

Where do Trajectories Diverge? Nativity and Ethnic Differences in Home Environment and Very
Early Cognitive Development

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Abstract:

This paper focuses on the cognitive development of young children from diverse backgrounds with a particular focus on ethnic differences in home environments and the possibility that such environments differ among immigrant and native families within the same ethnic groups. Looking at the first wave of the Early Childhood Longitudinal Study-Birth cohort data, we find significant racial and ethnic differences in several dimensions of the home environment and access to resources. Mother's age at arrival in the United States is also associated with more disadvantaged home environments, particularly in the case of economic resources and maternal education. Looking at the second wave of ECLS-B data, we find that racial and ethnic differences in cognitive development increase over time but family resources and parenting practices reduce differences in cognitive development by ethnicity and nativity. Overall, parental responsiveness is associated with more positive gains in cognitive development among children of foreign born mothers than their counterparts with US born mothers.

Introduction:

The recent growth of immigration to the United States has focused attention on the increasing proportion of children living in immigrant families. While there is great diversity in the educational attainment of adults in the United States by race, ethnicity and nativity, we do not have a clear picture of when the academic trajectories of the children of immigrants diverge and what factors lead to these differences. Some have suggested that children who find themselves inserted into a disadvantaged position in the American racial/ethnic hierarchy may become discouraged when faced with institutional barriers to achievement. But it is not clear just where trajectories for children in immigrant families may diverge from (or converge with) their higher order generation counterparts. If these children start out in a disadvantaged position based on the family environment present in early childhood, it seems likely that they will be at risk for poor school readiness and achievement. Understanding the extent to which second generation children start out behind their third and higher generation counterparts may elucidate the subsequent paths to socioeconomic success of this diverse group of children.

Studies of educational attainment point to divergent outcomes by age at entry in the United States and generation status. The disadvantaged position of some immigrants upon arrival in the United States and the barriers faced by immigrant families in the receiving context may explain the negative association between immigrant status and academic achievement observed in the cross section. Decreased school engagement among some children of immigrants who adapt towards other minority groups may result in lower achievement in the second generation compared to the first (Portes and Rumbaut, 2001).

While some studies of adults or adolescents have focused on the structural conditions encountered in the labor market or schools that lead to divergent educational outcomes, others have focused on the home environment and relationships between first generation parents and their second generation offspring as key to explaining differential trajectories. Studies of academic progress and other long-term outcomes suggest that some immigrant youth and second generation children have positive trajectories. Parental involvement and expectations account for generation status differences in subsequent educational attainment among adolescents (Fuligni, 1997). Immigrant parents' optimism and encouragement are identified as protective factors in the face of structural disadvantages in the United States and may help explain why some children from the second generation do better in school than their immigrant or third and higher generation counterparts (Glick and White, 2004; Kao and Tienda, 1995).

Looking even earlier in the educational process, Leventhal, Xue and Brooks-Gunn (2006) compare school age children's verbal trajectories by nativity within racial/ethnic groups and find positive outcomes for immigrant children. Although limited to children who could be tested in English, the results suggest children of immigrants experience great growth over time even though they start behind their co-ethnic peers from native families. This result was particularly striking among black immigrants when compared to their non-immigrant peers. These studies all point to important variations in the home environments of immigrant families and their native counterparts as key determinants of academic success.

The antecedents of school performance, particularly in the early grades, lie in the characteristics of the home environment, access to resources and parenting practices. This paper investigates cognitive development in early childhood as one of several indicators of the starting position of children of immigrants from diverse racial and ethnic backgrounds. We draw from a multidisciplinary theoretical approach incorporating immigrant adaptation and child development. Bioecological systems theory focuses on the way involvement with social systems, including families and schools, interacts with children's pre-existing characteristics and abilities, ultimately contributing to their ensuing developmental pathways. This perspective suggests the home environment, access to resources and parenting practices will all influence children's path towards school readiness. We suggest ecological theory of child development can be used in concert with theories of immigrant adaptation that focus on selection of migrants and their experiences in the United States as shaping outcomes over time. Gordon's (1964) articulation of a unidirectional assimilation process expects new arrivals to adapt to the receiving context over time. We suggest that increasing structural and cultural incorporation of immigrants also influences the outcomes of subsequent generations by shaping the home environment for these children in a way that is distinctive from that experienced by children of subsequent generations.

We focus particularly on the importance of parental nativity, age at arrival in the United States as well as different home language and parenting environments on this early life stage of children in the second generation. Combining these perspectives, we expect development among very young children to be associated with those characteristics subsumed under parental nativity (i.e. language background, national origins, generation status and race/ethnicity). Further, access to resources within the United States is also expected to be important for determining divergent developmental trajectories. The final set of characteristics we explore fall under the measures of home environment frequently employed in studies of child development.

Immigration, Adaptation and Parent Characteristics:

Certainly previous research on adults has found important differences in educational and economic attainment by generation status. However, to adapt this framework for very young children, it is the parents' migration status and history that may be most salient. Parent's age at arrival in the United States, for example, could be a greater marker of experience in the United States than the children's own generation status. Parenting practices and home environments mark the key social contexts for very young children so these young children of immigrants are likely to be influenced by their parents' experiences in the United States rather than their own.

Understanding how children in immigrant families, who come from diverse ethnic origins, may fare in the United States requires a greater focus on two dimensions: their racial/ethnic status as minority group members and the selectivity and disruption of migration itself. Parenting practices may vary among immigrants and natives of the same ethnic origins if immigrant parents are more positively selected from their country of origin (by having higher education than their native counterparts, for example) (Feliciano, 2005; Leventhal, Xue and Brooks Gunn, 2006). Or these differences could emerge if parenting practices and home environments are differentially rewarded and children experience home environments that are not consistent with the expectations predominantly touted by the majority culture (Garcia Coll et al, 2002; Garcia Coll et al., 1996; Bradley et al., 2001). Family environments that are at odds with the majority cultural norms may result in differential school readiness or achievement (Brooks-Gunn and Markman, 2005; Sy and Schulenberg, 2005). Thus, several researchers have posited that minority or immigrant children may face inconsistency in the messages they receive from multiple contexts (i.e., family versus schools) (Garcia Coll et al, 2002). But it is also likely that immigrant families change the home environment as they become more familiar with U.S. society (Schmitz, 2005). The question remains whether variation in home environments among the growing immigrant population are at all related to child developmental trajectories before school when children are most insulated from the broader social context. Answering this question would set the stage for subsequent research into the interactions between family and school or other social contexts for children of immigrants.

