This results in a different context of reception for arriving immigrants. The United Kingdom provides more universal health services than the United States, including free health care through the British National Health Service, home visits for new mothers, priority in scheduling medical appointments for children, and child centers with integrated child care services. Welfare state policies in the United Kingdom are also more generous with respect to family cash assistance, social housing, and childcare (Gornick and Myers 2005; Hills 2007).

The multitude of population and policy differences between the two countries could produce cross-national variation in the degree of the immigrant advantage that we observe, making it difficult to attribute any differences to a particular source. Evidence of similar patterns across countries, however, would be noteworthy.

Data and Methods

Data

We analyze two national birth cohort studies to study nativity differences in health behaviors: the American Fragile Families and Child Wellbeing Study (FFS) and the U.K. Millennium Cohort Study (MCS). Both studies represent national populations, contain longitudinal information on mothers' health behavior and oversample ethnic minority families. The FFS follows approximately 5,000 children born between 1998 and 2000 in large U.S. cities, including a large oversample of births to unmarried parents. Mothers, and most fathers, were interviewed in the hospital soon after birth, with additional interviews at ages one, three, and five; additional data based on interviews with nine-year-olds are being prepared for release. When weighted, FFS data are representative of births in cities with populations over 200,000. The FFS sample of immigrant and native-born mothers is very similar to national samples (vital statistics), as are multivariate relationships between our variables of interest. Moreover, the FFS is likely to be more representative of immigrant and native-born mothers than other surveys. A key component of the FFS study design was the use of a hospital-based sampling frame. By starting at the hospital, the FFS was able to obtain higher response rates than studies that sample from birth records and then try to interview mothers in their homes.

The MCS is the fourth of Britain's national birth cohort studies. The first wave of the MCS took place during 2001-2002 and included 18,552 families and 18,818 cohort children. Information was first collected from parents when their children were nine months old, with follow-up interviews with the main caregiver (usually the mother) at ages three, five, and seven. We use data through age five to maximize comparability with the FFS. The sample design included an overrepresentation of families living in areas with high proportions of child poverty

or ethnic minority populations. Overall, both data sources provide information on socio-demographic characteristics, parents' health, relationships, parenting, and child wellbeing.

Measures

Nativity and race/ethnicity

Although all children are born in the United States or the United Kingdom, mothers can be born abroad (foreign born, first generation); we separate these mothers from mothers born in the two countries. Given variation in immigrants' socioeconomic circumstances and health behaviors, we interact nativity with ethnicity. In the United States, we distinguish between two groups of immigrant mothers: Hispanic and non-Hispanic. Small sample sizes prevent further disaggregation by ethnicity in the U.S. sample; about 60 percent of foreign-born Hispanic mothers identify themselves as Mexican, with other mothers identifying as Puerto Rican, Cuban, and other Hispanic ethnicities. Most non-Hispanic foreign-born mothers (62 percent) are a race/ethnicity other than black or white: specifically, 64 percent of these mothers identify as Asian, 12 percent as American Indian, and 24 percent as "other." In the United Kingdom, we distinguish among four groups of foreign-born mothers: South Asian (Indian, Pakistani, Bangladeshi), black (African, Caribbean), white (mothers of European origin), and "other" (a residual category include Chinese immigrants and other groups with very small numbers). In the United Kingdom, information regarding nativity and country of origin was obtained at age three; the sample is therefore limited to mothers who participated in the survey when their child was age three. Overall, racial/ethnic categories among native-born mothers separate non-Hispanic white, Hispanic, black, and other mothers in the United States, and black (African or Caribbean), South Asian (Indian, Pakistani, Bangladeshi), other and white mothers in the United Kingdom. Nativity categories include foreign-born non-Hispanic and Hispanic mothers in the United States

(reference category is non-Hispanic white natives), and foreign-born white, South Asian, black and other mothers in the United Kingdom. The detail of the ethnic categories we use permits us to compare immigrant mothers to not only native-born white mothers but to native-born mothers in their own ethnic groups.

Table 1 presents weighted sample characteristics by nativity. The distribution of foreign-born mothers matches national figures in each survey: 25 percent in the United States (representative of large U.S. cities) and 10 percent in the United Kingdom. In the United States, 9 percent of mothers are foreign-born non-Hispanic, and 16 percent are foreign-born Hispanic. In the United Kingdom, 4 percent of mothers are foreign-born white; 3 percent are foreign-born South Asian; 1 percent are foreign-born black; and 2 percent are foreign born and of some other ethnicity. Among U.K. white immigrant mothers (who constitute 30 percent of immigrant mothers), 61 percent come from Western Europe, 8 percent from Eastern Europe, and 12 percent from Australia, New Zealand, the United States and Canada. The remaining 19 percent come from Asian, African, South American, and Caribbean countries. In sensitivity analyses, we create a comparable U.S. “foreign-born white” category by excluding non-white, foreign-born mothers from the non-Hispanic, foreign-born category. Because results do not change, we retain these mothers in our final models. Though we test disaggregated categories separating Indian, Pakistani, Bangladeshi, black African, black Caribbean, other (mostly East Asian), and white foreign-born mothers, Wald and likelihood ratio tests indicate that the South Asian ethnicities do not significantly differ from one another in their relationships with the outcomes, nor do the black ethnicities. Because “other” ethnicity foreign-born mothers differ significantly from South Asian, black, and white mothers, we treat them as a separate group.

Mothers' health behaviors

In both surveys, we examine mothers' health behaviors around the time of the child's birth, and between birth and age five. We build on parallel bodies of evidence documenting an immigrant advantage in children's birth outcomes (e.g., Collins, Wu and David 2002; Hummer et al. 1999; Wingate and Alexander 2006) and in adults' health (e.g., McDonald and Kennedy 2004). Mothers' health behaviors are markers of children's health environments and are strongly related to children's health, cognitive development and socioeconomic attainment (Alexander and Korenbrat 1995; Jackson 2010; Power et al. 2007; Wakschlag et al. 2002).

