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English Proficiency and Social Assimilation Among Immigrants: An Instrumental-Variables Approach*

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ABSTRACT

Using 2000 Census microdata on childhood immigrants, we relate family-formation variables to their age at arrival in the United States, and in particular whether that age fell within the "critical period" of language acquisition. We interpret the observed differences as an effect of English-language skills and construct an instrumental variable for English-language proficiency. Two-stage-least-squares estimates suggest that English proficiency raises the probabilities of marrying a native, being divorced, or having a high-earning and/or more educated spouse, and reduces the number of children. (JEL J12, J13, J15, J24)

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I. Introduction

For many immigrants to the United States, limited proficiency in the English language is a formidable challenge to both economic and social integration into their new home. Immigrants who speak English poorly are more superficially foreign than others, and this may contribute to their being discriminated against by U.S. natives. Moreover, immigrants with limited English proficiency might self-segregate, compounding this social and economic isolation.

The recent increase in immigration, much of it from non-English-speaking countries, has drawn attention to the role of English-language proficiency in immigrant assimilation.[1] Moreover, the effect of English-language skills on choices in the private sphere has important policy implications. On one hand, it will provide information about the family environment in which the children of immigrants grow up, and thereby what types of social services they are likely to need.[2] On the other hand, our ability to make demographic forecasts may improve if we understand how English proficiency impacts marriage and fertility decisions. Immigrants with better English skills might sound more 'American,' but do they act more American as well?

A considerable challenge to estimating the causal effect of English proficiency on marriage and fertility is the endogeneity of proficiency. English-language skills are correlated with many other variables that also affect family outcomes, such as ability, income, education and cultural attitudes. Additionally, reverse causality is possible. For example, immigrants who are married to U.S. natives may improve their English-language skills through interactions with their spouses. For these reasons, ordinary least squares regressions of marriage or fertility outcomes on English proficiency will mostly likely not estimate the causal effect.

[1] The 2000 U.S. Census showed that 10.4 percent of the U.S. population is foreign born, up from 7.9 percent in 1990. Moreover, the 2000 U.S. Census also indicated that 47 million U.S. residents (age 5 and over) spoke a language other than English at home and 21 million spoke English less than fluently.

[2] Children of immigrants comprise a large and growing share of the U.S. population—in 2002, they made up 18.7% of the U.S. population under 18—and their lower average education and earnings have aroused concern (Capps, Fix and Reardon-Anderson, 2003).

The research design of the present study is based on a well-documented phenomenon from psychology: the critical period of language acquisition. Simply stated, young children learn languages more easily than older children and adults. We show in Section III that there is a strong association between immigrants' age at arrival and their English-language skills in the 2000 Census. (The data are described in Section II.B.) Indeed, the relationship we find between English and age at arrival is supportive of the critical period hypothesis: immigrants who arrive before age nine are uniformly fluent in English while those arriving later have worse proficiency on average. Furthermore, we find minimal age-at-arrival effects on English for immigrants from countries where English is the dominant language, and for whom age at arrival is decoupled from age at first exposure to English.

We next present evidence, in Section IV.A, that arriving after the critical period is related to various social and family outcomes. Taken together, these language and socioeconomic results suggest the following mechanism: childhood immigrants with first exposure to English after the critical period attain poorer English proficiency as adults, and their reduced English-language skill in turn influences their socioeconomic outcomes. One complication with this interpretation, however, is that age at arrival probably affects immigrants through channels other than language, such as through better knowledge of American culture and institutions. We therefore use immigrants from English-speaking countries to control for non-language-related age-at-arrival effects. This leads us to use an instrumental variable for English proficiency: immigrants' age at arrival interacted with non-English-speaking country of origin.

In Section IV.B, we implement our instrumental-variables strategy based on age at arrival to the U.S. using individual-level data from the 2000 U.S. Census. We start by considering marriage outcomes, and find that lower English proficiency increases the probability of being married, both by increasing the probability of ever having married and decreasing the probability of being divorced. For those immigrants currently married with spouse present, we also examine spousal characteristics. We find that better English leads to more assimilation along several dimensions. First, immigrants with stronger English skill marry people who themselves have better fluency in English, and moreover their spouse is more likely to be a native of the United States, and less likely to be a native of the origin country. Furthermore, immigrants with poorer English tend to have spouses with less education and income. This latter result mirrors the effect of English-language skill on own education and income, which indicates a marriage market characterized by strongly assortative matching. Finally, we show that, apparently converging toward American norms, immigrants with better English proficiency have fewer children.

We then extend this analysis along several dimensions in Section V. First, we show that our main results are not sensitive to (a) re-estimating the regressions with alternative subsets of origin countries and (b) using several control variables to relax the assumption of comparability between the immigrants from English-speaking and non-English-speaking countries. Second, we show that education is a central channel for these results. Finally, we offer conclusions in Section VI.

II. Background and Data

A. Related literature

We are not aware of studies that address the problem of endogeneity of language skills when estimating the effect of language skills on marriage and fertility outcomes. However, a handful of studies examine the correlation between language usage and family formation. For example, Swicegood, Bean, Stephen and Opitz (1988) use 1980 Census data to estimate the effect of English proficiency on the fertility behavior of Mexican American women. They find that greater English proficiency is associated with significantly lower fertility, especially among more educated women. Also, Meng and Gregory (2005) find using Australian Census data that English proficiency raises the probability of intermarriage, which in turn speeds up earnings assimilation.

This study also relates to the literature on immigrant assimilation along marriage and fertility dimensions. These studies tend to compare the outcomes of immigrants who vary in their length of time spent in the destination country, with the coefficient for time since migration interpreted as assimilation to the destination country norms. Some of these studies also compare the outcomes of the immigrants (the first generation) to those of their U.S.-born children (the second generation) and grandchildren (the third generation), with progress across generations also interpreted as assimilation. For example, Blau and Kahn (2006) examine assimilation among Mexican Americans along various socioeconomic dimensions using 1994-2003 Current Population Survey data. They find that female immigrants' probability of being married with spouse present decreases relative to natives' with time since migration, and continues to decrease among the second and third generation. In contrast, male immigrants are more likely to be married as time since migration increases. They also find that women's fertility actually increases relative to natives' with time since migration, although it decreases with immigrant generation. Although acquisition of destination-country language skills is not the only reason for changes in immigrant outcomes across time and generations, it could be an important factor whose role is worth quantifying. Also, Duncan and Trejo (2006) examine intermarriage among Mexican Americans and find that Mexican Americans who are married to non-Mexicans tend to be more educated, speak English better, are more likely to work and earn more compared to ones married to either Mexican immigrants or U.S.-born Mexicans. Similar differences prevail between the spouses of intermarried Mexican Americans and spouses of other Mexican Americans, consistent with assortative matching.

The main contribution of this study is to address the problem of endogeneity of English-language skills when estimating the effect of English-language skills on fertility and marriage. Another contribution is that we consider a broader set of marriage outcomes than has been considered by previous studies of effects of language on marriage. In particular, in addition to the usual measures—probability of being married, probability of being divorced, probability of intermarriage—we examine the socioeconomic characteristics of the spouse.

B. Empirical strategy

The present study is based on the psychobiological phenomenon that younger children acquire language skills more easily than older children and adults (see Newport, 2002 for a review). This window of easier language learning is known in psychology as the "critical period of language acquisition." It appears to be linked to physiological changes in the brain (Lenneberg, 1967): maturational changes starting just before puberty reduce a child's ability to acquire second languages. If exposure to the language begins during the critical period, acquisition of the language up to native fluency is almost certain. If first exposure commences afterward, the individual's language proficiency is less assured.

To obtain a consistent estimate of the effect of English-language skills, we use an instrumental variable based on the age at arrival of childhood immigrants. Immigrants from non-English-speaking countries will need to learn English to function in U.S. schools, workplace and other institutions. Those who arrive at a younger age have an earlier age of first exposure to English, and therefore a language-learning advantage. (We demonstrate age-at-arrival effects on English proficiency below.) On the other hand, younger arrivers likely differ from older arrivers along non-language dimensions that also affect outcomes. Thus, age at arrival by itself is unlikely to be a valid exclusion restriction. Instead, the identifying instrument is an interaction between age at arrival and country of birth. Incorporating immigrants from English-speaking countries into the analysis enables us to partial out the non-language effects of age at arrival. This is because upon arrival in the U.S., immigrants originating from English-speaking countries encounter everything that immigrants from non-English-speaking countries encounter except a new language. Thus, any difference in child outcome between young and old arrivers from non-English-speaking countries that is over and above the difference from English-speaking countries can plausibly be attributed to language.

To clarify this research design, we offer this hypothetical example: consider four immigrants, each brought to the U.S. as a child. Two are from Jamaica (an English-speaking country), one aged 5 at arrival and the other aged 15. The other two are from Mexico (a non-English-speaking country), with parallel ages of arrival. If we observe a difference between the wages of the two Jamaicans, we could attribute it to secular age-at-arrival effects. But all of these effects are also present in the case of the two Mexicans, in addition to the fact that the Mexicans had substantially less exposure to the English language before immigrating. As such, the Jamaicans can be used to control for the non-language age-at-arrival effects. Any differences between the Mexicans in excess of the differences between the Jamaicans can be attributed to language effects, because the Mexican child who immigrated younger has an earlier age of first exposure to English.

C. Data and descriptive statistics

We implement our empirical strategy using individual-level data from the 2000 U.S. Census of Population and Housing.[3] This is a large data set containing measures of English-language skills; a large number of observations is helpful for implementing any instrumental-variables strategy.[4] These measures are self-reported, and many researchers studying the

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[3] Specifically, we combine the 1% and 5% samples from Integrated Public Use Microsample Series (IPUMS) (Ruggles et al., 2004).

