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Ethnic intermarriage in longitudinal perspective: Testing structural and cultural explanations in the United States, 1880–2011



Christoph Spörlein^{a,*}, Elmar Schlueter^b, Frank van Tubergen^c

^a University of Cologne, Cologne Graduate School in Management, Economics and Social Sciences, Richard-Strauß-Straße 2, Cologne 50931, Germany

^b Institut für Soziologie, Justus Liebig University Giessen, Karl-Glückner-Str. 21E, 35394 Giessen, Germany

^c Department of Sociology/ICS, Utrecht University, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands

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ABSTRACT

Focusing on macro-level processes, this article combines Decennial Census and Current Population Survey data to simultaneously test longitudinal and cross-sectional effects on ethnic intermarriage using structural and cultural explanations. Covering a 130 year period, the results of our multilevel analysis for 140 national-origin groups indicate that structural characteristics explain why some origin groups become more “open” over time while others remain relatively “closed”. Ethnic intermarriage is more likely to increase over time when the relative size of an immigrant group decreases, sex ratios grow more imbalanced, the origin group grows more diverse, the size of the third generation increases and social structural consolidation decreases. Cultural explanations also play a role suggesting that an origin group’s exogamous behavior in the past exerts long-term effects and exogamous practices increase over time when the prevalence of early marriage customs declines. For some of the discussed determinants of intermarriage, longitudinal and cross-sectional effects differ calling for a more careful theorizing and testing in terms of the level of analysis (e.g., longitudinal vs. cross-sectional).

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1. Introduction

Intermarriage has frequently been used to analyze the extent to which social or cultural barriers exist between different groups within a society (Kalmijn, 1998; Alba and Nee, 2003; Waters and Jiménez, 2005; Lichter et al., 2011). When members of one group frequently marry members of other groups, this group is said to be “open”. Earlier research indicates that these intergroup relations are subject to changes over time (Qian and Lichter, 2007; Gullickson, 2006; Fu, 2010). For instance, European origin groups have been found to be well integrated into today’s United States’ mainstream society with around 50–80% of first and second generation members marrying a spouse from the third generation and higher U.S.-born population (Kalmijn and van Tubergen, 2010). At the turn of the nineteenth century however, intermarriage rates of European origin groups with the U.S.-born population have been comparatively low. For example, only around 10–15% of German immigrants married into the native-born stock while similar figures today indicate that nearly 4 out of 5 Germans marry a native-born spouse. Migrants from other regions of the world generally show lower rates of intermarriage and have been much more likely to marry within their own group (Hwang et al., 1997; Bean and Stevens, 2003; Gullickson, 2006; Rosenfeld, 2008).

* Corresponding author.

E-mail address: spoerlein@wiso.uni-koeln.de (C. Spörlein).

When investigating temporal changes in ethnic intermarriage, prior research focused on describing trends or on quantifying changes in the association of race or ethnicity with the propensity to marry within or outside one's own group (Fryer, 2007; Qian and Lichter, 2007; Fu and Heaton, 2008; Gullickson, 2006; Fu, 2010). Race has been the central category in this field of research (Waters and Jiménez, 2005). Many studies are devoted to Black/White intermarriage (Kalmijn, 1993; Fu, 2007) or patterns of interracial marriage of Asian (Hwang et al., 1997; Okamoto, 2007; Chen and Takeuchi, 2011) and Latino origin groups (Furtado and Theodoropoulos, 2011; Lichter et al., 2011). While these studies certainly have their own merits they tell us little about what brings these changes in patterns of intermarriage about. And although structural and cultural explanations are frequently used to explain differences in intermarriage across immigrant groups (Kalmijn, 1998), very few studies employ them to investigate their explanatory potential with respect to changes over time (e.g., Qian and Lichter, 2011). In the following, cultural explanations relate to individuals' norms and preferences regarding intergroup contacts whereas structural explanations refer to factors that shape mating opportunities on local marriage markets (Blau and Schwartz, 1984; Kalmijn, 1998).