One key element of the home environment that is likely to distinguish children in immigrant families from those in non-immigrant families is the prevalence of non-English languages spoken in the home. Home language environment is salient for academic progress in elementary years of schooling (Oller et al., 2002). It goes beyond the scope of the present review and analyses to incorporate the extensive literature on children's language acquisition except to

say that English-only and bilingual homes appear to be associated with positive oral language scores in school age children over those in monolingual non-English homes. Further, children from lower socioeconomic backgrounds in bilingual homes may be particularly advantaged (Cobo-Lewis et al., 2002). However, differences in home language environment may not only directly influence children's own linguistic development but are reflective of familial cultural environment and interaction ease with other social institutions including medical and educational professionals. "For first generation parents, comfort with language skills may be a proxy for the familiarity and ease necessary to interact with institutions outside the home and ethnic environment" (Garcia Coll et al., 2002). Thus, we turn our attention to children's early cognitive development (rather than verbal abilities alone that are likely influenced by first language background) and examine the extent to which the non-English home environment is associated with divergent outcomes.

Beyond the linguistic environment in early childhood, the family's experience in the United States may also be an important determinant in outcomes for very young children in immigrant families versus their peers in native families. It is clear that age at arrival in the United States is associated with different outcomes for the immigrants themselves. Children who arrive as young children before the introduction to formal schooling has begun appear to have higher academic progress and educational attainment than those who arrive after schooling is underway (Glick and White, 2003). Likewise, immigrants who arrive as teenagers may never "drop in" to US schools and are likely to have lower ultimate educational attainment than those who either attend school in the United States or those who arrive as adults with higher education from the country of origin. Therefore, immigrant parents of US born children are likely to have very different educational experiences not only in terms of their completed years of schooling but also in terms of experience with formal school inside or beyond the United States.

The extent to which immigrants are positively selected according to their own education has important implications for their children's educational attainment (Feliciano, 2005). It seems likely the same is true for their involvement and provision of an environment conducive to early cognitive development of the US-born infants because children born in the United States are still influenced by their family's immigration history and reception in the United States (Waters and Jimenez, 2005). We rely on the mother's age at arrival, in addition to her current age and educational attainment, as a way to capture some of this variation in US experience, proximity to migration and location of the mother's own childhood socialization.

Access to Resources, Home Environment and Parenting Practices:

Racial and ethnic variations in early childhood cognitive development are associated with economic deprivation, learning stimulation and parental responsiveness (e.g., Brooks-Gunn, Klebanov and Duncan, 1996 and others). Early childhood development is very vulnerable to specific resources provided through family income, safe housing and access to health care. Disparities in cognitive development, therefore, are likely to be closely linked to disparities in socioeconomic status.

For very young children, the home environment is the primary developmental context. Several dimensions of the home environment contribute to child developmental outcomes including early cognitive and socio-emotional development. These include resources provided in the home via family income or parental education but also extend to parenting practices including responsiveness, disciplinary practices and interactions (Bradley et al., 2001). Parenting practices vary by ethnicity across all of these domains as well (Brooks-Gunn and Markman, 2005; Bradley et al., 2001; Coll, 1990; Hernandez, 1997). Migration to the United States may also be an important source of variation in family processes and outcomes (Garcia Coll et al., 1996). Parental migration history and change in family behaviors over time are likely to impact children's outcomes (Hernandez and Charney, 1998).

Leventhal, Xue and Brooks-Gunn (2006) point to the possibility that immigrant status is protective for minority children if immigrant parenting styles are characterized by the same warmth and autonomy associated with positive outcomes for children in non-immigrant families. Home environment and parenting practices are associated with early cognitive and language development but few studies have been able to employ detailed measures of parenting and home environment in diverse samples leaving questions remaining as to which parenting practices are associated with positive outcomes across racial/ethnic groups and immigrant groups. Earlier studies of early cognitive development were criticized for their primary focus on children from non-Hispanic White families (Garcia Coll 1990; Garcia Coll et al., 1996). Those recent studies that have expanded the economic range and ethnic groups under investigation find support for the cognitive gains associated with such measures as reading aloud, providing toys and other parenting factors (e.g., Black et al., 2000; Kolobe, 2004; Roberts et al., 1999; Tomopoulos et al., 2006). Early infant cognitive development (Black et al., 2000) and early vocalization (Oller et al., 1997) appear more resistant to environmental influences but over time, environmental variations play a greater role and children's developmental trajectories diverge by socioeconomic status and measures of the home environment. Parenting practices in early childhood are clearly important

influences on children's early verbal abilities and even serve as powerful mediators between socioeconomic status and developmental outcomes (Raviv, Kessenich and Morrison, 2004). The extent to which such practices reduce differences among children in immigrant families from those in native families remains an open question.

Hypotheses:

Initially, we expect to find significant racial, ethnic *and* nativity differences in the parenting practices of mothers in the ECLS-B as shown in previous studies. We expect these differences to persist net of mothers' educations and family incomes. We also expect family resources such as income, education and access to external resources such as healthcare will mediate the relationships between race, ethnicity and mother's nativity and the child's cognitive outcomes over time. We posit, along with others, that race and ethnicity are likely proxies for structural barriers encountered in the United States (Waters and Jimenez, 2005).

The extent to which parenting practices may be important for explaining differences in early cognitive development across racial/ethnic or immigrant groups seems less clear cut than our expectations for specific family resources. On the one hand, parenting practices are likely to be culturally enforced and these dimensions of the home environment measured by parental responsiveness or parental play, for example may not mediate the relationship between race, ethnicity and mother's nativity and children's cognitive outcomes at wave two. If mothers' parenting practices are reinforced by others children may find a supportive environment for exploration and learning regardless of the exact nature of these practices and there is less reason to expect a differential effect of specific parenting across groups. On the other hand, the nature of cognitive development testing may be more sensitive to particular parenting practices. Parental responsiveness or reading aloud to children may indeed vary across groups and this variation may be apparent on cognitive tests designed to tap into the particular traits encouraged by these practices. In this case, we would expect parenting practices to mediate differences in outcomes by mother's nativity.