[4] The Census question based on which the English-ability measures in this paper are constructed is: "How well does this person speak English?" with the four possible responses "very well," "well," "not well" and "not at all." This

relationship between language and earnings have used them.[5] Another attractive feature of the 2000 Census is that information is collected on all members of sampled households, which means individuals can be matched to co-resident spouses, enabling us to explore spousal characteristics as outcomes.

Our analysis is conducted using childhood immigrants currently aged 25 to 55.[6] We define a childhood immigrant as an immigrant who was under age 15 upon arrival in the U.S. For these immigrants, age at arrival is not a choice variable since they did not time their own immigration but merely come with their parents to the U.S.[7]

We divide our sample into three mutually exclusive language categories: individuals from non-English-speaking countries of birth, countries of birth with English as an official language that have English as the predominant language, and other countries of birth with English as an official language.[8] The first category is our "treatment" group and the second is our "control" group. The last category is omitted from the main analysis, since we are not sure how much exposure to the English language immigrants from these countries would have had

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question is only asked of individuals responding affirmatively to "Does this person speak a language other than English at home?" We have coded immigrants who do not answer "Yes" to speaking another language as speaking English "very well." We form an ordinal measure of English-speaking ability as follows: 0 = speaks English not at all, 1 = speaks English not well, 2 = speaks English well and 3 = speaks English very well.

[5] Kominski (1989) reports that the Census measure of English-speaking ability is highly correlated with standardized tests of English-language skills and functional measures of English-language skills.

[6] For the purposes of this paper immigrant is defined as someone born outside the fifty states and the District of Columbia. This means that a person born in Puerto Rico is considered an immigrant, although legally he/she is a U.S. citizen at birth.

[7] According to the U.S. Citizenship and Immigration Services, immigrating parents may bring any unmarried children under age 21. We use a more restricted set of childhood immigrants: immigrants who were under 15 upon arrival (i.e., maximum age at arrival is 14). Using this lower age at arrival cutoff should mitigate the concern that many low-educated young men migrate on their own to the U.S. from Mexico and Central America to look for work, which makes age at arrival a choice variable and makes it less plausible that the non-language age-at-arrival effects estimated using immigrants from English-speaking countries apply to immigrants from non-English-speaking countries.

[8] We used *The World Almanac and Book of Facts, 1999*, to determine whether English was an official language of each country. Recent adult immigrants from the 1980 Census were used to provide empirical evidence of the prevalence of English in countries with English as an official language. English-speaking countries are defined as those countries from which more than half the recent adult immigrants did not speak a language other than English at home. The remaining countries with English as an official language are excluded from the main analysis. We made two exceptions to this procedure. First, despite the fact that Great Britain was not listed as having an official language, we included it in the list of English-speaking countries. Second, we classified Puerto Rico as non-English speaking even though English is an official language due to its colonial history.

before immigrating. Table 1 provides the descriptive statistics for the treatment and control groups, with decompositions by age at arrival. Appendix Table 1 shows the decomposition of the sample by country of birth, and also presents our classification of countries by English-speaking status.

III. Age at Arrival and English Proficiency

In our sample of childhood immigrants, the relationship between age at arrival and English-language skills is strong. This can be seen in Figure 1, which plots for each age at arrival the difference in mean English-speaking ability between childhood immigrants from non-English-speaking countries and childhood immigrants from English-speaking countries. People who arrived at age nine or earlier from non-English-speaking countries speak English at least as well as their counterparts from English-speaking countries.[9] After age at arrival nine, people from non-English-speaking countries have significantly lower English-speaking proficiency, and indeed the disadvantage increases almost linearly with age at arrival.

These results are consistent with the critical period of language acquisition. Immigrants who arrive at older ages from non-English-speaking countries tend to have later ages of first exposure to the English language. For those arriving well within the critical period of language acquisition, a slightly later arrival does not depress English proficiency in the long run. On the other hand, those who arrived as their critical period was coming to a close attained significantly worse eventual English skills.

We also summarize in Figure 1 the relationship between age at arrival and English-language skills in a simple regression framework. In the analysis below, instead of estimating fifteen differences in means (for each age at arrival, 0 to 14), we estimate a parameterized

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[9] The significantly higher English proficiency among early arrivers from non-English-speaking countries is an artifact of controlling for Hispanic status, a conventional demographic control variable. The curve is shifted down if the Hispanic dummy is excluded, but the shape of the curve is essentially unchanged.

difference that is allowed to vary by age at arrival. In particular, we impose the restriction that the difference is zero between childhood immigrants from non-English-speaking countries and childhood immigrants from English-speaking countries up through age at arrival nine, but has a linear relationship with age at arrival thereafter. This captures much of the co-movement between age at arrival and English-language skills displayed in Figure 1. Symbolically, we use the following parameterization for age at arrival:

(1) $$k_{ija} = \max(0,a-9) \times I(j \text{ is a non-English-speaking country})$$

where a is age at arrival, I() is the indicator function, and j is country of birth.[10]

We estimate the relationship between English skill and age at arrival in the following equation:

(2) $$ENG_{ija} = \alpha_1 + \pi_1 k_{ija} + \delta_{1a} + \gamma_{1j} + \mathbf{w}_{ija}'\rho_1 + \varepsilon_{1ija}.$$

in which δ_{1a} and γ_{1j} are dummy variables for age at arrival and country of birth, respectively, and $\mathbf{w}_{ija}$ is a vector of demographic controls. Because there are no endogenous variables on the right-hand side, equation 2 can be consistently estimated using OLS. (Moreover, this is the first-stage equation in that English skill is an endogenous variable (in the analysis of Section IV below) and equation 2 relates the endogenous regressor to the instrument k_{ija}.)

The results from estimating equation 2 are found in Table 2. In Columns 1-4, for purposes of exposition, we control for main effects using only dummy for being born in a non-English-speaking country and a piecewise linear control for age at arrival, max(0,a-9). For each year past age nine that a parent from a non-English-speaking country arrives, the probability of speaking any English decreases 0.6 of a percentage point (Column 1), speaking English well decreases three percentage points (Column 2) and speaking English very well decreases 7.3 percentage points (Column 3). The ordinal measure of English-speaking ability, which

[10] The specific parameterization of the instrument does not materially affect instrumental-variables results below.

encapsulates movements at all these different levels of English proficiency, is worse by 0.11 points (Column 4). Arriving from a non-English-speaking country has a positive effect; this is counterintuitive, but can be understood by the fact that the race dummies and Hispanic dummy absorb much of the mean differences between English-speaking and non-English-speaking countries. The piecewise linear age at arrival term has a small, typically insignificant, negative effect. An age-at-arrival effect may be present for immigrants from English-speaking countries because even these countries have people who speak other languages; for example, the Quebecois from Canada. In Column 5, we control for main effects in a more detailed way using a full set of country-of-birth dummies and age-at-arrival dummies. The coefficient for the instrument remains of similar magnitude and significant.

IV. English Skill and Socioeconomic Outcomes

A. Graphical evidence

Compared to immigrants with English-speaking countries of origin, immigrants from non-English-speaking countries show substantial age-at-arrival effects for a number of social and economic outcomes. These results are seen in Figure 2, where we again consider differences among immigrants from English-speaking and non-English-speaking countries for various ages at arrival in the United States. We first consider in Panel A whether the immigrant is currently married with his/her spouse present. Earlier arrivers show essentially similar marriage rates across language-origin groups, while later arrivers from non-English-speaking countries are more likely to be married. For Panels B through D, we examine several spousal outcomes for the subsample of immigrants who are married with spouse present. Again, spouses of early arrivers look similar across language-origin groups for the outcomes considered. However, spouses of later arrivers from non-English-speaking show worse English proficiency (Panel B), fewer years of schooling (Panel C, own schooling is shown as a comparison), and more children (Panel D).

We attribute these differential age-at-arrival effects to language proficiency. First, recall the coincidence of the English-language effect with the critical period of language acquisition (Figure 1). Second, note the similarity of the curve for English proficiency on the one hand and the curves for and the marriage and spousal outcomes (Figure 2). For each outcome, the estimated curves (representing differential age-at-arrival effects) are generally flat and close to zero during the critical period, but show increasing differences starting around an age-at-arrival around eight or nine years. This suggests the following causal mechanism: childhood immigrants with first exposure to English after the critical period attain poorer English proficiency as adults, which in turn influences their marriage-market outcomes.

B. Instrumental-variables estimates

We combine the results for English and for socioeconomic outcomes above using Two Stage Least Squares (2SLS), an instrumental-variables estimator. Consider the following regression model:

$$y_{ija} = \alpha + \beta \, ENG_{ija} + \delta_a + \gamma_j + \mathbf{w}_{ija}'\rho + \varepsilon_{ija} \quad (3)$$

for individual i born in country j arriving in the U.S. at age a. y_{ija} is the outcome, ENG_{ija} is a measure of English-language skills (the endogenous regressor), δ_a is a set of age-at-arrival dummies, γ_j is a set of country-of-birth dummies and $\boldsymbol{w}_{ija}$ is a vector of exogenous explanatory variables (e.g., age and sex). Because English skills are endogenous, we cannot obtain unbiased estimates of equation 3 using ordinary least squares (OLS). Instead, we use k_{ija}, the excess age-at-arrival effect for non-English-origin immigrants, as an instrumental variable to identify the effect of English-language skill (the β parameter).

In Table 3, we display the OLS and 2SLS estimates of the effect of English proficiency on marital status. Using a sample containing both men and women, 2SLS estimates suggest that English proficiency significantly decreases the probability of being currently married (Column 2, Row A).[11] This is attributable to more English-proficient people being more likely to divorce and less likely to ever marry (see Column 2, Rows B and C). Perhaps English proficiency improves outside opportunities to such an extent that immigrants exit marriages at a lower threshold of marital discord. Alternatively, it could be that greater English proficiency engenders higher expectations of one's own spouse and greater acceptance of the American society's relatively liberal attitude toward divorce.