With this study, we aim to test structural and cultural explanations with respect to longitudinal developments in ethnic intermarriage among immigrants and their children. We contribute to the literature on intermarriage in three ways: first, we use cultural and structural explanations not only to explain origin group differences in ethnic intermarriage (i.e. cross-sectional differences) but also to explain changes in these differences over time (i.e. longitudinal differences). Clearly separating these two sources of origin group differences serves an important purpose because cross-sectional and longitudinal effects commonly differ from each other (Snijders and Bosker, 2011). In the literature, however, theoretical arguments are often not differentiated with longitudinal mechanisms and arguments used to derive cross-sectional hypotheses and vice versa (e.g., Blau and Schwartz, 1984). The approach pursued in this article allows us to disentangle longitudinal from cross-sectional theoretical mechanisms and to assess the various pathways in which structural and cultural conditions could affect immigrant intermarriage (Fairbrother and Martin, 2013).

Second, we improve upon earlier studies by using data that covers a longer time span and more groups. The dataset comprising of Decennial Censuses and Current Population Survey samples is particularly rich in both the number and breadth of origin groups it includes as well as in the time frame it covers. Using both census and survey data on immigrants in the United States, an extensive 130 year period from 1880 to 2011 is analyzed. The data include more than 140 national origin groups, some of which rank among the oldest origin groups with substantial ancestral representation among the U.S. population (British or Germans) while others began to be sizable ethnic categories only recently (some Asian origin groups). This dataset is especially useful in testing cultural and structural explanations, as it not only includes huge differences in the structural conditions such as the sizes of an immigrant groups as well as their demographic diversity, it also covers the development of these structural conditions and in its wake their potential effects on meeting and mating opportunities for the various immigrant groups. Moreover, the origin groups analyzed in this article exhibit a broad spectrum of cultural background properties such as religion, language, race and cultural practices. However the aim of this paper is not to give idiosyncratic accounts of the situations of the various origin groups in the United States, but rather provide insights into more general patterns underlying intergroup relations. When investigating the marriage choices of immigrants and their children, we will focus on simultaneously explaining why they marry outside as opposed to inside their own origin group and which determinants are associated with longitudinal changes in intergroup relations.

Third, we draw on recent developments in multilevel methods for repeated cross-sectional data in order to disentangle cross-sectional and longitudinal effects methodologically. From an analytical point of view, characteristics of the origin group such as linguistic or cultural distance may explain differences across groups and time. Likewise, characteristics of the context, that is, properties of the state of residence such as its composition in terms of origin groups, may account for group and temporal changes. Lastly, the combination of origin group and state of residence properties (i.e., the immigrant community) such as the state-specific availability of co-ethnics or the respective gender composition may account for group differences and temporal patterns. Hence, our empirical part utilizes a multilevel research design that enables us to simultaneously account for the nesting of immigrants in origin groups, U.S.-states and time, and to clearly separate the influence of cross-sectional and longitudinal components of structural and cultural determinants of intermarriage.

2. Theory

A number of explanations have been proposed as to why members of one immigrant group more often marry a co-ethnic partner than members of other immigrant groups. Kalmijn (1998) systematically categorized these explanations into three notions related to individual preferences as well as the role of third-parties and structural meeting opportunities. First, cultural explanations emphasize the preference of people to marry someone who is culturally similar in terms of religion, ethnicity or education (McPherson et al., 2001). In addition, third-parties like the family, religious institutions or the state may encourage and discourage exogamy (i.e., marrying someone from another group). These third parties may interfere in marital decisions and potentially override individual preferences. Second, structural explanations aim to explain differences in the propensity to marry exogamously by considering the structure of local marriage markets, and the resulting opportunities and restrictions they place on individuals' preferences. When individuals meet and interact with members of other groups in various settings on a daily basis, they have higher chances to form intimate relationships with them and thus are more likely to marry exogamously. Conversely, if eligible partners on the local marriage market are largely from the own group,

endogamy (i.e., marrying someone from the own group) seems more likely. Throughout this article, exogamy will refer to unions between immigrants (both first and second generation) and members of the U.S.-born population (i.e., third generation and higher).