Our next hypotheses are specifically focused on the mother's proximity to the migration experience. We ask how much of the variation among children in immigrant families is associated with those characteristics subsumed under parental nativity (i.e. language background, national origins, generation status or age at arrival in the United States, and race or ethnicity). It is difficult to formulate specific directional hypotheses for the effects of nativity because so little research has examined the pre-school years among diverse groups of immigrants' children. In fact, few studies have been able to employ a longitudinal examination of many of the factors we

examine here for such a young population (Raviv et al., 2004). However, we offer a few possibilities based on studies of school age children of immigrants. First, because greater experience in the United States will increase the likelihood that mothers have experienced conflict between family environments and majority cultural norms in the United States, parenting practices may be less positively associated with children's development for mothers who arrived in the United States at younger ages. Alternatively, parenting practices may be more positively associated with children's outcomes for immigrant mothers than US born mothers precisely because immigrant families face greater difficulties in the receiving community and so parental responsiveness or other practices are even more vital to ensuring children's well-being. Although we expect mothers' nativity and age at arrival in the United States to moderate the relationship between parenting practices and children's outcomes, we do not a priori propose a direction these effects may take.

Data and Methods:

The first waves of the Early Childhood Longitudinal Study- Birth Cohort (ECLS-B) are ideal for our purposes because the ECLS-B is a large, nationally representative sample with approximately 15,000 children born in the United States in calendar year 2000, and makes a special effort to include underrepresented groups such as Asian/Pacific Islanders. The survey interviews caregivers on a variety of topics including children's development, family environment, health and healthcare, childcare, and early education programs. In addition, ECLS-B includes direct observations of children's physical, cognitive (including linguistic), social, and emotional development. Thus, for our purposes, one key advantage of the ECLS-B dataset is the ability to observe developmental outcomes over time.

We will extend previous research on immigrant families by unbundling the characteristics associated with parents' nativity: generation status, linguistic and national origin backgrounds and racial/ethnic identification. For example, the Early Childhood Longitudinal Study-Birth cohort (ECLS-B) allows us to identify mothers within the broader panethnic groupings so frequently relied upon by researchers. We anticipate finding variation in the home environments within these panethnic groupings such that some "Asian" families will have greater resources than others (Glick and Hohmann-Marriott, forthcoming; analyses with ECLS-K). Additionally, for the largest ethnic groups, we will examine nativity differences within the group and the extent to which foreign born mothers' parenting practices vary with length of time in the United States.

Our primary dependent variable is cognitive development at age (approximately) 24 months relying on the second wave of the of ECLS-B data. We rely on the modified Bayley assessment. The primary aim of the Bayley's assessment is to gauge the cognitive development of infants. We will explore change models that examine scores at wave 2 based on preliminary scores from wave 1 to demonstrate how infants progress in areas such as verbal communication, and exploratory play. The association between home environment and performance on the Bayley assessment is likely to increase over time suggesting later waves of the ECLS-B will be useful for tracking these trajectories (Elardo, Bradley and Caldwell, 1975). Prior work with ECLS-B looking at racial differences in the Bayley scores suggest very small differences in mental function in the first wave of the data (Fryer and Levitt, 2006). Scores range from 54.55 to 112.48 in the wave 1 data. However, over time, there seems to be some divergence within the scores. Within the longitudinal data file the scores from the first wave have been recalibrated and range from 32.04 to 131.17. According to Andreassen and Fletcher(forthcoming) the recalibrated scores are more accurate, therefore we will conduct our analysis using the wave one recalibrated scores.

Our independent variables come primarily from the wave 1 data whenever possible. Another key advantage of the ECLS-B is that it includes information on the place of birth for both parents, even if the child has a nonresidential parent. At the 9-month interview, the primary parent (usually the mother) is asked about the primary language spoken at home and their own proficiency with spoken and written English. Primary language spoken in the home is coded so that English dominant homes are the reference group. At the 24-month interview, the primary parent reports country of birth, citizenship, and age when moved to the U.S. (if not born in the U.S.). The other parent, whether residential or not, reports country of birth and citizenship. Results from the first wave of the ECLS-B reflect the diverse family characteristics of young children in the United States today (Flanagan and West, 2004). The ECLS-B contains 2,900 mothers born outside the United States and data on 1,680 fathers born outside the United States (Consultation with NCES staff). Further, bilingual interviewers conducted the data collection in Spanish and Mandarin and translators were available for interviews in Cantonese or Vietnamese greatly increasing the reach to the foreign-born population over other studies.

The direct assessments of the children are conducted in the child's home language when possible. Children were able to complete their assessment in English, Spanish, Chinese or some other language. We create a variable to indicate if the child was assessed on their cognitive development using their home language by comparing the options for interview language to the

child's actual home language; if the languages matched the child was given a 1 suggesting they were interviewed in their home language.

Our final sample, after excluding Native Americans and those children without mothers present (and hence missing parent data), includes 2,108 mothers born outside the United States. The measurements of mother's nativity is a dichotomous variable coded 1 if the mother is foreign born and 0 if the mother was born in the U.S. Our analyses also focus on a variety of racial and ethnic groups. We separately identify groups by individual countries of origin when sample sizes permit. Our preliminary groups include non-Hispanic Whites, non-Hispanic Blacks, Mexican origin, Puerto Rican origin, Other Hispanics (includes Cubans) Asian Indian, Chinese, Pacific Islanders (includes Filipinos), Other Asians and a final group for other ethnicities not identified. We do not include Native Americans in the sample because they do not have a foreign born comparison group.

For our primary independent variables of home environment, we rely on measures documenting both the material resources available as well as the parenting practices observed and reported at the first wave of data. These measures include socioeconomic status, mother's race, and education. Socioeconomic status is measured using household income currently collapsed into four categories with the 25th percentile as the reference group. Mother's race and education are taken directly from the survey. For education, those with less than a high school education are the reference group. We also include a measure of health insurance coverage of the child. Children covered by private insurance are the reference group. Children covered by public health insurance include Medicaid and State children's insurance programs in one category while those with no insurance coverage at wave1 as the second group compared to the reference.

The measure for parenting practices is modeled on Bradley et al.'s (2001a) parental responsiveness index. Their IT-HOME-SF parental responsiveness index ranges from 0-5. We have added one additional measure to our index, safe home environment. Our index of parental responsiveness ranges from 0-6. This index was tested for validity using Proc Corr in SAS 9.0 yielding a standardized alpha of .96. Along with parental responsiveness we also measure parental play with children and frequency of reading to children. Parental play is an index that ranges from 0-3, and includes whether the parent takes the child outside to walk or play, tickles the child, or plays peek-a-boo with the child. This index was tested for validity using Proc Corr in SAS 9.0 yielding a standardized alpha of .14. Although this is a low alpha level, we retain the measure in our models for comparability to other studies of child development. Our third measure

of parenting practices is a simple measure of the frequency of reading to the child on a 0-3 scale that ranges from never reads to child to reads to child everyday.