At birth, we measure *breastfeeding initiation* (yes/no), *smoking during pregnancy* (yes/no), and *early prenatal care* (first trimester). We focus on behaviors meaningfully related to both mothers' and children's health that are comparable across the two data sources, and focus on behaviors that are likely to have intergenerational consequences. Mothers' smoking and breastfeeding behavior, as well as the quality of prenatal medical care, are strongly related to children's physical, behavioral, and cognitive development (Alexander and Korenbrat 1995; Heikkila et al. 2011; Kelly, Day and Streissguth 2000; Oddy et al. 2003; Wakschlag et al. 2002). Although it may seem that the greater likelihood of socioeconomic disadvantage in the FFS would mean that these mothers are more likely than mothers in the larger population to benefit from prenatal care assistance, identical findings persist when the sample is weighted to be nationally representative of all births in large U.S. cities. Though distinguishing among levels of prenatal smoking would be ideal, there are not enough cases in each nativity group when we distinguish among nonsmokers, low/medium smokers, and those that smoke heavily. Sensitivity analyses (based on small numbers) demonstrate that the findings are very consistent when we disaggregate smoking by degree, increasing confidence that this measure provides a reasonable

proxy. In early childhood—ages one to five—we continue to measure mothers' *smoking behavior around the child* (yes/no).

Sociodemographic characteristics

We measure characteristics correlated with both nativity and mothers' behaviors. In the United States, *maternal education* separates mothers with less than a high school education, a high school diploma, some college, and a college diploma or higher. In the United Kingdom, we use a comparable measure, separating mothers with no qualifications; Ordinary Level examinations (typically school leaving qualifications taken at age 16); A-level college entrance exams and vocational equivalents; and university degrees. *Family income* is measured using household poverty ratios (adjusted for household size and the number of children). In each sample we distinguish between ratios below 100 percent of the poverty line; ratios 100 to 199 percent of the poverty line; 200–299 percent; and 300 percent or above. Using other cutoffs, including separating households in the top 30 percent from those below, does not change the findings. At each age, *family structure* measures differentiate between mothers married, mothers who are cohabiting, and mothers who are single. At age five, the married and cohabiting categories include both biological and "social" fathers. We also control for mothers' age at birth and the child's sex. Additional controls (language spoken at home, measures of mothers' social support) did not change the substantive findings about immigrant/native differences, so we do not include them in the final models.

Table 1 shows that nativity groups vary dramatically in their levels of education and family income. In the United States, foreign-born, non-Hispanic mothers have above-average levels of education and family income: Forty-nine percent of these mothers have completed college or more, for example, relative to 22 percent of the total sample. In contrast, Hispanic

immigrant mothers have below-average levels of education and income: Just 7 percent of these mothers have a household poverty ratio of 300 percent or above at the time of children's birth, compared with 38 percent of the total sample and 57 percent of non-Hispanic immigrant mothers. FFS immigrant mothers are more likely to be in married or cohabiting relationships than their U.S.-born peers: Twenty-three percent of U.S.-born mothers are not living with the father at the time of the child's birth, compared with 6 percent of non-Hispanic immigrant mothers and 15 percent of Hispanic immigrant mothers. The higher level of cohabitation among Hispanic immigrant mothers (24 percent) may reflect normative differences in the meaning of marriage and cohabitation in some Latin American countries, where cohabiting and marital relationships are similarly valued (Choi and Seltzer 2009).

In the United Kingdom, white immigrant mothers are more likely to have a university degree or higher (49 percent) than native-born mothers (30 percent). South Asian immigrant mothers are disproportionately poorly educated, with only 19 percent holding a university degree. However, these mothers are only slightly less likely than other immigrant mothers (with the exception of whites) to live in high-earning households. These group differences are consistent with other national evidence. As in the United States, immigrant mothers are less likely to be single around the time of children's birth; a notable exception is seen among black immigrant mothers, who are much more likely to be single than their immigrant and native-born peers.

The substantial within-immigrant variation in mothers' education and economic resources is relevant in the predictions of hypothesis 3, which tests a stratified model of mothers' health-related integration. In particular, if hypothesis 3 is supported, we should expect to see

faster health decline among Hispanic immigrant mothers in the United States, and among black and South Asian immigrant mothers in the United Kingdom.

Method

We begin by examining cross-sectional nativity differences in mothers' health behaviors before birth, around the time of birth, and at age five. For each outcome we use binary logistic regression to estimate the likelihood that each mother (*i*) engages in a particular behavior (*p*):

$$\log[\frac{p_i}{1-p_i}] = \alpha_i + \beta X_i$$

We estimate nativity differences among mothers around the time of children's birth, net of the previously described age-specific measured sociodemographic factors, to establish within and cross-country patterns. From the parameter estimates we calculate the predicted probability of being in a particular category of each outcome, for immigrant and native mothers in each ethnic group with otherwise average characteristics.

In order to examine the persistence of nativity differences into early childhood, we use mothers' smoking behavior as our focal measure in multilevel growth-curve models that dynamically evaluate convergence or stability in immigrant and native-born mothers' smoking over the child's early life course. Most existing research relies on cross-sectional data to stratify by the number of years in the host country or by immigrant generation. Neither generational status nor duration of residence can reveal whether mothers have different trajectories, however. Among the foreign born, for example, there may be compositional differences varying by the year of arrival that have little to do with temporal patterns, including the context of reception, reason for migration, or socioeconomic circumstances. Though measures of duration provide a useful proxy for cohort differences among immigrant families, they do not distinguish between

immigrant/native differences due to variation in immigrant composition or the context of reception, and differences due to changes in the same mothers' behavior over time.