We also consider how English proficiency affects the spousal characteristics. These results are found in Table 4 and use the subsample of childhood immigrants who are married with spouse present. Panel A shows the effect of English proficiency on the ethnicity and nativity of the spouse. Greater English proficiency leads to having a spouse with better English skills as well, as seen in Row A of Panel A. Indeed, for men, the coefficient is approximately one, suggesting unit assortative matching on language skill. More English-proficient people are much more likely to marry a U.S. native (Row B), and this comes at the direct expense of marrying someone born in the same country (Row C). They are somewhat less likely to marry someone of the same ancestry as well (Row D), although the smaller magnitude in Row D compared to Rows B and C suggests that some of the U.S. natives they are marrying share their ancestry. For example, English-proficient Mexican immigrants are more likely to marry U.S. natives, some of whom may be of Mexican heritage.

Better English skills lead immigrants to have younger spouses, particularly for women.

[11] Generally, the OLS and 2SLS estimates have the same sign, but typically the OLS estimates are smaller in magnitude. At first glance, this would seem at odds with a story of endogeneity bias in which higher ability immigrants both learn more English and obtain better outcomes in the labor and marriages markets, for example. However, Dustmann and van Soest (2002) argue that the categorical measure of English employed by various surveys including the U.S. Census is characterized by substantial measurement error. It is well known that 2SLS can correct for measurement error as well as endogeneity bias. Accordingly, using an alternative measure of language for validation, Bleakley and Chin (2004) find that the downward bias caused by classical measurement error outweighs the upward bias due to an "ability bias"-type story.

In Panel B, Row A, we examine spouse age as the outcome. The 2SLS effect is significantly negative, but this is driven principally by the female sample. That is, when a woman is more English proficient, she chooses a younger husband (compared to a woman who is less English proficient). This is consistent with the idea that more traditional marriages have a larger age gap between husband and wife, and English proficiency reduces this age gap. (Note these regressions already contain full sets of age and age-at-arrival dummies, so these results are not mechanical.)

More English-proficient people have spouses who are more educated, as we see in the rest of Panel B. In Row B, spousal years of schooling is the outcome variable, and we see that a one-unit increase in English skill raises spousal education by over two years. For comparison, we report in Row F the results for own schooling: a one-unit increase in English raises own education by 3-4 years. That the effect of English-language skills on one's own education is so similar to the effect on one's spouse's education is indicative of strong assortative matching. However, the sorting is estimated to be less than perfect: the effect of English on spousal education is about two thirds of the effect on own years of schooling. Much of the increase in spousal education derives from higher likelihood of finishing high school and attending some college (Row C-D), which parallels estimates for own schooling (results not reported).

We estimate that better English leads to better labor market outcomes both for the immigrant and his/her spouse. Panel C contains these results. More English-proficient people have spouses who are more likely to work (Row C), and are themselves more likely to work (Row D) in a similar proportion. This is driven by wives participating in the labor market more (Columns 5 and 6); husbands tend to have higher levels of participation, which are less sensitive to language skills (Columns 3 and 4). Putting these two facts together, we see in Row E that English-proficient people are much more likely to be in marriages in which both the husband and the wife work. Conditional on working, wages are higher for the spouses of more English-proficient people, and this effect is slightly lower in magnitude to the effect on own wages.

We examine fertility outcomes in Table 5. The 2000 Census enables us to construct fertility measures based on the number of children residing in the same household. [12] Columns 1-6 show results for the whole sample while Columns 7-12 shows results for the subsample that is currently married with spouse present. As above, we consider both men and women; however, because children are more likely to be in the same household with their mothers than their fathers, the results for women are more straightforward to interpret.

We estimate substantial effects of English skill on reducing fertility, especially along the intensive margin. In Row A, we estimate the impact of English on the total number of children in the household, and find uniformly negative and generally statistically significant results. Row B's outcome is a dummy for having at least one child in the household, i.e. the extensive margin of fertility. The 2SLS estimates of the effect on whether one has a child are always negative, and in some cases significantly different from zero. Rows C-F show language effects on various points in the fertility distribution, and moreover that language skills most strongly affect fertility decisions among medium-sized families. On the other hand, we fail to find statistically significant effects on single parenthood (Rows G and H).

V. Interpretation

A. How comparable are the treatment and comparison countries?

In this subsection, we consider and discard several alternative hypotheses for the results

[12] Unfortunately this means that children who have left the household will not be counted. This will bias our results if the age distribution of children and probability of child leaving parental household conditional on age depend on parental English proficiency. To guard against this possibility, we replicate our design (in results not shown) using the 1990 Census, which also offers a better measure of fertility—children ever born to a woman. Analysis of both fertility measures (children ever born and children residing in the same household) yields the same conclusions about the impact of English proficiency on fertility. Moreover, results using the resident-children measure agree across the two different censuses. This raises our confidence that the fertility results using 2000 Census data truly relate to fertility and are not seriously biased by children endogenously leaving the parental household.

from above on English-speaking ability and family formation outcomes. For the 2SLS estimate, we interpret the age-at-arrival effect for immigrants from non-English-speaking countries that is in excess of the age-at-arrival effect for immigrants from English-speaking countries as the causal effect of English proficiency. However, if non-language age-at-arrival effects differ between the two groups of immigrants, then our strategy to identify the effect of English proficiency is invalid. For example, English-speaking countries and non-English-speaking countries may differ in ways that affect the assimilation process of immigrants in the U.S. To assess this potential problem, we perform a variety of specification checks.

First, it is possible that immigrants from non-English-speaking countries exhibit a stronger age-at-arrival effect simply because immigrants from poorer countries face additional barriers to adaptation and that these barriers increase in severity as a function of age at arrival. This is plausible because non-English-speaking countries tend to be poorer than English-speaking countries. Richer countries might have better school systems. If there are different returns associated with the schooling obtained in a non-English-speaking country versus an English-speaking one, the 2SLS estimate using the interaction as the identifying instrument may reflect not only differential English-language skills but also differential returns to origin-country schooling. To address this, we incorporate data on per capita GDP in 1980 from the Penn World Tables (Summers and Heston, 1988). We include as a control variable an interaction between age at arrival and per capita GDP in the country of birth. The estimation results, shown in Column 2, are similar to the base results.

Second, the age-at-arrival effect could depend on the fertility rate in the origin country. Assimilation to U.S. norms would mean a reduction in fertility for people from higher-fertility countries but an increase in fertility for people from lower-fertility countries. The fertility rate in the U.S. is higher than in most other industrialized countries, but lower than in most developing countries, and English-speaking countries are more likely to be industrialized. Thus, immigrants from English-speaking countries may not properly control for the non-language age-at-arrival effects on fertility experienced by immigrants from non-English-speaking countries. To address this potential source of bias, we incorporate data on total fertility rate in 1982 from the *World Development Indicators* CD-ROM (World Bank, 2005). We include as a control variable an interaction between age at arrival and total fertility rate in the country of birth. The estimation results, shown in Column 3, are similar to the base results.

Third, the size of the immigrant group could alter the assimilation process in a way that affects age-at-arrival effects. If the group is particularly large, it might be easier to form enclaves and be more isolated from the broader society. To account for this, we interact the logarithm of the number of immigrants from the origin country with age at arrival and include this new variable in the 2SLS regression. The results are shown in Column 4. The estimated coefficient on English is of comparable, although generally larger, magnitude to the baseline.

Finally, English-speaking countries might have greater cultural and institutional similarity to the U.S., making adjustment easy for immigrants from these countries irrespective of age at arrival. In contrast, immigrants from non-English-speaking countries encounter both a foreign language and foreign culture, so even ignoring the language, there is more to adjust to for the older arrivers. To address this concern, we restrict analysis to groups of countries that might be more similar to each other. In Column 5, we drop immigrants from Canada. They account for almost one third of the observations of immigrants from English-speaking countries, yet they may be poor controls for the assimilation process of the average immigrant due to Canada's geographic proximity to the U.S. and status as a former British colony. The results are broadly similar outcomes to those in Column 1.

In Column 6, we restrict analysis to people who emigrated from the Caribbean. When looking within the Caribbean region, the number of observations is considerably smaller but the control and treatment countries should be more similar in terms of their economic and historical backgrounds. Consistent with the base results, English-proficient people have spouses who have better English skills, more education and earnings, and greater labor-force participation (see Panels B-D). However, the results on marital status, spousal nativity and fertility are now insignificantly different from zero.

At first glance, the Caribbean results might cast doubt on the base results; after all, when we focus on Caribbean immigrants, we are mitigating differences between English- and non-English-speaking countries that might exist when we use all immigrants. We believe that the Caribbean-only marriage and fertility results might be idiosyncratic and should not overturn the base results. We believe race is a bigger factor for the Caribbean subsample than the whole sample. Many Caribbean immigrants are black. In the U.S., black-white intermarriage is less common than other types of intermarriage. On the other hand, black natives have lower education and earnings than white natives and black immigrants (Butcher, 1994). We have included race dummies in all our models, i.e., we have allowed blacks to have a different mean outcome from other race groups. However, we have not allowed for black-specific effects for other control variables, such as age at arrival. It is possible that more English-proficient Caribbean immigrants, just like other more English-proficient immigrants, are seeking someone like themselves, i.e., someone with more education and better earnings opportunities. There are more whites satisfying the criteria than blacks, given the poor outcomes on average of native blacks. Thus, if one wants to marry another black with a similar socioeconomic profile, one may end up choosing a fellow immigrant. Further investigation of assimilation in marriage and fertility by race seems warranted.