We also include a series of control variables capturing child characteristics that may be predisposing to cognitive development measures but independent of nativity or race/ethnicity. These include the child's gender, age at first assessment, birthweight family structure and mother's age. Child's gender is measured using a dichotomous variable with male as the reference group. The child's age at first assessment is continuous and measured in months. For birth weight if a child weighed less than 1,500 grams at birth they were classified as very low, 1,500 to 2,500 gram babies were classified as moderately low and those weighing more than 2,500 grams were classified as normal birth weight. The normal category is being used as the reference group. Family structure is created using the home roster and is collapsed into four dichotomous variables: two biological cohabiting parents, a mother and a male figure and single mother with two biological married parents as the reference group. Mother's age is taken directly from the survey and ranges from 15 to 32.

Sample characteristics are presented in Table 1. The first column in Table 1 depicts our full sample from wave 1. The second column of Table 1 shows the characteristics of the sample when we exclude cases not included in the second wave of data. Overall, the Bayley scores of the sample are not significantly different. However, when we compare the characteristics of those included in both waves and those cases lost after wave 1 (third column), we observe several other differences. Children lost from the sample are more likely to come from homes with fewer resources whether measured by income, mother's education or access to public health insurance. They are more likely to live with two cohabiting parents at wave 1. Black and Mexican origin children are also over represented among the cases lost between the two waves as are children from homes in which a non-English language is the primary language spoken.

[Table 1 about here]

To examine cognitive development at approximately 24 months of age, we employ standardized regression analyses with the Bayley scores as the dependent variable. Due to missing values the data was analyzed using the Proc MIANALYZE procedure in SAS 9.0 which accounts for missing data via multiple imputation. There are a number of methods one could use to account for missing data however, multiple imputation has been found to be the least biased estimate (Allison, 2002). We rely on multiple imputation because we have considerable missing data from those lost to follow up including measures of mother's nativity and the wave 2 cognitive scores but still retain significant information on these cases at wave 1. The particular

method of multiple imputation we use is conditional mean imputation, in which SAS predicts missing values based on the means of other variables within the data (Allison, 2002). In addition to employing the Proc MIANALYZE procedure we have also analyzed the data using the SURVEYREG procedure in SAS 9.0. The survey procedure in SAS accounts for the stratified clustered survey design. The data has also been weighted using the appropriate weights as described by Nord et al. (2006).

Results:

We first compare the home resources and parenting practices of young children by race/ethnicity and by the mothers' age at arrival in the United States. Mother's education, family income and access to health care via health insurance are all associated with children's cognitive development and these characteristics vary considerably across groups. Table 2 illustrates the considerable racial and ethnic diversity in Mother's education. Overall, Black and Hispanic origin children have mothers with lower levels of education than non-Hispanic White or Asian origin children. There is particular disparity at the upper levels of education as Asian Indian and Chinese origin children are more likely to have mothers with more than a college education. These disparities by education are mirrored in the disparities by access to health insurance. Non-Hispanic Black children, Mexican origin and Puerto Rican origin children are most likely to have public health insurance through Medicaid or State-level public insurance programs.

As notable as the differences in home resources are by race and ethnicity, the second panel of Table 2 demonstrates just how much variation exists by mother's age at arrival in the United States. The most educated mothers are those who arrived in the United States in adulthood (age 22-28 or 29 and above) with lowest levels of education evidenced among those who arrived in middle childhood or adolescence. This is consistent with the literature of adolescent and adult educational attainment among immigrants. Immigrant mothers who arrived in the United States when they themselves were young children (prior to age 9) are less likely to have completed high school than their US born counterparts but are also more represented among those with some college education than their counterparts who arrived in middle childhood and adolescents. Once again, such differences in educational attainment are similar to the differences in children's health insurance coverage with a few surprises. Children whose mothers arrived as young children (0-8) are less likely to have any health insurance coverage. Children whose mothers arrived as adolescents are most likely to have access to public health insurance programs and the least likely to be covered by private health insurance.

Drawing on the bioecological framework, variation in parenting practices should also influence differences in cognitive development in young children. Figures 1 and 2 compare parenting scales from wave 1: parental responsiveness, parental play and frequency of reading to children. Although small in magnitude, there is significant variation in the parenting practices for families by race/ethnicity and by age of arrival in the United States. Figure 1 demonstrates that parental responsiveness is lower ($p < .05$) than non-Hispanic Whites for several groups including Blacks, Mexicans, Chinese, and other Asian children. Hispanic origin children also have lower scores from the parental play scale than non-Hispanic White children. Finally, non-Hispanic Whites read to their infants at a higher frequency than other groups. Again, these differences are small but consistent with previous work documenting ethnic variations in parenting practices and expectations for what is appropriate when raising young children.

We also observe significant differences in parental responsiveness by mother's age at arrival in the United States such that parental responsiveness is lower in homes in which the mother is born outside the United States. Figure 2 presents scores on parental responsiveness (panel A), parental play (panel B) and frequency of reading to infants (panel C). Those who arrived as adolescents or young adults are significantly lower than U.S. born mothers on all dimensions of parenting. This lends some preliminary support to our expectations that parents who were not born in the United States are less likely to present parenting practices most similar to the majority group pattern in the United States.

We conducted multivariate analyses predicting parental responsiveness to determine that ethnic differences persist even when other characteristics are controlled. We find that these results hold even controlling for family income, language background and family structure. For example, parental responsiveness at wave 1 is lower among Blacks and several Asian origin groups compared to non-Hispanic Whites even when non-English language, family socioeconomic status and family structure are controlled. (results not presented here). This suggests that these group differences observed in Figures 1 and 2 may be significant and durable parenting approaches rewarded or expected by these groups rather than simply due to compositional differences.

So our next step is to determine if such differences are indeed related to early cognitive gains as suggested by previous work (Brooks-Gunn and Markman, 2005). An examination of cognitive development scores at wave 1 suggests very modest differences in the Bayleys scores by race and ethnicity. However, we expect scores to diverge by race, ethnicity *and* migration proximity by the second wave as environmental factors have greater influence on children's performance. We standardize the scores and include wave 1 scores as a means of adjusting for

additional pre-existing conditions. Thus, our regression analyses capture the change in cognitive development between wave 1 (when children are approximately 9 months old) and wave 2 (when children are approximately 24 months old). The results of the regression analyses are presented in Table 3.