Growth curve models assess not only cross-sectional variation but variation in growth or decline over time within the same individuals, providing a way to examine whether trajectories vary around a mean and whether that variation can be predicted by covariates. The unconditional model estimates a mother-specific (*i*) and child age-specific (*t*) trajectory of maternal health behaviors (measured continuously), (*y)*, as a function of a mother-specific intercept (π_0), and mother and time-specific slopes (π_1), age (*A*), and errors (ε). This mother-level trajectory equation can be written as follows:

$$Y_{ti} = \pi_{0i} + \pi_{1i} A_{ti} + e_{ti} \quad (1)$$

The second level of the growth model allows mothers' trajectories to vary as a function of not only children's age but of covariates that vary across mothers. This amounts to equations for the random intercepts and slopes:

$$\begin{aligned} \pi_{0i} &= \gamma_{00} + \gamma_{01} X_i + \mu_{0i} \\ \pi_{1i} &= \gamma_{10} + \gamma_{11} X_i + \mu_{1i} \end{aligned} \quad (2)$$

where *X* denotes time-invariant measures (e.g., nativity, sex) that predict group differences in intercepts and slopes, and μ denotes random error terms. These equations result in a combined model:

$$Y_{ti} = \gamma_{00} + \gamma_{01} X_i + \gamma_{10} A_{ti} + \gamma_{11} X_i A_{ti} + \mu_{1i} A_{ti} + \mu_{0i} + e_{ti} \quad (3)$$

Because our measure of smoking is dichotomous, we extend equation (3):

$$Y_{ti}^{*} = \pi_{0i} + \pi_{1i} A_{ti} + e_{ti} \quad (4)$$

where y_{it}^{*} is an underlying continuous variable indicating the ordered categories (in this case, 0 or 1), and $y_{it}^{*} = \begin{cases} 0 \ if \ y^{*} < \pi_t \\ 1 \ if \ y^{*} \geq \pi_t \end{cases}$

We use this modeling strategy to examine the pace of change in mothers' *propensity* to smoke during early childhood. Because a measure of smoking around the child is not available at age one in the United States, we examine smoking behavior (not explicitly smoking around the child) for the growth curve analysis. The U.K. smoking measure remains the same. When examining behavioral change, it is important to consider how much change should be expected to occur in a short (five-year) time period. It is possible that immigrants selectively decide whether to adopt particular behaviors and norms of the host country. In the case of smoking, if immigrant mothers have below-average smoking rates upon arrival, then we might not expect them to change their behavior as the host country decides that it is unhealthy. This form of social-change argument would be more viable over a longer time period, however.

Missing data, selection and attrition

Missing values on predictor and outcome variables are imputed using multiple imputation, using complete data from theoretically relevant predictor variables to fill in missing values (Allison 2002). It is impossible to study patterns over time without also considering health selectivity. If those who migrate are the healthiest of their sending populations, then some degree of "regression to the mean" may be inevitable (Jasso et al. 2004), producing a pattern of convergence that occurs for reasons independent of unhealthy acculturation. Factors related to migration—who migrants are and whether they represent their sending population—should therefore be considered as possible explanations for nativity differences, as well as changes in their size over time. Foreign-born mothers, for example, may make up the members of their

native population with the healthiest lifestyles, given recent evidence of socioeconomic gradients in smoking and obesity among women in countries with previously inverse relationships between socioeconomic status and health behavior (Buttenheim et al. 2010). If so, they may be positively selected on health behavior, driving up estimates of the immigrant advantage. Because we cannot compare the health of these foreign-born mothers to that of mothers in their home countries, any immigrant advantage we observe should be interpreted as an upper bound.

Though the two surveys we analyze do not include information about mothers in the countries of origin, we are able to compare the breastfeeding and smoking behavior of our mothers with the same behaviors of women in the largest sending countries in our two samples. We use published data from multiple years of the Demographic and Health Surveys (DHS) and World Health Organization (WHO) in Mexico, the Dominican Republic, Bangladesh, Germany, India, Ireland, and Pakistan. Table 2 shows that the percentage of FFS and MCS immigrant women who breastfeed is similar to national statistics from their home countries; exceptions are seen among Irish women, who have higher breastfeeding rates than the very low national rate in Ireland, and Pakistani women, who have below-average breastfeeding rates. For smoking, when we are able to obtain data on the percentage of similarly aged mothers (vs. women overall) who smoke, the percentages are almost identical. About 5 percent of Mexican-born mothers in the FFS smoke, for example, compared with about 5.8 percent of Mexican mothers ages 20 to 34 in 2002 DHS data. Similarly, close to zero percent of Indian-born mothers in the MCS smoke, compared with 0.8 percent of mothers ages 20 to 34 in 2005 DHS data from India. These comparisons increase our confidence that the mothers in our data have similar health behaviors to mothers in their countries of origin.

Return migration may also contribute to patterns observed over time: If the least healthy foreign-born mothers return home, then they may be entirely missing from later waves, producing lower convergence toward natives' health behaviors than would otherwise exist, or producing a pattern of seemingly healthier behaviors among immigrants, leading to divergence. Examining FFS attrition shows that 15 percent of mothers participating at birth do not participate when children are five years old. Foreign-born mothers are more likely than U.S.-born mothers to drop out by age five (26 percent vs. 13 percent), but those who remain are not positively selected on observable health behaviors. Among natives, those who drop out are slightly less likely to breastfeed (45 percent vs. 50 percent) and more likely to smoke during pregnancy (26 percent vs. 22 percent) than those who remain. In the MCS, 21 percent of mothers who participate in wave one do not participate in wave three, when children are five. Foreign-born mothers are slightly more likely to drop out by age five than natives (14 percent vs. 11 percent), but those who drop out do not have systematically poorer health behaviors. Natives who drop out are less likely to breastfeed (56 percent vs. 68 percent) and more likely to smoke while pregnant (32 percent vs. 24 percent) than those who stay. On the one hand, positive health selectivity among natives and a lack of selective health-related attrition among the foreign born suggests that the immigrant advantage may be understated. On the other hand, we do not know the degree of migrant mothers' selectivity, making it important to interpret the foreign-born advantage as an upper bound.

Findings

Is the immigrant advantage in mothers' health behavior universal?

The first research aim is to examine whether the immigrant behavioral advantage extends to mothers in the United Kingdom. Table 1 suggests that is does, revealing striking nativity differences in mothers' health behaviors in both countries. In the United States, 18 percent of native-born mothers smoke during pregnancy, compared to 4 percent and 1 percent of non-Hispanic and Hispanic immigrant mothers, respectively. All immigrant mothers are also more likely than U.S.-born mothers to breastfeed, and less likely to smoke around their children at all ages. In the United Kingdom, South Asian, black, and other immigrant mothers are less likely to smoke during pregnancy, less likely to smoke around their children, and more likely to breastfeed. White immigrant mothers, although more likely to breastfeed than native-born mothers, have only slightly lower levels of prenatal smoking. Importantly, in both countries there are very small differences in immigrant versus native-born mothers' receipt of early prenatal care, suggesting that the United States largely succeeds at providing health care access to children, despite a health care system with less universal access than in the U.K.