In Column 7, we drop immigrants from Mexico. They account for 29% of the observations of immigrants from non-English-speaking countries. By dropping them, we can explore whether the estimated effect of English is driven by Mexicans alone, or whether the effect is common to other groups as well. Although the results are qualitatively similar to the base results, one difference should be noted. Now a one-unit increase in English proficiency generates a larger increase in the probability of marrying a U.S. native and a larger decrease in the probability of marrying a fellow countryman. Moreover, the probability that the spouse has the same ancestry is much less (the point estimate is -0.51 compared to the base result of -0.18). We must recognize that the estimates are imprecise, but the following story seems plausible. All immigrants who are more English-proficient can choose not only U.S. natives of a different ancestry as spouses, but also immigrants and U.S. natives of the same ancestry. Mexican immigrants and their descendants are much more numerous than other ancestries, and additionally they are relatively concentrated in certain areas of the U.S. This means that a Mexican immigrant who is English proficient has a larger chance of finding a mate satisfying the education and earnings requirements who is also of Mexican ancestry. Non-Mexican immigrants typically have to marry someone born in a different country or of a different ancestry to satisfy their requirements. A different story that is also consistent with these results is that Mexicans have a stronger preference to marry other Mexicans regardless of English proficiency, such that English proficiency only changes which generation of Mexican immigrant they marry.

Overall, Table 6 suggests that our main findings are robust to changes to sample or specification that might make the immigrants from English-speaking countries better controls for the non-language age-at-arrival effects experienced by immigrants from non-English-speaking countries.

B. What is the role of education in mediating these effects?

Educational attainment appears to be an important channel through which the effect of

English proficiency affects the spouse's educational and labor-market outcome, but has a smaller role in marriage and fertility decisions. To show this, we estimate the same specifications as before but add years of schooling as a regressor. These results are displayed in Table 7. Column 1 shows the original result and Columns 2 and 3 show the result after controlling for years of schooling. This analysis suggests that although education often significantly affects the marriage and fertility measures used in this paper (see Panels A and E, Column 3), there remains a significant effect of English proficiency (see Column 2). The effects on being currently married and being currently divorced actually increase in magnitude because education has an effect of the opposite sign (Panel A). Additionally, education appears not to matter much for spouse's ethnicity and nativity, such that the effects of English proficiency do not change much after controlling for education (Panel B). Results for fertility are similar, albeit of somewhat smaller magnitude when education in controlled for. This suggests that the additional education attained as a result of better English is not the central channel for these results, leaving room for some other channels for the effect of English proficiency, such as enabling communication (thus increasing the pool of suitors), social assimilation or learning (discovering and adopting U.S. cultural norms), and raising female bargaining power (through improving exit options for women disproportionately). On the other hand, in Panels C and D, the coefficients on English decline markedly after controlling for education. That is, the assortative matching on education explains a considerable fraction of the effect of own English proficiency on spouse's education. However, the decline in these coefficients is typically less than 100%, suggesting that channels besides education also have a smaller role in determining the spouse educational and labor-market characteristics.

VI. Conclusion

Using 2000 Census microdata on childhood immigrants, we relate family-formation variables to their age at arrival in the United States, and in particular whether that age fell within the "critical period" of language acquisition. This suggests the following mechanism: childhood immigrants with first exposure to English after the critical period attain poorer English proficiency as adults, which in turn influences their marriage and labor-market outcomes. Accordingly, we use information on age at arrival and English use in the country of origin to construct an instrumental variable for English-language proficiency. Two-stage-least-squares estimates suggest that English proficiency raises the probabilities of marrying a native, being divorced, or having a high-earning and/or more educated spouse, and reduces the number of children, among other outcomes. These results indicate that English skill has an important role in the process of assimilation, and furthermore that the marriage market for immigrants is characterized by strongly assortative matching.

These results help understand the household environment in which the children of immigrants grow up. Immigrants with higher English proficiency have spouses who are U.S. natives, more educated and earn more. This means that marriage decisions magnify existing differences across individuals along linguistic lines. For example, when someone marries a U.S. native, his/her use and knowledge of English will grow. Also, when someone marries another higher earner, total family income will rise. In other work, we have found that the English proficiency of immigrant parents has a significant benefit for English proficiency and educational outcomes of their U.S.-born children (Bleakley and Chin, 2006). Likely, an important mediator is the family structure—children with one parent who has higher English proficiency, education and earnings are more likely to have the other parent possess similar traits. The children with one parent with low English proficiency will be more likely to have the other parent be less English-proficient, which means lower education and earnings in the family on average. We also find English proficiency reduces fertility, mostly on the intensive margin. Thus, the U.S.-born children of immigrants with English-proficient parents have an additional difference in family structure—fewer siblings—that affects their well-being. Surely per-capita family income would be affected; however, predictions about parental time input into childrearing per child are less clear since, although number of children has decreased due to greater English proficiency, both parents are more likely to work.

We do not propose to manipulate language policy in order to attain certain marriage or fertility outcomes. However, language policy is often manipulated for the sake of improving education and earnings outcomes, and this study points out that there will be concomitant effects on family formation.

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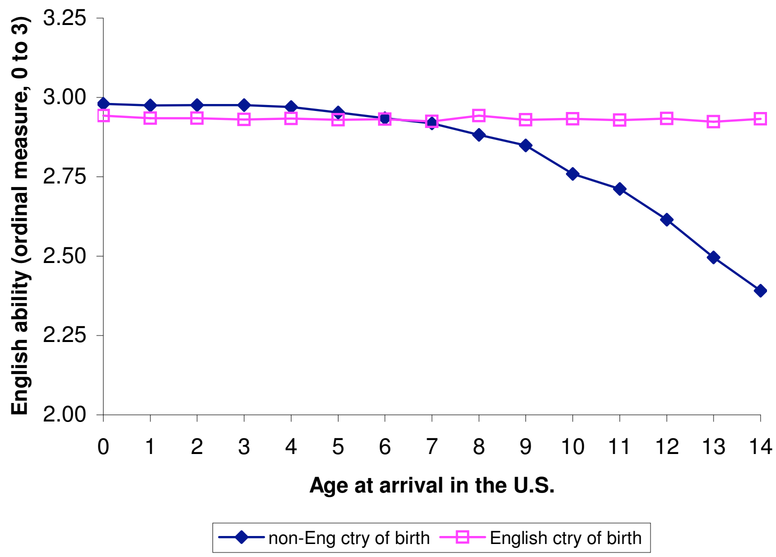
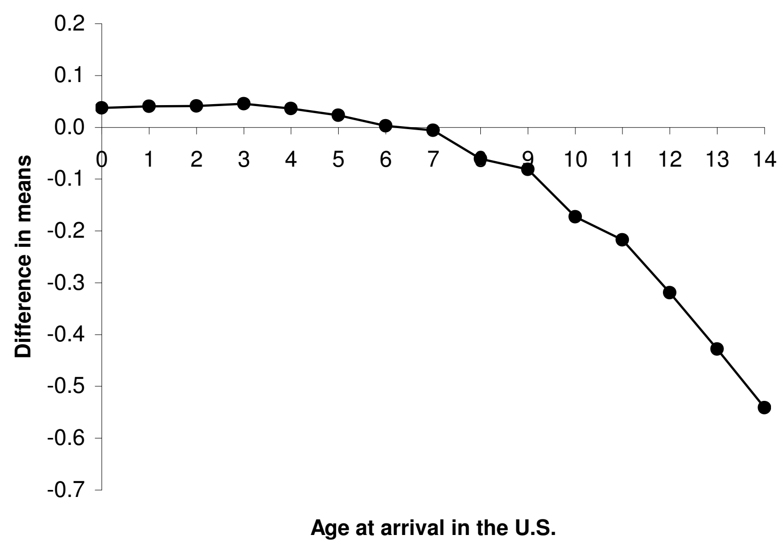
Figure 1. English-Speaking Ability by Age at Arrival