[Table 3 about here]

The first model of Table 3 controls for those child characteristics that are associated with development prior to the first wave of the study when children are around 6-9 months old. This model may be thought of as the initial conditions children face from prenatal development until the first wave. Child's sex and age are significant but the coefficients for birth weight are larger and demonstrate the importance of even early developmental constraints on cognitive development. The coefficients for birth weight change very little across the models suggesting this effect on early cognitive development is coming directly from the negative developmental trajectories associated with birth weight itself rather than other associated measures.

Model 1 also adjusts for initial Bayley scores at wave 1. The positive coefficient indicates that children with higher cognitive scores at wave 1 see greater gain in scores by wave 2. With prior scores in the model, any coefficients for other variables may be interpreted as the effect net of the development up until wave 1. In other words, coefficients for mother's characteristics, home environment and parenting indicate the effect of these characteristics at wave 1 on children's development at wave 2. We also note that the language in which children are assessed is significant in this first model suggesting children with the opportunity to be assessed in their home language do significantly better on the assessment itself. This suggests caution interpreting analyses from this or other datasets that do not consider children's early linguistic environment when choosing appropriate measures of development.

The second model adds measures of the mother's race/ethnicity and a dummy variable for homes in which a non-English language predominates. The results here provide evidence that differences in scores by race/ethnicity persist even controlling for earlier scores and developmental constraints such as birth weight. Model 3 adds mother's nativity. Preliminary models (not shown here) indicate that mother's nativity (foreign born vs. US born) is a more powerful predictor of scores than the more refined measure of age at arrival. Children of foreign born mothers score lower on the Bayley measure at wave 2 than their counterparts born to US born mothers. We note some important movement of the race/ethnic coefficients when nativity is added to the models suggesting that the advantaged scores of children of Chinese origin mothers were somewhat suppressed until nativity is controlled. Negative coefficients for Mexican origin,

Puerto Rican and other Hispanics are reduced suggesting some of the deficit relative to non-Hispanic Whites is explained by the greater prevalence of foreign born mothers among these groups.

Model 4 adds the measures of family socioeconomic status and access to health insurance to the regression analysis. Here we observe significantly better scores for children of Mother's with higher education and from families with higher incomes. Access to private health insurance is also associated with higher scores than public insurance or no insurance coverage. The race/ethnic and nativity differences in scores are reduced by including these measures in the model but persist. Therefore, we next include measures of parenting practice and home environment in model 5. Parental responsiveness and the frequency of reading to young children do significantly impact early cognitive development. And, the addition of these measures further reduces variation in scores by race/ethnicity and mother's nativity.

At the outset, we noted that there has been little previous research on which to base expectations of the effects of home environment and parenting by parental nativity when looking at very young children's development because so few studies have peered into the pre-school development of children of immigrant parents. We tested interactions between mother's nativity and parenting practices in an effort to determine whether such practices have a differential effect in immigrant families compared to their native counterparts. We do find a significant interaction between the parental responsiveness scale and mother's nativity (see Model 6). At very low levels of parental responsiveness, children of foreign born mothers score much lower on the Bayley measure than children of US born mothers. By the higher levels of responsiveness, however, children of foreign born mothers have much more similar scores. We depict this significant interaction with predicted scores in Figure 3.

[Figure 3 about here]

We also investigated models including the more refined measure of mother's age at arrival in the United States. Overall, the distinction between foreign born and US born mothers seems greater than any gradations by age at arrival. However, given the large racial and ethnic diversity in age at arrival and subsequent educational attainment of the mothers, we suspect it may be more fruitful to examine these effects within racial and ethnic group than across all groups as we have done thus far.

Discussion:

Our analyses suggest that the antecedents of the divergent educational outcomes for children of immigrants come not only from their families' interactions with schools but also from the early developmental paths that set the stage for school readiness in the United States. For the U.S. born children of immigrant parents this means being raised in a context different from that in which their parents were socialized and with perhaps different expectations about what is appropriate for young children to lead to early school success. Studies of adults or adolescents have focused on the structural conditions encountered in the labor market or schools that lead to divergent educational outcomes but the home environment and relationships between first generation parents and their second generation offspring are also clearly key to explaining differential trajectories.

Our analyses of a large, nationally representative sample of children born in the United States from diverse ethnic and nativity backgrounds reinforces previous research in child development. We find that early conditions including birth weight and age are associated with deficits in cognitive development scores by the time children are entering their third year. We also find that families with lower incomes, less access to private health insurance and lower maternal education are also associated with lower development scores. And, consistent with prior research, we find that these resources help explain some of the differences in development across racial and ethnic groups and for children of the second generation compared to those in the third and higher generations.

Our analyses of the importance of parental practices, however, are new to the study of children in immigrant families. More responsive parenting practices and greater frequency of reading to children is beneficial to cognitive development across all groups of children. Differences across racial/ethnic groups and by mother's nativity are reduced when these variables are added suggesting family environment will be an important factor leading to school readiness and early school performance even before children directly interact with the schools themselves. Intriguingly, we also find that parental responsiveness is even more protective for children of immigrants' developmental trajectories than children in the third and higher generation. This result is tantalizingly prescient of the results of studies examining the importance of family environment and parent-child relationships on outcomes for second generation youth in adolescence (Glick and White, 2003; Fuligni, 2001). The interaction of parental responsiveness and mother's nativity indicate that advantaged parenting practices may overcome other

constraints such as linguistic isolation. Further work with the ECLS-B cohort will allow us to elucidate these patterns further.

There are some important next steps needed to further elucidate the importance of immigrant family environments on early child development. First, we need to expand the outcomes under investigation and incorporate more measures as children mature. We expect to have these measures available by the third wave of data. Second, we need to incorporate other measures of the home environment that are known to differ across immigrant groups. These include the presence and involvement of other adults at home but also involvement in non-parental care settings beyond the home. Finally, we need a greater understanding of the degree to which these processes vary across ethnic groups. Models that look at nativity and mother's age at arrival *within* particular ethnic groups will help answer the remaining questions about the extent to which familial resources and home environments may have differential effects due to the migration process *per se*.