The descriptive distributions described above indicate that large nativity differences in mothers' health behaviors exist in both the United States and the United Kingdom. Because differences persist throughout early childhood, these descriptive findings are more consistent with hypothesis 2 (predicting stable immigrant/native differences) than hypothesis 1 (predicting a faster decline in healthy behavior among foreign-born mothers). In addition, because healthier behaviors exist throughout early childhood among more socioeconomically disadvantaged immigrant mothers—specifically, Hispanic, black, and South Asian mothers—the descriptive findings are inconsistent with the third hypothesis, predicted by the segmented assimilation

literature, that healthy behaviors should decline most rapidly among socioeconomically disadvantaged ethnic groups.

Table 3 examines these questions for the United States more rigorously, presenting parameter estimates from multivariate models of nativity differences, adjusted for sociodemographic factors. Each column contains estimates for a different outcome. The first panel of Table 3 shows clear differences between immigrant and native-born mothers. The odds of prenatal smoking are significantly lower among non-Hispanic immigrant mothers in the U.S.—70 percent lower—compared to U.S.-born non-Hispanic white mothers, net of observed social and demographic differences ($e^{-1.200}$). These differences are even larger among Hispanic immigrants, at 95 percent ($e^{-1.200-1.648}$).

Consistent with the descriptive findings, there are few meaningful immigrant/native differences in early prenatal care use; the one exception is seen among immigrant Hispanic mothers, who are more likely than their native-born Hispanic peers to receive early prenatal care. The odds of breastfeeding are more than four times higher for non-Hispanic immigrant mothers than for non-Hispanic white natives, net of observed social and demographic differences ($e^{1.378}$). Hispanic immigrant mothers are even more likely to breastfeed—over six times more likely than non-Hispanic white native mothers ($e^{1.378 +0.466}$); this difference is marginally significant. Hispanic immigrant mothers are also significantly more likely to breastfeed than their native-born, Hispanic peers.

These differences are better understood in the form of predicted probabilities. The first panel of Table 4 presents the predicted probability of each behavior in the United States for each foreign-born and native-born ethnic group, holding social and demographic characteristics constant at their means. Panel 1 shows that non-Hispanic and Hispanic immigrant mothers are 75

percent and 99 percent, respectively, less likely than U.S.-born, non-Hispanic white mothers to smoke while pregnant. The magnitude of these differences is smaller, but still sizeable, when comparing immigrant mothers to their native-born ethnic peers. Similarly, the predicted probability of breastfeeding in the United States is about 40 percent higher among both non-Hispanic and Hispanic immigrants than among native-born, non-Hispanic whites (0.815 and 0.867 vs. 0.583).

Tables 4 and 5 reveal similarly large nativity differences among mothers in the United Kingdom. White immigrant mothers are significantly more likely than U.K.-born white mothers to breastfeed ($e^{0.734}$), but no less likely to smoke while pregnant. South Asian, black, and other immigrant mothers are more likely to breastfeed than white natives; however, they are less likely to breastfeed than white immigrant mothers and, in the case of South Asians, than their U.K.-born ethnic peers. These three groups of mothers are significantly less likely to smoke while pregnant than immigrant and native white mothers, as well as U.K.-born mothers in their own ethnic group. As in the U.S., there is little evidence of immigrant/native differences in early prenatal care; the one exception is immigrant "other" mothers, who are more likely than their native-born ethnic peers to receive early prenatal care (as shown in a Wald test). The second panel of Table 4 reinforces these patterns more intuitively and also demonstrates the similar magnitude of immigrant/native differences in both countries. South Asian immigrant mothers, for example, are 97 percent less likely to smoke while pregnant than U.K.-born whites (0.212 vs. 0.009). The gaps are of similar magnitude for black and other mothers.

Thus far, two main findings emerge from Tables 3-5. First, in the United States, healthier behaviors among the foreign-born are not limited to Hispanics. Though in some cases the behavioral advantage is strongest among Hispanic mothers, there are also large differences

between non-Hispanic immigrant mothers (most of whom are Asian or "other") and natives. We also find differences between non-Hispanic white immigrant mothers and their U.S.-born peers, despite the significantly higher average levels of education and family income available to these mothers. This finding adds to existing U.S. evidence that has produced mixed findings among the non-Hispanic foreign-born population. Second, extending the analysis to the United Kingdom shows that the "immigrant advantage" in mothers' health behavior extends to other groups. In the United Kingdom, patterns at birth are more varied among white immigrant mothers, the most socioeconomically advantaged foreign-born ethnic group. These mothers are significantly more likely to breastfeed than U.K.-born white mothers, but no less likely to smoke while pregnant. In contrast, South Asian, black, and other immigrant mothers are more likely to breastfeed and less likely to smoke. Although the foreign-born advantage may be strongest among the most socioeconomically disadvantaged groups, it is not limited to these mothers.

How persistent is the foreign-born advantage?

Having established strong differences between immigrant and native-born mothers near the time of children's birth, we move to the second research question: Does the behavioral advantage of foreign-born mothers persist beyond infancy? Specifically, we test three hypotheses: 1) that immigrant mothers adopt unhealthy behaviors more quickly, producing decreasing nativity differences as children grow up; 2) that immigrant mothers maintain healthier behaviors, resulting in stable nativity differences; and 3) that mothers in socioeconomically disadvantaged ethnic groups adopt unhealthy behaviors most quickly. We begin with cross-sectional analyses, which can provide some insight into the persistence of nativity differences over children's early life course. Table 3 shows that, in the United States, the odds of smoking around the child at age five are significantly lower among non-Hispanic immigrant mothers than

among native whites; non-Hispanic immigrant mothers are 60 percent less likely to smoke around their child. Differences between natives and immigrant mothers, or among immigrant mothers, are similar for Hispanics. In the United Kingdom, as Table 5 shows, white immigrant mothers are no less likely to smoke around their children at age five than native-born white mothers, whereas black and other immigrant mothers are significantly less likely to smoke. The fact that strong nativity differences remain at age five is consistent with hypothesis 2, suggesting stable differences over time. That U.K. black mothers—who are, on average, socioeconomically disadvantaged relative to their peers—are less likely to smoke when children are five provides evidence contrary to the predictions of hypothesis 3.