Panel A. Regression-Adjusted Means

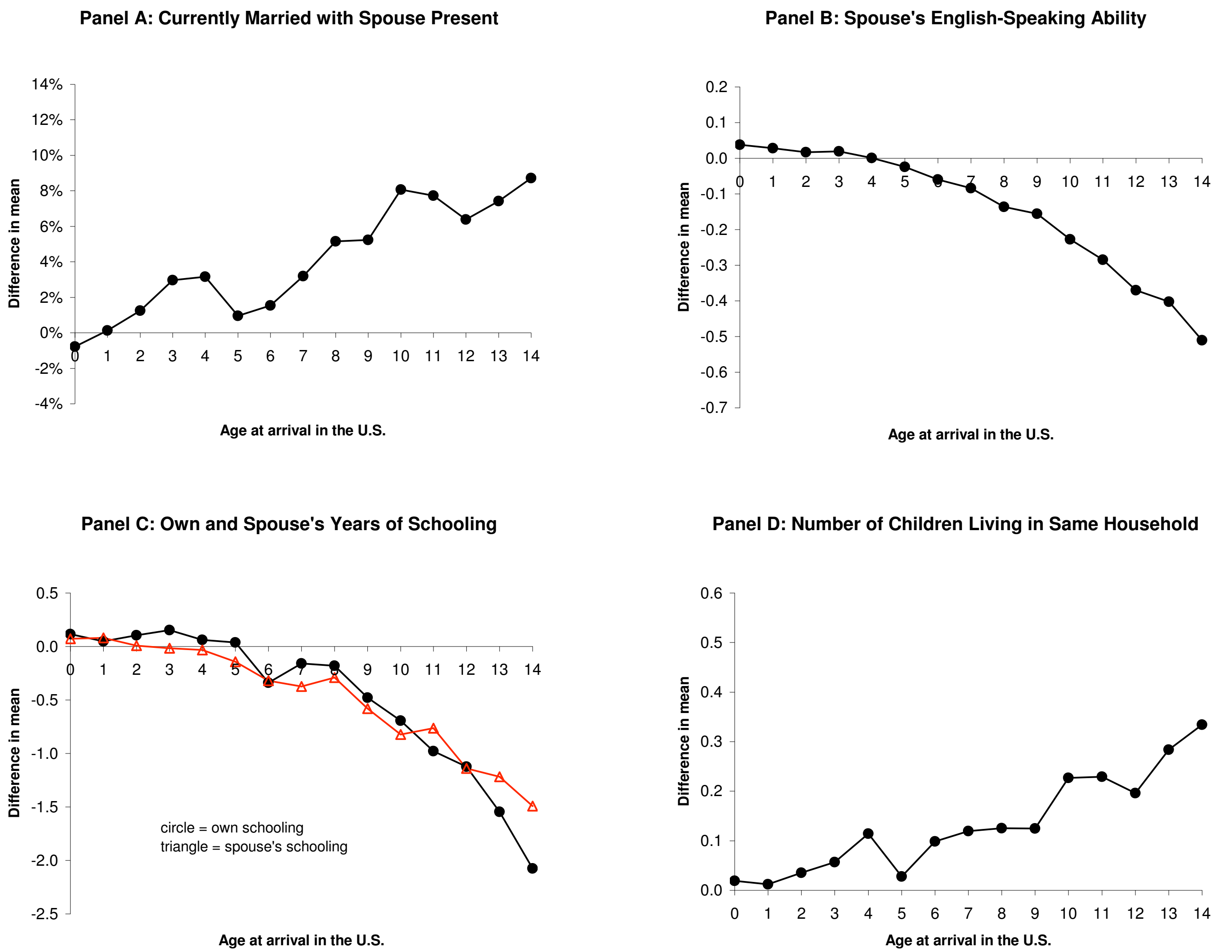


Panel B. Difference in Means



Notes: Data are from the 2000 IPUMS. Sample size is 191,534 (composed of people who immigrated to the U.S. before age 15 and are currently aged 25-55, and with nonmissing English variable). In Panel A, displayed for each age at arrival is the mean English-speaking ability. In Panel B, displayed for each age at arrival is the difference in mean English-speaking ability between people from non-English-speaking countries and people from English-speaking countries. Means are weighted by IPUMS weights, and regression-adjusted for age, race, Hispanic and sex dummies. The race categories used were White, Black, Asian & Pacific Islander, Multiracial and Other. The English ordinal measure is defined as: 0 = no English, 1 = not well, 2 = well and 3 = very well.

Figure 2. Select Outcomes by Age at Arrival



Notes: Data are from the 2000 IPUMS. Panels A and D use data for all childhood immigrants and Panels B and C use data for the subset that is currently married with spouse present. In each panel, displayed for each age at arrival is the difference in mean between people from non-English-speaking countries and people from English-speaking countries for the outcome named. Means are weighted by IPUMS weights, and regression-adjusted for age, race, Hispanic and sex dummies.

Table 1. Descriptive Statistics

	Born in non-English-speaking country			Born in English-speaking country		
	total	arrived aged 0-9	arrived aged 10-14	total	arrived aged 0-9	arrived aged 10-14
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Regressors						
English-speaking ability ordinal measure	2.719	2.872	2.441	2.980	2.981	2.979
	(0.619)	(0.420)	(0.797)	(0.167)	(0.167)	(0.170)
Age	36.549	36.839	36.025	38.403	38.906	37.014
	(8.256)	(8.357)	(8.044)	(8.367)	(8.387)	(8.153)
Female	0.500	0.512	0.478	0.528	0.513	0.569
	(0.500)	(0.500)	(0.500)	(0.499)	(0.500)	(0.495)
White	0.554	0.609	0.454	0.666	0.766	0.390
	(0.497)	(0.488)	(0.498)	(0.472)	(0.424)	(0.488)
Black	0.030	0.031	0.030	0.247	0.164	0.478
	(0.171)	(0.172)	(0.170)	(0.432)	(0.370)	(0.500)
Asian/Pacific Islander	0.123	0.106	0.154	0.028	0.024	0.038
	(0.328)	(0.307)	(0.361)	(0.164)	(0.153)	(0.192)
Other single race	0.240	0.201	0.310	0.019	0.016	0.028
	(0.427)	(0.401)	(0.462)	(0.136)	(0.124)	(0.164)
Multiracial	0.053	0.053	0.053	0.040	0.031	0.066
	(0.224)	(0.224)	(0.223)	(0.196)	(0.173)	(0.248)
Hispanic	0.520	0.452	0.644	0.012	0.012	0.011
	(0.500)	(0.498)	(0.479)	(0.109)	(0.110)	(0.106)
Years of schooling	13.138	13.753	12.014	14.527	14.593	14.342
	(3.461)	(2.956)	(3.994)	(2.452)	(2.446)	(2.459)
Panel B: Marital Status Outcomes						
Is currently married with spouse present	0.604	0.588	0.632	0.561	0.584	0.497
	(0.489)	(0.492)	(0.482)	(0.496)	(0.493)	(0.500)
Is currently divorced	0.097	0.107	0.077	0.120	0.123	0.112
	(0.296)	(0.309)	(0.267)	(0.325)	(0.328)	(0.315)
Has ever married	0.767	0.757	0.787	0.736	0.755	0.680
	(0.422)	(0.429)	(0.409)	(0.441)	(0.430)	(0.466)
Panel C: Spouse's Ethnicity and Nativity						
Spouse English-speaking ability ordinal measure	2.588	2.758	2.301	2.979	2.981	2.973
	(0.765)	(0.599)	(0.916)	(0.170)	(0.164)	(0.189)
Spouse is US-born	0.494	0.632	0.261	0.804	0.859	0.622
	(0.500)	(0.482)	(0.439)	(0.397)	(0.348)	(0.485)
Spouse has the same country of birth	0.393	0.265	0.609	0.094	0.055	0.223
	(0.488)	(0.442)	(0.488)	(0.292)	(0.228)	(0.416)
Spouse has the same ancestry	0.543	0.459	0.681	0.245	0.218	0.331
	(0.498)	(0.498)	(0.466)	(0.430)	(0.413)	(0.471)
Panel D: Spouse's Age and Education						
Spouse age	38.077	38.479	37.399	40.491	40.823	39.410
	(9.069)	(9.069)	(9.029)	(8.849)	(8.806)	(8.904)
Spouse years of schooling	13.016	13.645	11.936	14.578	14.647	14.351
	(3.704)	(3.267)	(4.135)	(2.530)	(2.525)	(2.534)
Spouse has high school diploma	0.765	0.839	0.637	0.941	0.946	0.922
	(0.424)	(0.368)	(0.481)	(0.237)	(0.226)	(0.267)

Notes: The table continues on the next page.

Table 1. Descriptive Statistics (Continued)

	Born in non-English-speaking country			Born in English-speaking country		
	total (1)	arrived aged 0-9 (2)	arrived aged 10-14 (3)	total (4)	arrived aged 0-9 (5)	arrived aged 10-14 (6)
Spouse has any college or more	0.547	0.617	0.427	0.741	0.750	0.712
	(0.498)	(0.486)	(0.495)	(0.438)	(0.433)	(0.453)
Spouse has Bachelor's degree or more	0.265	0.304	0.198	0.386	0.396	0.350
	(0.441)	(0.460)	(0.398)	(0.487)	(0.489)	(0.477)
Own years of schooling	13.135	13.849	11.913	14.652	14.699	14.499
	(3.479)	(2.895)	(4.014)	(2.416)	(2.410)	(2.427)
Spouse has more schooling than self	0.296	0.280	0.322	0.278	0.283	0.260
	(0.456)	(0.449)	(0.467)	(0.448)	(0.450)	(0.439)
Panel E: Spouse's Labor Market Outcomes						
Spouse log(wages last year)	10.201	10.265	10.078	10.370	10.371	10.368
	(0.991)	(0.988)	(0.984)	(1.025)	(1.042)	(0.965)
Own log(wages last year)	10.212	10.269	10.107	10.376	10.379	10.366
	(0.956)	(0.960)	(0.939)	(0.982)	(0.990)	(0.954)
Spouse worked last year	0.825	0.848	0.786	0.883	0.884	0.879
	(0.380)	(0.359)	(0.410)	(0.322)	(0.321)	(0.326)
Own worked last year	0.854	0.868	0.830	0.886	0.889	0.874
	(0.353)	(0.339)	(0.376)	(0.318)	(0.314)	(0.331)
Both worked last year	0.701	0.733	0.646	0.781	0.784	0.771
	(0.458)	(0.442)	(0.478)	(0.414)	(0.412)	(0.421)
Panel F: Fertility Outcomes						
Number of children living in same household	1.246	1.141	1.436	0.974	0.969	0.986
	(1.346)	(1.279)	(1.440)	(1.178)	(1.175)	(1.187)
Has a child living in same household	0.580	0.554	0.628	0.506	0.502	0.518
	(0.493)	(0.497)	(0.483)	(0.500)	(0.500)	(0.500)
Has at least 2 children in same household	0.402	0.370	0.459	0.314	0.317	0.308
	(0.490)	(0.483)	(0.498)	(0.464)	(0.465)	(0.462)
Has at least 3 children in same household	0.177	0.151	0.223	0.110	0.110	0.112
	(0.381)	(0.358)	(0.416)	(0.313)	(0.312)	(0.316)
Has at least 4 children in same household	0.060	0.047	0.083	0.031	0.030	0.033
	(0.237)	(0.212)	(0.276)	(0.173)	(0.171)	(0.180)
Has at least 5 children in same household	0.018	0.013	0.028	0.008	0.007	0.009
	(0.133)	(0.112)	(0.165)	(0.089)	(0.086)	(0.096)
Is a single parent	0.101	0.101	0.101	0.107	0.093	0.144
	(0.301)	(0.301)	(0.301)	(0.309)	(0.291)	(0.351)
Is a never-married single parent	0.029	0.028	0.033	0.038	0.028	0.064
	(0.169)	(0.164)	(0.178)	(0.190)	(0.165)	(0.244)

Notes: The sample consists of individuals from the 2000 1% and 5% PUMS files who are currently aged 25-55, immigrated to the U.S. before age 15 and has nonmissing own age, year of immigration, country of birth and English variables. In Panels A, B and F, statistics are reported for all childhood immigrants; total number of observations is 191534 for the English variable, with Columns 1-6 containing 165628, 106890, 58738, 25906, 19217and 6689 observations, respectively. In Panels C-E, statistics are reported for the subset of childhood immigrants that is currentlly married with spouse present; total number of observations is 114190 for the spouse age variable, with Columns 1-6 containing 99481, 62794, 36687, 14709, 11323 and 3386 observations, respectively. Statistics are weighted by IPUMS weights. The English-speaking ability ordinal measure is defined as: 0 = no English, 1 = not well, 2 = well and 3 = very well.