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Table 1. Means and Percentage for Sample, Waves 1-2 and Lost to Follow Up

	In Wave 1 Only In Wave 1 and Wave 2 Lost to Follow Up		
Child' Characteristics			
9 month mental scale score	76.683	76.787	76.787
24 month mental scale score	-	127.349	-
Female	48.91%	48.84%	48.96%
Interviewed in home language	76.00%	85.88%	-
Missing on interview language	22.68%	12.61%	-
Child has private insurance	50.39%	50.29%	38.38%
Child has public insurance	44.99%	44.92%	58.15%
Child has no insurance	4.06%	4.19%	3.48%
Missing health insurance information	0.56%	0.61%	-
Normal birthweight	92.54%	92.62%	91.67%
Moderate birthweight	6.21%	6.19%	6.85%
Low birthweight	1.25%	1.20%	1.48%
Mom's Age			
	28.21	28.415	26.45
Primary Home Language			
Non-English Language	13.44%	13.02%	18.94%
Mom's Race			
White Only	58.24%	59.55%	43.52%
Black Only	14.72%	14.12%	19.67%
Mexican	15.54%	15.17%	22.86%
Puerto Rican	1.53%	1.44%	2.07%
Other Hispanic	5.37%	5.31%	5.48%
Asian Indian	0.88%	0.86%	1.00%
Chinese	0.77%	0.70%	1.35%
Pacific Islander	0.85%	0.79%	1.39%
Other Asian	1.48%	1.41%	2.31%
Other	0.55%	0.59%	0.34%
Mother's Nativity			
Foregin Born	-	20.31%	-
Mother's age at arrival			
US born	-	79.66%	-
0-8 years old	-	3.24%	-
9-15 years old	-	2.95%	-
16-21 years old	-	6.19%	-
22-28 years old	-	5.80%	-
29 + years old	-	2.05%	-
Missing on mother's age at arrival	-	0.11%	-
Mom's Education			
Less than High School	27.07%	25.67%	40.76%
High School Graduate or Equal	21.90%	21.22%	28.02%
Some College	26.26%	27.00%	17.42%
Bachelors Degree	15.48%	16.24%	9.64%
Some Graduate School or more	9.29%	9.87%	4.16%
Family Income			
First Income Quartile	25.56%	24.14%	40.89%
Second Income Quartile	23.33%	22.99%	25.41%
Third Income Quartile	30.48%	31.24%	21.98%
Fourth Income Quartile	20.62%	21.63%	11.72%
Family Structure			
Two married Parents	65.51%	66.92%	53.19%
Two Cohabit Parents	11.44%	11.05%	16.56%
Mom and a Male Figure	0.95%	0.94%	1.04%
Single Mom	19.50%	18.56%	26.30%
Missing on Family Stucture	2.59%	2.53%	2.91%
Home Environment			
Parental Responsiveness (0-6)	5.395	5.406	5.18
Missing on Parental Responsiveness	0.20%	0.20%	7.85%
Parental Play (0-3)	2.932	2.931	2.94
Missing on Parental Play	0.25%	0.26%	0.30%
Reading Books to Child (0-3)	1.743	1.759	1.62
N	9,510	8,316	801

Source: Early Childhood Longitudinal Study-Birth Cohort,wave 1-2 and lost to follow up between waves 1 and 2.

Table 2, Panel 1. Percentage for Mom's Education and Type of Health Insurance Child has by Mom's Race/Ethnicity, Wave 1

	White Only	Black Only	Mexican	Puerto Rican	Other Hispanic	Asian Indian	Chinese	Pacific Islander	Other Asian	Other
Mom's Education										
Less Than High School	16.47%	33.47%*	58.75%*	36.01%*	37.12%*	12.47%*	11.31%*	16.24%*	23.44%*	31.51%*
High School Graduate or Equal	21.35%	29.35%*	17.59%*	22.86%*	26.34%*	8.74%*	7.03%*	19.92%*	15.61%*	18.30%*
Some College	29.39%	27.12%*	16.71%*	20.06%*	21.27%*	13.19%*	11.61%*	33.49%*	27.48%*	34.45%*
Bachelors Degree	20.58%	5.71%*	5.31%*	14.74%*	10.50%*	31.50%*	25.41%*	17.90%*	23.75%*	10.16%*
Some Graduate School or more	12.21%	4.36%*	1.64%*	6.32%*	4.78%*	34.10%*	44.64%*	12.45%*	9.72%*	5.59%*
Health Insurance										
Child has private insurance	64.06%	24.56%*	25.28%*	38.29%*	34.77%*	74.66%*	81.11%*	64.36%*	62.12%*	52.37%*
Child has public insurance	32.96%	72.23%*	64.19%*	55.43%*	55.77%*	19.11%*	16.83%*	31.67%*	33.72%*	46.08%*
Child has no insurance	2.49%	2.79%*	9.75%*	6.28%*	8.83%*	2.36%*	1.18%*	3.15%*	3.43%*	0.75%*
Missing health insurance information	0.49%	0.42%*	0.78%*	0.00%*	0.62%*	3.87%*	0.88%*	0.81%*	0.73%*	0.80%*
N	4,630	1,694	1,150	131	384	281	468	235	450	71

Source: Early Childhood Longitudinal Study-Birth Cohort, first wave (n = 9,510). * Denotes statistical significance from Whites (p<.01)

Table 2, Panel 2. Percentage for Mom's Education and Type of Health Insurance Child has by Mom's Race/Ethnicity, Wave 1

	US born	Arrived 0-8 years old	Arrived 9-15 years old	Arrived 16-21 years old	Arrived 22-28 years old	Arrived 29+ years old	Missing	Lost to follow up
Mom's Education								
Less Than High School	20.86%	35.20%*	44.83%*	56.33%*	41.51%*	30.92%*	60.14%*	40.76%*
High School Graduate or Equal	21.93%	17.81%*	17.26%*	19.52%*	16.24%*	24.97%*	0.76%*	28.02%*
Some College	29.14%	28.48%*	23.73%*	15.29%*	15.88%*	14.17%*	2.44%*	17.42%*
Bachelors Degree	17.73%	9.37%*	9.98%*	6.40%*	13.39%*	15.02%*	36.66%*	9.64%*
Some Graduate School or more	10.34%	9.15%*	4.21%*	2.46%*	12.97%*	14.91%*	0.00%*	4.16%*
Health Insurance								
Child has private insurance	55.58%	42.53%*	43.22%*	27.17%*	40.69%*	38.54%*	20.51%*	37.93%*
Child has public insurance	41.15%	44.51%*	45.03%*	62.88%*	50.43%*	56.49%*	53.64%*	58.15%*
Child has no insurance	2.83%	11.34%*	10.16%*	8.44%*	8.22%*	4.71%*	25.85%*	3.48%*
Missing health insurance information	0.44%	1.62%*	1.60%*	1.51%*	0.67%*	0.26%*	0.00%*	0.44%*
N	6196	332	284	539	675	278	12	801

Source: Early Childhood Longitudinal Study-Birth Cohort, second wave (n = 9,117). * Denotes statistical significance from Whites (p<.01)