Because comparisons across nativity groups cannot fully reveal continuity or change in smoking trajectories, to better test hypotheses 2 and 3 we use a growth-curve modeling approach to dynamically assess within-mother patterns over time.[3] Tables 3 and 5 present estimates of nativity differences in mothers' smoking behavior when their children are ages one to five. The findings confirm a stable pattern of nativity differences, consistent with hypothesis 2. Moreover, that stability is observed among all ethnic groups is inconsistent with the predictions of hypothesis 3 that we should observe a segmented pattern of change in smoking.

The first row in each panel on smoking change presents differences in mothers' smoking behaviors at child's age one (the intercept of the intercept, or the log odds of smoking at age one for white native mothers), as well as the average change in smoking propensity between ages one and five (the intercept of the slope, or the change in smoking behavior for white natives). Beginning with the United States in Table 3, comparing intercepts and slopes among immigrant groups demonstrates that nativity is a significant predictor of smoking behavior at age one in both countries, with a significantly lower log odds of smoking (-2.721) among non-Hispanic

immigrant mothers than among non-Hispanic white, U.S.-born mothers (-0.193). This baseline relationship is stronger still among Hispanic immigrant mothers (-2.721-1.229). However, examination of the slopes suggests no evidence of a differential pace of change between ages one and five in smoking behavior between foreign and native-born mothers, when compared to both native-born white mothers and to their native-born ethnic peers. Foreign-born Hispanic mothers have a lower predicted increase in smoking propensity (-0.164) than non-Hispanic white natives (-0.007, the intercept of the slope), but these healthier temporal patterns are not statistically significant. Differences between Hispanic native and immigrant mothers are also statistically insignificant, as shown by the Wald tests at the bottom of the table. In contrast, native-born black and Hispanic mothers increase their smoking propensity at a faster rate than their non-Hispanic white peers, though they are still less likely to smoke by the time children are age 5.

Table 5 also reveals stability in nativity differences between birth and age 5 among U.K. mothers. Despite lower smoking intercepts among South Asian, black and other immigrant mothers, there is no nativity variation in the pace of smoking change. Overall, findings from the growth-curve analysis suggest that, although there are differences in mothers' smoking behaviors across nativity groups, the disparities are fairly stable over time. This finding is inconsistent with convergence that could be driven by either regression toward the mean (due to high levels of selection on health and healthy behaviors) or unhealthy acculturation due to behavioral changes during early childhood.

Discussion

In most industrialized nations, racial, ethnic, and socioeconomic disparities in children's health are large and unequally distributed at the time of birth. Evidence of favorable health and development among the growing proportion of children in immigrant families suggests the value

of understanding whether healthy behaviors are maintained as children age, as well as identifying family-level factors associated with any behavioral and health changes. Drawing from a diverse population of immigrant mothers from disparate regions of the world and socioeconomic backgrounds—Hispanic and non-Hispanic immigrant mothers in the United States and white, South Asian, black African and Caribbean, and East Asian immigrants in the United Kingdom—we consider how broadly immigrant mothers' advantage in health behaviors extends, and whether any advantage remains stable or changes over time. We focus on mothers' behaviors to provide a proximate assessment of the family-level behavioral processes that occur with migration; mothers' behaviors constitute a key domain of children's health environments, with intergenerational consequences. Our focus on the United States and the United Kingdom is salient, given that roughly 25 percent of children and youth in both countries live in immigrant families.

Before summarizing our findings and their implications, it is important to weigh the merits of this research against its limitations. First, we cannot compare the health of children born to immigrant mothers to that of children born to mothers who do not migrate (in order to assess the degree of selective migration among immigrant families). Though descriptive comparisons of our samples with smoking and breastfeeding data from several countries of origin increase our confidence in the representativeness of the mothers we study, any immigrant advantage we observe should nonetheless be interpreted as an upper bound. Second, the large number of differences in population composition and policy across the United States and United Kingdom limit our ability to attribute cross-national variation to a particular source.

These limitations notwithstanding, analysis of two rich national and longitudinal data sources yields several important findings. First, extending our analytic consideration to the

United Kingdom makes it possible to assess whether the immigrant advantage is limited to the United States. Results of this investigation confirm a fairly "universal" immigrant advantage in mothers' health behaviors spanning a broad array of ethnic and socioeconomic groups, as well as national boundaries. In line with existing research, Hispanic immigrants in the United States have healthier behaviors than their non-Hispanic white peers, and often than their native-born Hispanic peers. Non-Hispanic immigrants in the U.S.—predominantly Asian—also have significantly healthier behaviors than non-Hispanic native-born mothers, despite being socioeconomically advantaged (on average) relative to natives. In the United Kingdom, there is some evidence of healthier behaviors among white immigrant mothers with above-average levels of education and family income, as well as among less advantaged South Asian, black, and other-ethnicity immigrant mothers. With the exception of breastfeeding, nonwhite immigrant mothers in the United Kingdom have healthier behaviors than both whites and their co-ethnic peers born in the United Kingdom. The immigrant advantage also appears equally strong in the United States and the United Kingdom. Moreover, early prenatal care is common among all mothers in both countries; the United States largely succeeds at providing health care access to children, despite a less universal coverage system than in the United Kingdom.

The longitudinal design of the two surveys we analyze also permits us to test several hypotheses related to a second research question: whether immigrant mothers' health behavioral advantage extends through early childhood. Using the case of mothers' smoking behavior to test competing hypotheses predicting either convergence or stability of nativity differences during early childhood, we find evidence of stability in mothers' smoking behavior. These findings suggest that immigrant mothers' behavioral advantage is not limited to the prenatal period or infancy. Nor does the behavioral advantage of foreign-born mothers disappear over time, as

would be implied in a pattern of convergence due to either unhealthy acculturation or regression toward the mean. The similarly stable immigrant/native differences among all ethnic groups is also at odds with a third hypothesis, motivated by theories of segmented assimilation, predicting a faster decline in health behavior among mothers in the most socioeconomically disadvantaged ethnic groups.

There are some caveats to our findings about the stability of immigrant/native differences. First, although the five-year time window is an improvement over existing cross-sectional research, it is possible that convergence in mothers' behaviors would occur over a longer time period. As more data become available, it will be possible to study whether these patterns extend beyond early motherhood, and whether they depend on changes in families and social networks. Secondly, though we examine change in smoking behavior as a temporal extension of the abundance of existing research on prenatal smoking, it is possible that immigrant/native convergence occurs for other health behaviors.