Table 2. Reduced-form Effect on English-Language Skills

	Speaks English not well, well or very well (1)		Speaks English well or very well (2)		Speaks English very well (3)		English ability ordinal measure (4)		(5)	
Max (0, age at arrival - 9)× non-English-speaking country of birth	-0.0063	**	-0.0304	***	-0.0731	***	-0.1098	***	-0.1043	***
	(0.0029)		(0.0115)		(0.0110)		(0.0253)		(0.0288)	
Non-English-speaking country of birth	0.0034	*	0.0129		-0.0008		0.0155			
	(0.0019)		(0.0082)		(0.0085)		(0.0173)			
Max (0, age at arrival - 9)	-0.0001		-0.0006		-0.0001		-0.0008			
	(0.0001)		(0.0007)		(0.0016)		(0.0022)			
Age at arrival dummies	No		No		No		No		Yes	
Country of birth dummies	No		No		No		No		Yes	
Adjusted R-squared	0.024		0.094		0.204		0.194		0.238	

Notes: The sample is as described in Table 1 notes. Each column is from a separate OLS regression that is weighted by IPUMS weights and contains dummies for age, race (White, Black, Asian, Multiracial and Other), Hispanic origin and sex. In Column 5, the country-of-birth dummies are based on IPUMS detailed birthplace codes. Standard errors adjusted for country of birth clusters are shown in parentheses. Asterisks denote significance levels (*=.10, **=.05, ***=.01).

Table 3. Effect of English on Marital Status

	All Childhood Immigrants		Female Childhood Immigrants		Male Childhood Immigrants	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
A. Is currently married with spouse present	0.008	-0.108 ***	-0.004	-0.076 **	0.019 *	-0.141 ***
	(0.009)	(0.040)	(0.009)	(0.032)	(0.011)	(0.054)
B. Is currently divorced	0.010 ***	0.052 ***	0.015 ***	0.064 **	0.006	0.038 *
	(0.003)	(0.016)	(0.003)	(0.027)	(0.004)	(0.022)
C. Has ever married	-0.002	-0.072 **	-0.001	-0.015	-0.004	-0.134 ***
	(0.007)	(0.028)	(0.005)	(0.028)	(0.009)	(0.050)

Notes: The sample is as described in Table 1 notes. Each lettered row of each column is from a separate regression that is weighted by IPUMS weights and contains dummies for country of birth, age at arrival, age, race, Hispanic origin and sex. The "2SLS" columns are estimated using 2SLS with max(0, age at arrival - 9)×non-English-speaking country as the identifying instrument. Standard errors adjusted for country of birth clusters are shown in parentheses. Asterisks denote significance levels (*=.10, **=.05, ***=.01).

Table 4. Effect of English on Spouse's Other Characteristics

	All Married Childhood Immigrants		Female Childhood Immigrants		Male Childhood Immigrants	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Panel A: Nativity and Ethnicity						
A. Spouse English-speaking ability ordinal measure	0.512 ***	0.814 ***	0.474 ***	0.618 ***	0.560 ***	1.039 ***
	(0.016)	(0.072)	(0.008)	(0.091)	(0.027)	(0.062)
B. Spouse is US-born	0.105 ***	0.322 **	0.101 ***	0.270 *	0.109 ***	0.386 ***
	(0.009)	(0.129)	(0.011)	(0.142)	(0.006)	(0.121)
C. Spouse has the same country of birth	-0.120 ***	-0.351 ***	-0.118 ***	-0.285 **	-0.122 ***	-0.434 ***
	(0.007)	(0.126)	(0.009)	(0.140)	(0.006)	(0.108)
D. Spouse has the same ancestry	-0.076 ***	-0.181	-0.078 ***	-0.171	-0.074 ***	-0.197
	(0.011)	(0.129)	(0.013)	(0.138)	(0.009)	(0.122)
Panel B: Age and Education						
A. Spouse age	-0.348 ***	-0.901 **	-0.496 ***	-1.312 **	-0.147 ***	-0.382
	(0.035)	(0.383)	(0.055)	(0.641)	(0.033)	(0.611)
B. Spouse years of schooling	1.353 ***	2.378 ***	1.367 ***	2.214 ***	1.343 ***	2.619 ***
	(0.034)	(0.298)	(0.036)	(0.391)	(0.043)	(0.241)
C. Spouse has high school diploma	0.146 ***	0.314 ***	0.140 ***	0.281 ***	0.155 ***	0.353 ***
	(0.005)	(0.027)	(0.004)	(0.040)	(0.008)	(0.034)
D. Spouse has any college or more	0.132 ***	0.228 ***	0.133 ***	0.211 ***	0.132 ***	0.253 ***
	(0.010)	(0.054)	(0.010)	(0.051)	(0.010)	(0.064)
E. Spouse has Bachelor's degree or more	0.061 ***	0.069	0.066 ***	0.057	0.054 ***	0.090
	(0.017)	(0.049)	(0.017)	(0.051)	(0.017)	(0.066)
F. Own years of schooling	1.836 ***	3.561 ***	1.846 ***	3.097 ***	1.826 ***	4.030 ***
	(0.059)	(0.285)	(0.075)	(0.351)	(0.047)	(0.281)
G. Spouse has more schooling than self	-0.050 ***	-0.158 ***	-0.048 ***	-0.113 **	-0.051 ***	-0.201 ***
	(0.006)	(0.033)	(0.005)	(0.046)	(0.009)	(0.048)
Panel C: Labor Market Outcomes						
A. Spouse log(wages last year)	0.169 ***	0.302 ***	0.166 ***	0.236 **	0.172 ***	0.422 ***
	(0.006)	(0.086)	(0.006)	(0.113)	(0.012)	(0.139)
B. Own log(wages last year)	0.238 ***	0.451 ***	0.263 ***	0.436 ***	0.216 ***	0.462 ***
	(0.008)	(0.116)	(0.012)	(0.160)	(0.010)	(0.109)
C. Spouse worked last year	0.039 ***	0.079 ***	0.021 ***	0.022	0.062 ***	0.144 ***
	(0.003)	(0.023)	(0.005)	(0.021)	(0.004)	(0.050)
D. Own worked last year	0.068 ***	0.062 ***	0.105 ***	0.116 ***	0.025 ***	-0.004
	(0.004)	(0.017)	(0.006)	(0.027)	(0.008)	(0.019)
E. Both worked last year	0.090 ***	0.122 ***	0.106 ***	0.122 ***	0.072 ***	0.118 **
	(0.004)	(0.029)	(0.006)	(0.024)	(0.004)	(0.054)

Notes: The analysis uses the subset of the sample described in Table 1 notes that is currently married with spouse present.
Each lettered row of each column is from a separate regression that is weighted by IPUMS weights and contains dummies for country of birth, age at arrival, age, race, Hispanic origin and sex. The "2SLS" columns are estimated using 2SLS with max(0, age at arrival - 9)×non-English-speaking country as the identifying instrument. Standard errors adjusted for country of birth clusters are shown in parentheses.
Asterisks denote significance levels (*=.10, **=.05, ***=.01).