Table 3. Regression of Standardized 24 Month Mental Scale Score

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Child' Characteristics	β	β	β	β	β	β
Female	0.300 ***	0.303 ***	0.302 ***	0.312 ***	0.309 ***	0.309 ***
Child's age at Wave 1	-0.085 ***	-0.078 ***	-0.078 ***	-0.068 ***	-0.065 ***	-0.065 ***
Interviewed in home language	0.318 ***	0.090	0.065	0.077	0.059	0.060
Moderate birthweight	-0.273 ***	-0.258 ***	-0.260 ***	-0.238 ***	-0.238 ***	-0.236 ***
Low birthweight	-0.599 ***	-0.577 ***	-0.577 ***	-0.566 ***	-0.569 ***	-0.569 ***
Standardized Wave 1 Mental Scale score	0.294 ***	0.277 ***	0.276 ***	0.261 ***	0.243 ***	0.243 ***
Mom's Age	0.017 ***	0.010 ***	0.012 ***	-0.004	-0.005 *	-0.004
Primary Home Language						
Non-English Language		-0.223 ***	-0.144 ***	-0.125 **	-0.114 **	-0.113 **
Mom's Race (vs. White Only)						
Black Only		-0.409 ***	-0.397 ***	-0.287 ***	-0.240 ***	-0.244 ***
Mexican		-0.453 ***	-0.365 ***	-0.240 ***	-0.210 ***	-0.211 ***
Puerto Rican		-0.328 *	-0.306 *	-0.256	-0.220	-0.226
Other Hispanic		-0.406 ***	-0.305 ***	-0.219 ***	-0.181 **	-0.186 **
Asian Indian		-0.099	0.023	-0.148	-0.115	-0.121
Chinese		0.221 **	0.349 ***	0.214 **	0.254 **	0.253 **
Pacific Islander		-0.265 **	-0.183	-0.187	-0.183	-0.180
Other Asian		-0.171 *	-0.080	-0.095	-0.064	-0.062
Other		-0.223	-0.150	-0.109	-0.097	-0.094
Mother's Nativity						
Foreign Born			-0.229 ***	-0.182 ***	-0.155 **	-0.521 **
Mom's Education (vs. less than High School)						
High School Graduate or Equal				0.005	-0.009	-0.009
Some College				0.094 *	0.056	0.057
Bachelors Degree				0.215 ***	0.166 ***	0.167 ***
Some Graduate School or more				0.406 ***	0.346 ***	0.347 ***
Family Income (vs. lowest quartile)						
Second Income Quartile				0.023	0.022	0.022
Third Income Quartile				0.107 **	0.102 **	0.104 **
Fourth Income Quartile				0.124 **	0.107 *	0.108 *
Health Insurance(vs. private)						
Child has public insurance				-0.204 **	-0.193 **	-0.192 **
Child has no insurance				-0.140 ***	-0.129 ***	-0.128 ***
Family Structure (vs. Two Married Parents)						
Two Cohabit Parents				-0.020	-0.021	-0.020
Mom and a Male Figure				-0.015	-0.024	-0.022
Single Mom				0.006	0.005	0.005
Home Environment						
Parental Play					0.059	0.066
Parental Responsiveness					0.073 ***	0.044 **
Reading Books to Child					0.090 ***	0.090 ***
Foreign Born*Parental Responsiveness						0.069 *
Intercept	0.068	0.600 ***	0.602 ***	0.789 ***	0.100	0.198
R²	0.106	0.165	0.170	0.199	0.212	0.213
N	9,960	9,960	9,960	9,960	9,960	9,960

Source: Early Childhood Longitudinal Study-Birth Cohort, waves 1-2 and lost to follow up between waves 1 and 2.

Figure 1. Variations in Home Environment by Mother's Race and Ethnicity, ECLS-

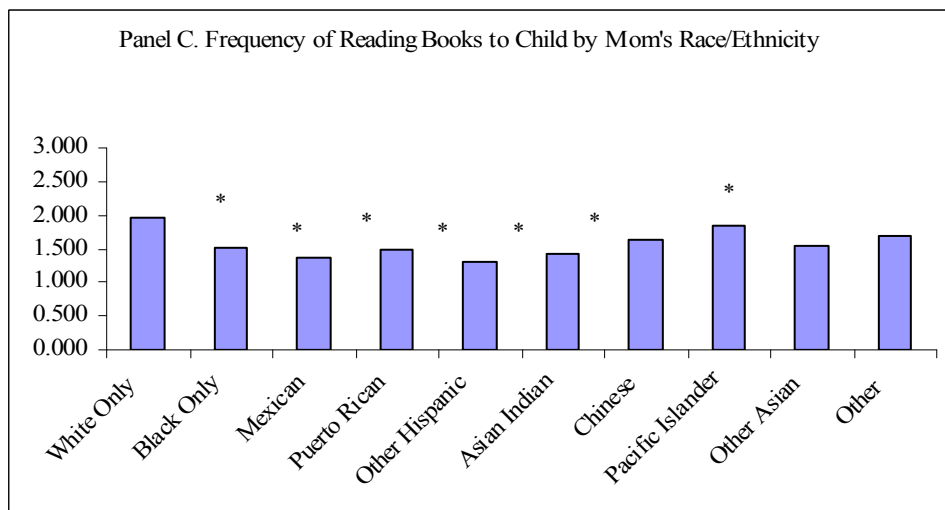
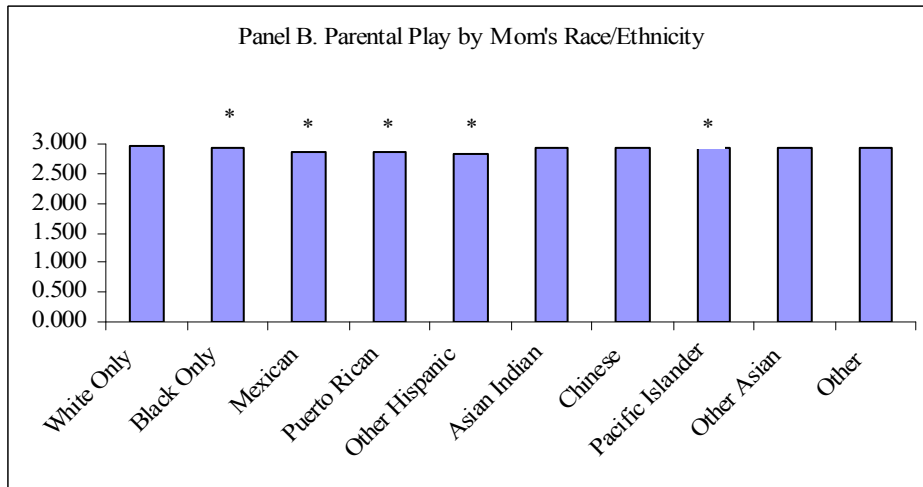
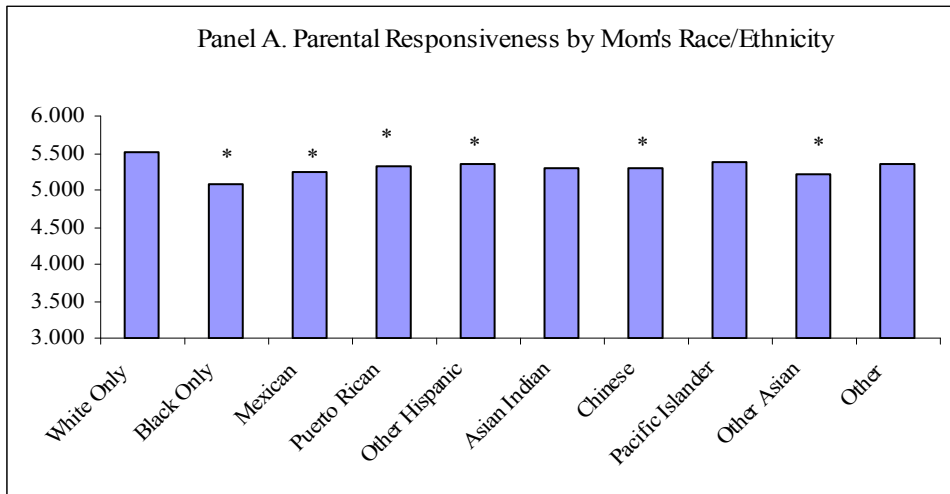