However, cultural and structural conditions are far from stable. Cultural transformations like the progression of secularization for instance change and constrain the degree to which religious institutions may interfere in marital decisions. Likewise, continuous immigration and attempts by the state to regulate it potentially change the composition and structure of local marriage markets by altering the relative size distributions of the various origin groups. These changes in cultural and structural conditions over time are likely to bear influence on intergroup relations and are therefore important to recognize. Although we will analyze each cultural and structural determinant regarding its contribution to explain differences between groups and changes over time, this article's main focus is to explain changes in intermarriage over time. In the following, longitudinal effects refer to how changes in one determinant over time are expected to affect intermarriage while cross-sectional effects deal with explaining differences between groups. More specifically, the former tries to answer why, for example, Germans nowadays marry exogamously more frequently than they did in the past while the latter is concerned with the question why Germans in general marry exogamously more frequently than for instance Mexican or Vietnamese immigrants (Kalmijn and van Tubergen, 2010).

In their seminal work, Blau and Schwartz (1984) gave a comprehensive theoretical account on how structural conditions may shape intergroup relations. However, the theoretical arguments they use to derive hypotheses of how these structural conditions help explain differences across groups are mostly longitudinal in nature. For instance their first theorem posits that “as group size increases, the probable rate of outgroup relations decreases” (Blau and Schwartz, 1984: 31). Thus, they explicitly refer to a longitudinal process which is subsequently tested cross-sectionally. Evaluating longitudinal processes with cross-sectional data may however lead to inadequate or faulty conclusions (Curran and Bauer, 2011; Fairbrother and Martin, 2013). With a research design that allows us to disentangle cross-sectional from longitudinal effects for a large number of origin groups, we hope to provide a more systematic test of the determinants of intermarriage.

2.1. Structural explanations

In the following, we will discuss five structural characteristics: the size of an immigrant group, its gender distribution, the demographic heterogeneity of an immigrant group, the size of the third generation and the consolidation of social structural positions.

One of the most prominent structural factors in studies of intermarriage is the size of an immigrant group (Lieberson and Waters, 1988; Hwang et al., 1997; Lievens, 1998; Okamoto, 2007; Furtado and Theodoropoulos, 2011). According to Blau and Schwartz (1984), meeting members of one's own group and meeting members of other groups depends on the relative sizes of these groups. Individuals in large immigrant communities simply have more opportunities to meet members of the same origin country than individuals in small immigrant communities. Hence, albeit possibly strong preferences for endogamy, members of small immigrant groups tend to be more likely to resort to marrying exogamously because the structural conditions inhibit meeting members of one's own group and ultimately forming intimate relations with them. As the size of an immigrant community increases, more structural meeting opportunities for endogamy are created and members of that community will consequently be less likely to marry exogamously.

Another structural factor related to intermarriage is the gender distribution within an immigrant community (Hwang et al., 1997; Angrist, 2002; Okamoto, 2007; Kalmijn and van Tubergen, 2010). A shortage of group members of the opposite sex can lead individuals to search for marriageable partners outside the ethnic community. Skewed sex ratios in an immigrant community can therefore promote exogamy. At early stages of a group's immigration history sex ratios are usually highly skewed, indicating that initially either more men or women enter a country of destination (Castles and Miller, 2003). Historically, this has been the case for a number of European origin groups in the United States. At the beginning of the twentieth century for example, there were more than twice as many Italian first generation males than females, thus creating little structural opportunities to marry endogamously (Angrist, 2002). Thirty years later, by the 1940s, the Italian sex ratio was almost balanced. We therefore expect that as an immigrant community's sex ratio grows more balanced, its members will be more likely to marry endogamously.