Table 5. Effect of English on Fertility

	All Childhood Immigrants						Only Married-with-Spouse-Present Childhood Immigrants					
	All		Female		Male		All		Female		Male	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
A. Number of children living in same household	-0.106 ***	-0.441 ***	-0.162 ***	-0.472 ***	-0.049 *	-0.403 ***	-0.177 ***	-0.410 ***	-0.203 ***	-0.591 ***	-0.148 ***	-0.190
	(0.021)	(0.075)	(0.019)	(0.078)	(0.026)	(0.102)	(0.013)	(0.058)	(0.017)	(0.100)	(0.013)	(0.152)
B. Has a child living in same household	-0.005	-0.073 *	-0.019 ***	-0.041	0.009	-0.113 **	-0.019 ***	-0.007	-0.024 ***	-0.020	-0.014 ***	0.008
	(0.004)	(0.038)	(0.003)	(0.035)	(0.007)	(0.049)	(0.004)	(0.020)	(0.004)	(0.021)	(0.004)	(0.035)
C. Has at least 2 children in same household	-0.020 ***	-0.145 ***	-0.035 ***	-0.150 ***	-0.004	-0.136 ***	-0.035 ***	-0.125 ***	-0.042 ***	-0.175 ***	-0.028 ***	-0.062
	(0.006)	(0.035)	(0.004)	(0.037)	(0.009)	(0.041)	(0.002)	(0.039)	(0.004)	(0.049)	(0.004)	(0.063)
D. Has at least 3 children in same household	-0.036 ***	-0.113 ***	-0.050 ***	-0.147 ***	-0.021 ***	-0.070 **	-0.055 ***	-0.134 ***	-0.063 ***	-0.207 ***	-0.046 ***	-0.042
	(0.007)	(0.017)	(0.007)	(0.019)	(0.007)	(0.035)	(0.006)	(0.021)	(0.007)	(0.039)	(0.007)	(0.061)
E. Has at least 4 children in same household	-0.026 ***	-0.059 ***	-0.034 ***	-0.074 ***	-0.017 ***	-0.042 ***	-0.039 ***	-0.074 ***	-0.044 ***	-0.102 ***	-0.033 ***	-0.042 *
	(0.005)	(0.013)	(0.006)	(0.017)	(0.003)	(0.014)	(0.005)	(0.014)	(0.006)	(0.024)	(0.004)	(0.021)
F. Has at least 5 children in same household	-0.012 ***	-0.029 ***	-0.016 ***	-0.034 ***	-0.008 ***	-0.023 ***	-0.017 ***	-0.041 ***	-0.019 ***	-0.053 ***	-0.014 ***	-0.027 ***
	(0.002)	(0.006)	(0.002)	(0.009)	(0.001)	(0.006)	(0.002)	(0.005)	(0.002)	(0.008)	(0.002)	(0.009)
G. Is a single parent	-0.001	0.021	-0.001	0.032	-0.001	0.000						
	(0.004)	(0.025)	(0.007)	(0.031)	(0.001)	(0.015)						
H. Is a never-married single parent	-0.003	-0.002	-0.005	-0.005	-0.002 **	-0.008						
	(0.002)	(0.018)	(0.004)	(0.026)	(0.001)	(0.008)						

Notes: The sample is as described in Table 1 notes. Each lettered row of each column is from a separate OLS regression that is weighted by IPUMS weights and contains dummies for country of birth, age at arrival, age, race, Hispanic origin and sex. The "2SLS" columns are estimated using 2SLS with max(0, age at arrival - 9)×non-English-speaking country as the identifying instrument. Standard errors adjusted for country of birth clusters are shown in parentheses. Asterisks denote significance levels (*=.10, **=.05, ***=.01).

Table 6. 2SLS Effect of English Using Alternative Samples and Specifications

	Base results (1)	Control for origin GDP (2)	Control for origin fertility (3)	Control for origin #immigrants (4)	Drop Canada (5)	Caribbean only (6)	Drop Mexico (7)
Panel A: Marital Status							
A. Is currently married with spouse present	-0.108 ***	-0.082 **	-0.097 **	-0.185 ***	-0.109 **	0.025	-0.160 **
	(0.040)	(0.032)	(0.048)	(0.071)	(0.048)	(0.049)	(0.073)
B. Is currently divorced	0.052 ***	0.051 ***	0.054 ***	0.076 **	0.049 **	0.032	0.071 **
	(0.016)	(0.013)	(0.020)	(0.030)	(0.020)	(0.025)	(0.030)
C. Has ever married	-0.072 **	-0.043 **	-0.057 *	-0.135 ***	-0.072 **	0.023	-0.116 **
	(0.028)	(0.022)	(0.032)	(0.051)	(0.033)	(0.054)	(0.050)
Panel B: Spouse's Ethnicity and Nativity							
A. Spouse English-speaking ability ordinal measure	0.814 ***	0.757 ***	0.824 ***	1.013 ***	0.802 ***	0.730 ***	1.031 ***
	(0.072)	(0.054)	(0.074)	(0.092)	(0.071)	(0.085)	(0.093)
B. Spouse is US-born	0.322 **	0.261 ***	0.368 **	0.558 ***	0.224 **	-0.104	0.593 ***
	(0.129)	(0.082)	(0.166)	(0.182)	(0.102)	(0.089)	(0.216)
C. Spouse has the same country of birth	-0.351 ***	-0.285 ***	-0.389 **	-0.542 **	-0.278 **	0.099	-0.591 ***
	(0.126)	(0.077)	(0.167)	(0.198)	(0.129)	(0.134)	(0.216)
D. Spouse has the same ancestry	-0.181	-0.091	-0.212	-0.423 **	-0.144	0.084	-0.509 **
	(0.129)	(0.072)	(0.156)	(0.189)	(0.139)	(0.209)	(0.197)
Panel C: Spouse's Age and Education							
A. Spouse age	-0.901 **	-0.913 **	-1.100 **	-1.533 **	-0.978 *	-2.613 **	-1.493 **
	(0.383)	(0.376)	(0.459)	(0.757)	(0.497)	(1.123)	(0.729)
B. Spouse years of schooling	2.378 ***	2.320 ***	2.471 ***	2.796 ***	2.301 ***	1.167 *	2.794 ***
	(0.298)	(0.261)	(0.444)	(0.593)	(0.385)	(0.623)	(0.594)
C. Spouse has high school diploma	0.314 ***	0.314 ***	0.335 ***	0.364 ***	0.303 ***	0.266 ***	0.356 ***
	(0.027)	(0.028)	(0.044)	(0.055)	(0.031)	(0.068)	(0.055)
D. Spouse has any college or more	0.228 ***	0.203 ***	0.241 ***	0.313 ***	0.189 ***	0.115	0.319 ***
	(0.054)	(0.037)	(0.073)	(0.089)	(0.051)	(0.086)	(0.095)
E. Spouse has Bachelor's degree or more	0.069	0.036	0.092	0.157 *	0.074	-0.029	0.178 **
	(0.049)	(0.035)	(0.064)	(0.089)	(0.060)	(0.083)	(0.085)
F. Own years of schooling	3.561 ***	3.730 ***	3.684 ***	3.582 ***	3.548 ***	1.582 ***	3.506 ***
	(0.285)	(0.299)	(0.440)	(0.640)	(0.384)	(0.516)	(0.683)
G. Spouse has more schooling than self	-0.158 ***	-0.165 ***	-0.172 ***	-0.198 ***	-0.135 ***	-0.112	-0.199 ***
	(0.033)	(0.033)	(0.042)	(0.054)	(0.034)	(0.077)	(0.067)
Panel D: Spouse's Labor Market Outcomes							
A. Spouse log(wages last year)	0.302 ***	0.279 ***	0.349 ***	0.385 **	0.236 ***	0.133	0.395 **
	(0.086)	(0.066)	(0.123)	(0.163)	(0.089)	(0.238)	(0.175)
B. Own log(wages last year)	0.451 ***	0.419 ***	0.472 ***	0.565 **	0.451 ***	0.357	0.623 ***
	(0.116)	(0.093)	(0.154)	(0.231)	(0.156)	(0.236)	(0.228)
C. Spouse worked last year	0.079 ***	0.070 ***	0.063 **	0.084 *	0.063 **	0.093 ***	0.091 **
	(0.023)	(0.020)	(0.030)	(0.047)	(0.028)	(0.027)	(0.046)
D. Own worked last year	0.062 ***	0.065 ***	0.062 ***	0.049	0.051 **	0.031	0.062
	(0.017)	(0.016)	(0.023)	(0.036)	(0.020)	(0.061)	(0.037)
E. Both worked last year	0.122 ***	0.116 ***	0.105 ***	0.104	0.102 ***	0.066	0.115 *
	(0.029)	(0.025)	(0.038)	(0.064)	(0.034)	(0.057)	(0.060)

Notes: The table continues on the next page.

Table 6. 2SLS Effect of English Using Alternative Samples and Specifications (Continued)

	Base results (1)	Control for origin GDP (2)	Control for origin fertility (3)	Control for origin #immigrants (4)	Drop Canada (5)	Caribbean only (6)	Drop Mexico (7)
			Panel E: Fertility				
A. Number of children living in same household	-0.441 ***	-0.399 ***	-0.349 ***	-0.553 ***	-0.414 ***	0.029	-0.476 ***
	(0.075)	(0.065)	(0.089)	(0.150)	(0.087)	(0.120)	(0.160)
B Has a child living in same household	-0.073 *	-0.041 *	-0.058	-0.126 *	-0.058	0.077	-0.113 *
	(0.038)	(0.023)	(0.046)	(0.071)	(0.043)	(0.058)	(0.066)
C. Has at least 2 children in same household	-0.145 ***	-0.127 ***	-0.133 ***	-0.225 ***	-0.126 ***	-0.017	-0.199 ***
	(0.035)	(0.026)	(0.042)	(0.055)	(0.033)	(0.047)	(0.064)
E. Has at least 3 children in same household	-0.113 ***	-0.118 ***	-0.090 ***	-0.106 ***	-0.112 ***	-0.011	-0.088 ***
	(0.017)	(0.017)	(0.024)	(0.033)	(0.020)	(0.029)	(0.031)
F. Has at least 4 children in same household	-0.059 ***	-0.062 ***	-0.038 **	-0.047 *	-0.063 ***	0.003	-0.036 *
	(0.013)	(0.012)	(0.018)	(0.025)	(0.014)	(0.019)	(0.021)
G. Has at least 5 children in same household	-0.029 ***	-0.029 ***	-0.016 **	-0.021	-0.028 ***	0.000	-0.017
	(0.006)	(0.006)	(0.008)	(0.014)	(0.007)	(0.011)	(0.012)
H. Is a single parent	0.021	0.034 *	0.025	0.027	0.033	0.007	0.010
	(0.025)	(0.020)	(0.031)	(0.049)	(0.026)	(0.038)	(0.045)
I. Is a never-married single parent	-0.002	0.008	0.001	0.002	0.005	0.015	-0.009
	(0.018)	(0.015)	(0.021)	(0.034)	(0.020)	(0.033)	(0.031)

Notes: The data and specification are the same as in Table 3, Column 2 for Panel A, Table 4, Column 2 for Panels B-D, and Table 6, Column 2 for Panel E with the following modifications: (1) Column 2 contains an additional control variable, max(0, age at arrival - 9)×log 1980 GDP of country of birth; (2) Column 3 contains an additional control variable, max(0, age at arrival - 9)×total fertility rate of country of birth in 1982; (3) Column 4 contains an additional control variable, max(0, age at arrival - 9)×log number of immigrants aged 20-60 from country of birth in the US; (4) Column 5 excludes people born in Canada; (5) Column 6 only includes people born in the Caribbean (IPUMS general country code 260 plus Cuba, Puerto Rico and the U.S. Virgin Islands); and (6) Column 7 excludes people born in Mexico. Each lettered row of each column is from a separate 2SLS regression that uses max(0, age at arrival - 9)×non-English-speaking country as the identifying instrument, is weighted by IPUMS weights and contains dummies for country of birth, age at arrival, age, race, Hispanic origin and sex. Standard errors adjusted for country of birth clusters are shown in parentheses. Asterisks denote significance levels (*=.10, **=.05, ***=.01).