Figure 2. Variations in Home Environment by Mother's age at arrival in United States, ECLS-B

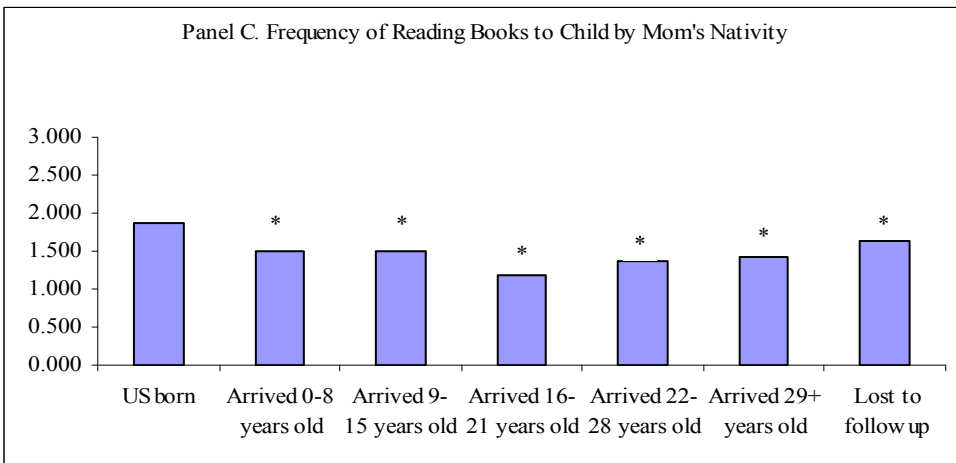
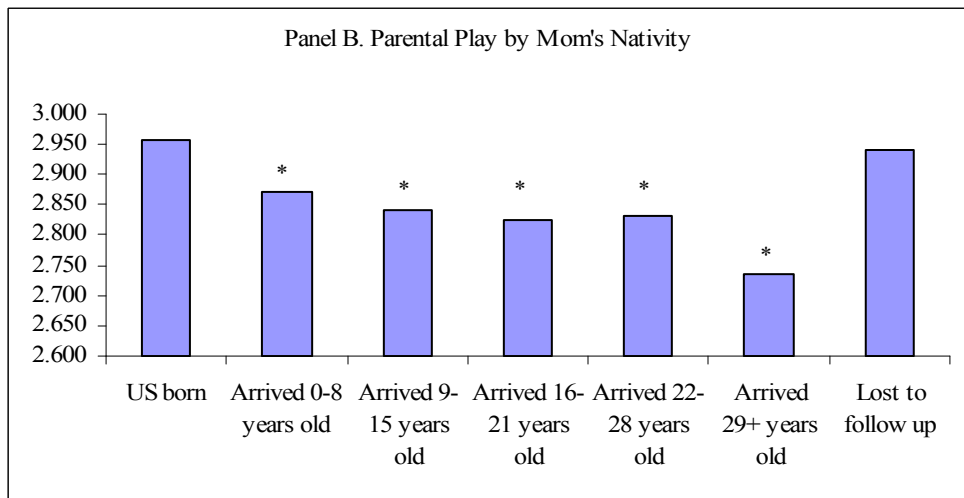
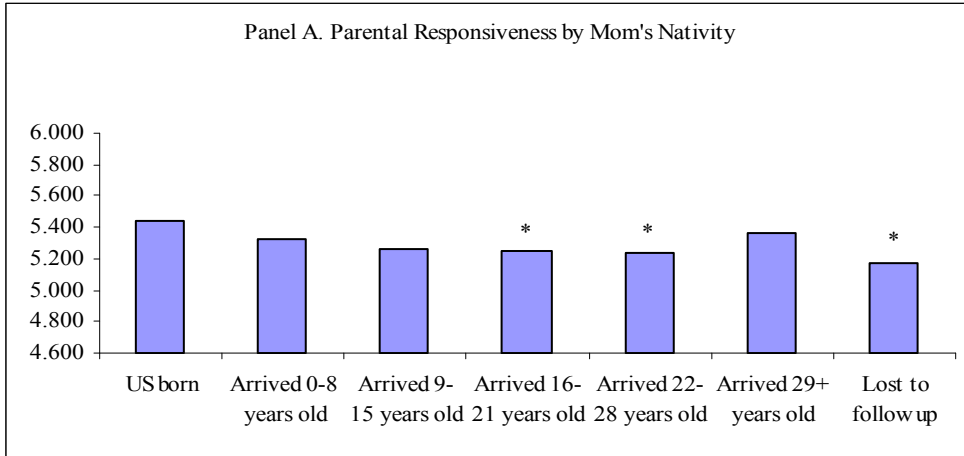


Figure 3. Predicted Development Scores (modified Bayley measure) at 24 months by Parental Responsiveness and Mother's Nativity