That we observe largely similar patterns across the United States and the United Kingdom in most of the outcomes we examine is striking. Important differences in U.S. and U.K. immigrants' regional origins and reasons for migration, and in the policy structure of each country, might have led us to expect some differences in patterns across the two countries. Examining immigrant/native differences in the two countries provides an extension of the analytic lens beyond the United States, which has informed much of our understanding about mothers' health behaviors in the context of immigration. Although we are unable to fully rule out the possibility that immigrant mothers are a selective sample of their origin populations, in the absence of this selection process it may be that factors related to immigrants' origin culture may be protective with respect to their health behaviors, in this case those that are tied closely to their

children's health environments. This protective pattern may be less pronounced for domains of child wellbeing that are more reliant on structural resources, such as cognitive development.

Health selection, cultural differences, and changing environmental circumstances undoubtedly play a role in explaining patterns of nativity-based inequalities observed in the host country. The varied family, neighborhood, and social arrangements experienced by immigrant families imply that as children age, environmental factors beyond their parents' behaviors will inform their subsequent trajectories. Given the large number of first- and second-generation parents and children in the United States and the United Kingdom, it is increasingly important to understand the evolution of health trajectories among this diverse group of families and children. If immigrant families practice healthier behaviors, the challenge lies in maintaining healthy environments over time, as well as finding ways to extend those benefits to the broader population.

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Notes

[1] A larger literature establishes healthier birth outcomes among East and South Asian mothers (Gould et al. 2003; Hummer et al. 1999; Landale, Oropesa and Gorman 1999).

[2] At the same time, however, Kelly et al. (2009) also document an ethnic minority disadvantage in birth weight.

[3] In side analyses available by request, we examine cross-sectional differences between recent and more longstanding migrants. Although there is a pattern of healthier behaviors among recent migrants, the differences between recent and older migrants are not consistently significant, and the gaps between older migrants and native-born mothers are highly significant. This is consistent with a pattern not limited to recent migrants. We do not present these findings, because sample sizes become quite small when disaggregating by nativity, ethnicity, and duration of residence.

TABLE 1
Weighted Characteristics of United States and United Kingdom Samples

	United States (FFS)					United Kingdom (MCS)					
	For. Born, Non-Hisp.	For. Born. Hispanic	U.S. Born	Total		For. Born White	For. Born. South Asian	For. Born Black	For. Born Other	UK Born	Total
(N)	309	535	2,598	3,442	(N)	623	491	171	193	13,582	15,060
Nativity status (row %)	9	16	75	100	Nativity status (row %)	4	3	1	2	90	100
Mean years in U.S.[a]	8.7	7			Mean years in U.K.[a]	19.1	15.2	13.5	12.5		
Race/Ethnicity					Race/Ethnicity						
Hispanic	0	100	21	32	African or Caribbean	0	0	100	0	2	3
Black	22	0	27	23	South Asian[b]	0	100	0	0	2	5
Non-Hispanic White	16	0	49	37	Other	0	0	0	100	1	2
Other	62	0	3	8	White	100	0	0	0	95	90
					Sociodemographic						
Sociodemographic Characteristics					Characteristics						
Child Male	55	52	55	55	Child Male	51	49	50	45	51	51
Maternal Age at Birth	30.5	27.5	26.7	27	Maternal Age at Birth	30.8	27.9	31.3	30.8	29.2	29.3
Maternal Education					Maternal Education						
Less than High School	15	64	23	29	No Qualifications	9	46	30	26	9	11
High School	23	24	32	30	O-Levels or Equiv.	22	22	19	20	40	38
Some College	13	8	22	19	A-Levels or Equiv.	20	13	20	20	21	21
College or Higher	49	3	23	22	University Degree or Higher	49	19	30	34	30	30
Household Poverty Ratio					Household Poverty Ratio						
Below 100%, Birth	7	49	24	26	Below 100%, 9 months	19	56	45	33	25	26
100-199%, Birth	28	27	20	22	100-199%, 9 months	28	27	31	38	35	35
200-299%, Birth	8	17	14	14	200-299%, 9 months	26	9	15	17	25	24
300-399%, Birth	57	7	42	38	300-399%, 9 months	27	8	9	12	15	15
Below 100%, Age 5	19	59	28	31	Below 100%, Age 5	15	62	53	36	23	
100-199%, Age 5	11	27	24	24	100-199%, Age 5	35	26	31	30	40	39
200-299%, Age 5	22	9	16	16	200-299%, Age 5	25	8	13	22	23	22
300-399%, Age 5	48	5	33	30	300-399%, Age 5	25	4	3	12	14	14
Maternal Family Structure					Maternal Family Structure						

Married to Bio. Father at birth	86	61	57	60	Married to Bio. Father at 9 months	72	94	46	78	61	62
Cohabiting at birth	8	24	20	20	Cohabiting at 9 months	21	0	14	7	26	24
Single at birth	6	15	23	20	Single at 9 months	7	6	41	15	13	13
Married at age 5	70	56	56	57	Married at age 5	74	92	50	86	63	65
Cohabiting at age 5	4	19	19	18	Cohabiting at age 5	15	3	9	4	20	19
Single at age 5	26	25	25	25	Single at age 5	10	6	40	10	17	17
Maternal Health Behaviors					Maternal Health Behaviors						
Smoked During Pregnancy	4	1	18	14	Smoked During Pregnancy	17	3	1	4	22	22
Breastfed	89	80	60	66	Breastfed	88	95	82	96	72	73
Prenatal Care in First Trimester	83	82	79	80	Prenatal Care in First Trimester	81	76	73	78	78	77
Smoking Around Child					Smoking Around Child						
Age 1	-	-	-	-	*Age 1*	9	9	1	4	12	11
Age 3	11	6	15	13	*Age 3*	12	8	2	8	17	16
Age 5	3	1	14	11	*Age 5*	10	6	2	3	13	12
Smoking					Smoking						
Age 1	4	2	27	22	*Age 1*	22	5	6	7	28	26
Age 3	3	3	14	11	*Age 3*	20	2	8	9	29	27
Age 5	4	6	30	24	*Age 5*	19	3	9	8	26	24