Table 7. Estimates Controlling for Education, 2000 Census

	Base Specification	Add Control for Years of Schooling	
	Coeff for English (1)	Coeff for English (2)	Coeff for Schooling (3)
Panel A: Marital Status			
A. Is currently married with spouse present	-0.108 ***	-0.148 ***	0.014 ***
	(0.040)	(0.050)	(0.003)
B. Is currently divorced	0.052 ***	0.073 ***	-0.007 ***
	(0.016)	(0.022)	(0.002)
C. Has ever married	-0.072 **	-0.075 **	0.002
	(0.028)	(0.033)	(0.002)
Panel B: Spouse's Ethnicity and Nativity			
A. Spouse English-speaking ability ordinal measure	0.814 ***	0.813 ***	0.000
	(0.072)	(0.080)	(0.003)
B. Spouse is US-born	0.322 **	0.336 **	-0.004
	(0.129)	(0.157)	(0.008)
C. Spouse has the same country of birth	-0.351 ***	-0.352 **	0.001
	(0.126)	(0.154)	(0.008)
D. Spouse has the same ancestry	-0.181	-0.164	-0.005
	(0.129)	(0.154)	(0.008)
Panel C: Spouse's Age and Education			
A. Spouse age	-0.901 **	-0.719	-0.038
	(0.383)	(0.470)	(0.025)
B. Spouse years of schooling	2.378 ***	0.584 **	0.496 ***
	(0.298)	(0.235)	(0.019)
C. Spouse has high school diploma	0.314 ***	0.218 ***	0.027 ***
	(0.027)	(0.032)	(0.003)
D. Spouse has any college or more	0.228 ***	0.029	0.056 ***
	(0.054)	(0.050)	(0.006)
E. Spouse has Bachelor's degree or more	0.069	-0.151 ***	0.062 ***
	(0.049)	(0.038)	(0.013)
F. Spouse has more schooling than self	-0.158 ***	0.041	-0.056 ***
	(0.033)	(0.034)	(0.004)
Panel D: Spouse's Labor Market Outcomes			
A. Spouse log(wages last year)	0.302 ***	0.136	0.048 ***
	(0.086)	(0.101)	(0.006)
B. Own log(wages last year)	0.451 ***	0.143	0.085 ***
	(0.116)	(0.113)	(0.013)
C. Spouse worked last year	0.079 ***	0.068 **	0.004 **
	(0.023)	(0.029)	(0.002)
D. Own worked last year	0.062 ***	0.008	0.015 ***
	(0.017)	(0.024)	(0.002)
E. Both worked last year	0.122 ***	0.073 **	0.015 ***
	(0.029)	(0.036)	(0.003)
Panel E: Fertility			
A. Number of children living in same household	-0.441 ***	-0.381 ***	-0.018 **
	(0.075)	(0.092)	(0.007)
B. Has a child living in same household	-0.073 *	-0.059	-0.004
	(0.038)	(0.045)	(0.003)
C. Has at least 2 children in same household	-0.145 ***	-0.140 ***	-0.001
	(0.035)	(0.042)	(0.002)
E. Has at least 3 children in same household	-0.113 ***	-0.097 ***	-0.005 ***
	(0.017)	(0.018)	(0.001)
F. Has at least 4 children in same household	-0.059 ***	-0.044 ***	-0.004 ***
	(0.013)	(0.013)	(0.001)
G. Has at least 5 children in same household	-0.029 ***	-0.023 ***	-0.002 ***
	(0.006)	(0.006)	(0.000)
H. Is a single parent	0.021	0.048	-0.009 ***
	(0.025)	(0.031)	(0.002)
I. Is a never-married single parent	-0.002	0.005	-0.003 **
	(0.018)	(0.022)	(0.001)

Notes: The sample is as described in Table 1 notes. For each outcome, two specifications were estimated using 2SLS (with max(0, age at arrival - 9)×non-English-speaking country as the identifying instrument) and weighing by IPUMS weights. The base specification has as regressors English-speaking ability and dummies for country of birth, age at arrival, age, race, Hispanic origin and sex; Column 1 reports the coefficient for English from this specification. The other specification adds years of schooling as a regressor; Column 2 and 3 reports the coefficients for English and schooling, respectively, from this specification. Standard errors adjusted for country of birth clusters are shown in parentheses. Asterisks denote significance levels (*=.10, **=.05, ***=.01).

Appendix Table 1. Individuals by Country of Birth

Panel A. English-speaking countries (=Control Group)

Rank by N	country	N	% of group
1	Canada	8,962	34.6%
2	England	6,121	23.6%
3	Jamaica	3,180	12.3%
4	United Kingdom, ns	1,242	4.8%
5	Trinidad & Tobago	1,014	3.9%
6	Guyana/British Guiana	991	3.8%
7	Scotland	803	3.1%
8	Ireland	565	2.2%
9	Australia	543	2.1%
10	South Africa (Union of)	308	1.2%
11	Barbados	297	1.1%
12	Bermuda	283	1.1%
13	Bahamas	258	1.0%
14	U.S. Virgin Islands	256	1.0%
15	Belize/British Honduras	251	1.0%
16	New Zealand	131	0.5%
17	Antigua-Barbuda	112	0.4%
18	St. Vincent	90	0.3%
19	Liberia	84	0.3%
20	Grenada	82	0.3%
21	St. Kitts-Nevis	73	0.3%
22	Wales	71	0.3%
23	Northern Ireland	69	0.3%
24	Zimbabwe	63	0.2%
25	St. Lucia	59	0.2%
26	British Virgin Islands	1	0.0%
27	Anguilla	1	0.0%
	Total English-spking obs	*25,910*	100.0%

Panel B. Non-English-speaking countries (=Treatment Group)

Rank by N	country	N	% of group
1	Mexico	47611	28.7%
2	Germany	19445	11.7%
3	Puerto Rico	13203	8.0%
4	Cuba	9389	5.7%
5	Vietnam	6334	3.8%
6	Italy	5642	3.4%
7	Japan	5475	3.3%
8	Korea	3926	2.4%
9	El Salvador	3233	2.0%
10	Dominican Republic	3103	1.9%
11	France	2466	1.5%
12	Portugal	2390	1.4%
13	Colombia	2266	1.4%
14	Taiwan	1987	1.2%
15	China	1854	1.1%
16	Laos	1668	1.0%
17	Poland	1499	0.9%
18	Haiti	1468	0.9%
19	Guatemala	1452	0.9%
20	Greece	1427	0.9%
21	Panama	1415	0.9%
22	South Korea	1344	0.8%
23	Ecuador	1316	0.8%
24	Iran	1314	0.8%
25	Spain	1207	0.7%
26	Netherlands	1188	0.7%
27	Nicaragua	1186	0.7%
28	Cambodia (Kampuchea)	1081	0.7%
29	Israel/Palestine	983	0.6%
30	Peru	933	0.6%
31	Argentina	926	0.6%
32	Thailand	818	0.5%
33	Honduras	801	0.5%
34	Austria	781	0.5%
35	Brazil	751	0.5%
36	Africa, ns/nec	680	0.4%
37	Venezuela	644	0.4%
38	Lebanon	637	0.4%
39	Hungary	550	0.3%
40	Turkey	544	0.3%
41	Azores	492	0.3%
42	Yugoslavia	487	0.3%
43	Costa Rica	466	0.3%
44	Chile	465	0.3%
45	Egypt/United Arab Rep.	454	0.3%
46	Iraq	443	0.3%
47	Other USSR/Russia	416	0.3%
48	Belgium	392	0.2%
49	Romania	358	0.2%
50	Indonesia	358	0.2%
	subtotal, top 50 countries	159,268	96.1%
	subtotal, other (91) countries	6,397	3.9%
	Total non-Eng-spking obs	*165,665*	100.0%

Notes: Information on each country's official languages is from the World Almanac. Recent adult immigrants from the 1980 IPUMS were used to divide English-official countries into English-speaking (at least 50% of recent adult immigrants did not speak a language other than English at home) or Other. The countries in the "Other" category are the Philippines, India, Hong Kong, Guam, Pakistan, Nigeria, American Samoa, Fiji, Tonga, Ghana, Kenya, Singapore, Dominica, Tanzania, Uganda, Sierra Leone, Senegal, Malta, Zambia, Micronesia, Marshall Islands, Papua New Guinea, Kiribati, Palau, Gambia, Malawi, Mauritius and Swaziland; people from these countries have been dropped from the empirical analysis.
Above tabulations by country of birth use following sample: individuals from the 2000 1% and 5% PUMS files who are currently aged 25-55, immigrated to the U.S. before age 15 and has nonmissing age, year of immigration, country of birth and English variables. Country refers to IPUMS detailed birthplace code.