Sources: Fragile Families for United States. Millennium Cohort Study for England
Note: Cells show percentages, unless otherwise indicated. Frequencies are lower than in subsequent tables because these distributions are weighted.
[a] Foreign-born only
[b] Indian, Pakistani, Bangladeshi

TABLE 2
Select Source Country Characteristics for Mothers: United States and United Kingdom

	Ever Breastfed	% Who Smoke
Mexico		
FFS	86	3
Mexico	83	12
Dominican Republic		
FFS	86	5
DR	86	5.8[a]
Bangladesh		
MCS	89	1
Bangladesh		4
Germany		
MCS	84	32
Germany	80	26
Ireland		
MCS	77	21
Ireland	50	28
India		
MCS	87	0
India	95	0.8[a]
Pakistan		
MCS	72	2
Pakistan	94	7

Sources: Fragile Families (FFS) for United States. Millennium Cohort Study (MCS) for England.
Note: All country of origin statistics are for the total female adult population, unless otherwise noted. Data sources from countries of origin are as follows: Mexico, Mexican Census; Dominican Republic, DHS 1991, DHS 2002 (mothers aged 20-34), WHO 2006; Bangladesh, DHS 1993 and WHO 2006; Germany, WHO 2006; India, DHS 1992, DHS 2005 (mothers aged 20-34), WHO 2006; Ireland, WHO 2006; Pakistan, DHS 1990 and WHO 2006; Somalia, N/A.
[a] Mothers aged 20-34

TABLE 3
Regression of Maternal Health Behaviors on Nativity and Race/Ethnicity: United States

	Prenatal Smoking	Breastfed	Early Prenatal Care	Smoking around Child, Age 5	Smoking Change	
					Intercept	Slope
Foreign-Born	-1.200**	1.378**	-0.111	-1.110*	-2.721**	0.059
	(0.27)	(0.20)	(0.19)	(0.48)	(0.90)	(0.15)
Hispanic	-1.737**	-0.137	-0.217†	-1.542**	-2.608*	0.148*
	(0.13)	(0.12)	(0.13)	(0.21)	(0.29)	(0.06)
Hispanic, Foreign-Born	-1.648**	0.466†	0.581**	-0.606	-1.229*	-0.164
	(0.46)	(0.25)	(0.24)	(0.72)	(0.60)	(0.19)
Black	-1.265**	-0.474**	0.085	-0.416**	-2.436**	0.152**
	(0.11)	(0.10)	(0.11)	(0.14)	(0.24)	(0.05)
Other Race	-1.068**	0.003	-0.340	-0.375*	-0.861	-0.024
	(0.27)	(0.24)	(0.22)	(0.17)	(0.57)	(0.13)
Mother High School	-0.680**	0.300**	0.341**	-0.131	-0.987**	
	(0.10)	(0.09)	(0.09)	(0.130	(0.16)	
Mother Some College	-1.163**	0.923**	0.539**	-0.538**	-1.561*	
	(0.12)	(0.10)	(0.11)	(0.16)	(0.18)	
Mother College or More	-2.377**	1.606**	1.320**	-2.386**	-3.227**	
	(0.25)	(0.17)	(0.24)	(0.45)	(0.34)	
HH Pov. Ratio 100-199%, Birth	-0.116	0.208*	0.046	-0.188	-0.169	
	(0.10)	(0.09)	(0.09)	(0.13)	(0.16)	
HH Pov. Ratio 200-299%, Birth	-0.319*	0.200†	0.388**	-0.438*	-0.324†	
	(0.13)	(0.11)	(0.12)	(0.18)	(0.09)	
HH Pov. Ratio 300%+, Birth	-0.540**	0.260*	0.722**	-0.523*	-1.010**	
	(0.14)	(0.13)	(0.14)	(0.21)	(0.22)	
Mother Married, Birth	-1.285**	0.500**	0.634**	-0.106	-1.767**	
	(0.15)	(0.11)	(0.13)	(0.16)	(0.22)	
Mother Cohabiting, Birth	-0.031	0.118	0.256**	0.364*	0.060	
	(0.09)	(0.08)	(0.08)	(0.16)	(0.14)	
Mother's Age at Birth	0.075**	0.020**	-0.008	-0.002	-0.040**	
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	
Child Male	-0.176*	-0.056	0.124†	-0.048	-0.076	
	(0.08)	(0.07)	(0.07)	(0.11)	(0.13)	
Intercept	-0.957**	0.069	0.860**	-0.610*	-0.193	-0.007
	(0.20)	(0.19)	(0.20)	(0.29)	(0.36)	(0.04)
Tests of Coefficient Equality						
FB Hispanic vs. NB Hispanic						
x2 (1)	0.00	4.04	9.33	1.41	2.51	0.5
$p>x^2$	0.96	0.04	0.00	0.23	0.11	0.48
N	4897	4897	4897	2874	3143	3143

Sources: Fragile Families (FFS) for United States. Millennium Cohort Study (MCS) for England.
Note: Binary logistic regression. Reference categories are as follows: white native mothers, less than high school education, household poverty ratio below 100%, mother single at birth, child is female.
†<.10; * p<.05 ; ** p <.01

TABLE 4
Predicted Probability of Maternal Health Behaviors by Nativity and Race/Ethnicity: United States and United Kingdom

	Prenatal Smoking	Breastfed	Early Prenatal Care	Smoking around Child, Age 5
United States				
U.S. Born Non-Hispanic White	0.398 [0.361, 0.436]	0.583 [0.546, 0.619]	0.828 [0.801, 0.855]	0.224 [0.184, 0.263]
U.S. Born Non-Hispanic	0.258 [0.240, 0.276]	0.527 [0.506, 0.548]	0.82 [0.804, 0.837]	0.187 [0.1660, 0.280]
Foreign-Born Non-Hispanic	0.096 [0.050, 0.143]	0.815 [0.756, 0.873]	0.784 [0.722, 0.846]	0.071 [0.010, 0.131]
U.S. Born Hispanic	0.059 [0.045, 0.073]	0.503 [0.453, 0.553]	0.787 [0.752, 0.823]	0.047 [0.029, 0.064]
Foreign-Born Hispanic	0.004 [0.001, 0.006]	0.867 [0.832, 0.902]	0.858 [0.825, 0.890]	0.009 [0.00. 0.018]
United Kingdom				
U.K. Born White	0.212 [0.203, 0.221]	0.674 [0.664, 0.683]	0.781 [0.774, 0.789]	0.12 [0.112, 0.127]
Foreign-Born White	0.239 [0.197, 0.280]	0.812 [0.775, 0.848]	0.791 [0.757, 0.826]	0.126 [0.093, 0.157]
U.K. Born South Asian	0.039 [0.024, 0.054]	0.883 [0.857, 0.910]	0.758 [0.718, 0.800]	0.032 [0.019, 0.046]
Foreign-Born South Asian	0.006 [0.002, 0.01]	0.900 [0.882, 0.917]	0.771 [0.739, 0.804]	0.034 [0.024, 0.044]
U.K. Born Black	0.141 [0.104, 0.178]	0.940 [0.916, 0.964]	0.756 [0.700. 0.813]	0.013 [0.003, 0.023]
Foreign-Born Black	0.014 [0.005, 0.023]	0.971 [0.956, 0.986]	0.777 [0.726, 0.826]	0.014 [0.003. 0.024]
U.K. Born Other	0.202 [0.111, 0.294]	0.928 [0.875, 0.982]	0.685 [0.597, 0.760]	0.022 [0.004, 0.039]
Foreign-Born Other	0.022 [0.007, 0.036]	0.955 [0.933, 0.976]	0.798 [0.743, 0.852]	0.023 [0.006, 0.04]

Sources: Fragile Families (FFS) for United States. Millennium Cohort Study (MCS) for England.
Note: Probabilities computed from parameters shown in Tables 3 and 5. All other covariates held constant at their group-specific means. 95% confidence intervals shown below probabilities.

TABLE 5
Regression of Maternal Health Behaviors on Nativity and Race/Ethnicity: United Kingdom

	Prenatal Smoking	Breastfed	Early Prenatal Care	Smoking around Child, Age 5	Smoking Change	
					Intercept (t)	Slope
Foreign-Born	0.152	0.734**	0.062	0.054	0.018	-0.018
	(0.12)	(0.12)	(0.11)	(0.15)	(0.17)	(0.05)
South Asian	-1.883**	1.303**	-0.129	-1.242**	-0.585**	-0.110
	(0.20)	(0.13)	(0.12)	(0.23)	(0.21)	(0.07)
South Asian, For. Born	-2.031**	-0.569**	0.010	-0.163	-0.288	0.024
	(0.39)	(0.20)	(0.18)	(0.32)	(0.31)	(0.10)
Black	-0.493**	2.024**	-0.139	-0.473*	-0.441*	-0.015
	(0.16)	(0.22)	(0.15)	(0.22)	(0.20)	(0.07)
Black, For. Born	-2.618**	0.037	0.043	-1.844**	-2.475**	0.112
	(0.38)	(0.37)	(0.25)	(0.47)	(0.61)	(0.17)
Other	-0.060	1.839**	-0.496*	-0.232	-0.098	-0.019
	(0.28)	(0.40)	(0.25)	(0.37)	(0.42)	(0.13)
Other, For. Born	-2.586**	-0.254	0.535	-1.554*	-1.045*	-0.019
	(0.46)	(0.49)	(0.32)	(0.56)	(0.50)	(0.17)
Mother O-Level Exams or Equiv.	-0.575**	0.549**	0.111†	-0.492**	-0.459**	
	(0.06)	(0.06)	(0.06)	(0.07)	(0.04)	
Mother A-Level Exams or Equiv.	-1.006**	1.039**	0.071	-0.925**	-0.877**	
	(0.07)	(0.07)	(0.07)	(0.09)	(0.05)	
Mother University Degree or more	1.673**	1.729**	0.162*	-1.400*	-1.400**	
	(0.09)	(0.08)	(0.07)	(0.11)	(0.06)	
HH Pov. Ratio 100-199%, 9 mos.	-0.492**	0.286**	0.253*	-0.580*	-0.658**	
	(0.06)	(0.05)	(0.05)	(0.07)	(0.04)	
HH Pov. Ratio 200-299%, 9 mos.	-1.009**	0.610**	0.351*	-0.862**	-1.134**	
	(0.08)	(0.07)	(0.07)	(0.10)	(0.05)	
HH Pov. Ratio 300%+, 9 mos.	-0.975**	0.867**	0.339*	-1.400**	-1.510**	
	(0.11)	(0.09)	(0.09)	(0.11)	(0.10)	
Mother Married, 9 mos.	-0.987**	0.376**	0.434**	-0.433**	-0.479**	
	(0.07)	(0.06)	(0.06)	(0.07)	(0.04)	
Mother Cohabiting, 9 mos.	-0.192**	0.282**	0.254**	0.132†	0.087*	
	(0.06)	(0.06)	(0.06)	(0.08)	(0.04)	
Mother's Age at Birth	-0.017**	0.027**	0.003	-0.020**	-0.035**	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	
Child Male	-0.106*	-0.064†	0.049	-0.043	-0.063	
	(0.04)	(0.04)	(0.04)	(0.05)	(0.13)	
Intercept	1.334**	-1.454*	0.495**	0.226	-0.378**	0.041**
	(0.13)	(0.12)	(0.13)	(0.16)	(0.05)	(0.01)
Tests of Coefficient Equality						
FB South Asian vs. NB South Asian						
x2 (1)	0.29	37.36	0.51	7.28	0.2	0.12
$p>x^2$	0.59	0.00	0.47	0.01	0.65	0.73
FB Black vs. NB Black						

x2 (1)	15.57	17.48	0.15	40.67	0.65	0.09
$p>x^2$	0.00	0.00	0.70	0.00	0.42	0.76
FB Other vs. NB Other						
x2 (1)	12.32	6.19	3.52	3.99	0.39	0.03
$p>x^2$	0.00	0.01	0.08	0.04	0.53	0.87
N	15060	15060	15060	13381	14500	

Sources: Fragile Families (FFS) for United States. Millennium Cohort Study (MCS) for England.
Note: Binary logistic regression. Reference category is white native mothers; mother single at 9 months; poverty ratio below 100%; mother has no qualifications; child is female.
†<.10; * p<.05 ; ** p <.01