The heterogeneity of an immigrant group is another integral part of Blau's structural perspective (Blau and Schwartz, 1984; Hwang et al., 1997; Lievens, 1998) where heterogeneity is defined as the probability that any two persons belong to different social structural groups. Although sharing a common country of origin, members of an immigrant group may be quite heterogeneous along other social structural categories. Since people tend to have a preference for interactions with similar others (McPherson et al., 2001), diverse immigrant groups provide individuals with less opportunities to meet potential partners similar to themselves than in homogeneous groups (Hwang et al., 1997; Lievens, 1998; Okamoto, 2007). We therefore expect that as groups become more heterogeneous over time, structural opportunities to meet similar others will decline. This decline in structural meeting opportunities will induce individuals of that origin group to search for a suitable spouse outside the pool of co-ethnics. Consequently, increases in in-group heterogeneity over time will increase the likelihood of immigrants marrying exogamously.

The stock of third-generation members of an origin group may also shape the structural opportunities that immigrants encounter in the United States (Kalmijn and van Tubergen, 2010). Due to differences in migration histories, some origin groups will have a higher stock of third-generation members than other groups. This is likely to increase the

opportunities to meet someone with similar ancestry for members of origin groups with a larger third-generation stock. For example, British immigrants at the end of the 19th century were encountering a large stock of third generation (or higher) co-ethnics facilitating intermarriage whereas the generational composition of the Italian origin group tended towards first generation immigrants. Presently, members from fairly recent immigrant groups such as the Chinese and the Vietnamese face similar structural opportunities than the Italians a century earlier (Bean and Stevens, 2003). Thus for these groups, structural opportunities for marrying into the native-born stock by means of marrying someone with shared ancestry are less favorable. We therefore expect that increases in the size of the third generation over time will increase the likelihood of exogamy.

We also investigate a rarely studied aspect of Blau and Schwartz's (1984) structural theory: the consolidation of social structural positions. Blau and Schwartz (1984) posit that societies are delineated by many lines of social structural differentiation (e.g., ethnic, religious and political affiliation, social class). Social structural positions are said to be consolidated in case the affiliation with one group largely determines the position in other social structural groups. Group boundaries are thus reinforced because in-group members in one dimension are most likely also in-group members in other dimensions. Hence, contacts bridging group boundaries are less frequent compared to groups with a low degree of consolidation. In societies that are highly segmented according to religion or ideology (e.g., "pillarized" societies like the Netherlands or Ireland), each segment usually has its own social institutions like political parties, schools or sports clubs. For individuals in these societies, being member of one segment often determines which parties they vote for, or which schools they or their children attend and thus create little structural opportunities to meet members of other segments. With respect to intermarriage, this line of reasoning implies that when social structural consolidation increases, opportunities to meet out-group members decline and consequently exogamy is less likely (Hwang et al., 1997; Lievens, 1998; Okamoto, 2007).

2.2. Cultural explanations

Next, we will discuss a number of cultural explanations, namely early marriage customs, state regulations banning intermarriage and the propensity of origin group members to marry exogamously in earlier periods.

One aspect in which third party influence materializes is seen in early marriage customs. It is generally assumed that parents prefer their children to marry endogamously for reasons of group identification and to maintain social boundaries (Alba and Nee, 2003). Exogamy would include interaction and possibly identification with members of the out-group and thus threaten a group's internal cohesion and homogeneity (Huijnk and Liefbroer, 2012). Parents therefore had a strong incentive to interfere in spousal selection by arranging marriages when their children are still young. Compared to Western societies, the age at first marriage is traditionally very low in numerous countries such as India, Bangladesh or Sudan where early marriage customs are widespread (Singh and Samara, 1996). It was therefore argued that early marriage customs in the country of origin are indicative of the traditional practice of parental interference in marital decisions (Kalmijn and van Tubergen, 2010). That is not to say that these parents will arrange marriages for their children in the United States but they will probably tend to interfere more in spousal selection than parents from other countries of origin where parental interference may be less prevalent. Hence, as parental interference weakens over time, immigrants will be more likely to marry exogamously.

Another third party that may influence individuals' tendency to marry across group boundaries is the state. States have a variety of policy instruments at their disposal that may regulate intergroup relations. After slavery was abolished, many states in the United States implemented laws that prohibited interracial marriage as a way of re-institutionalizing Black/White distinctions (Gullickson, 2006; Fryer, 2007; Sohoni, 2007). Since anti-miscegenation laws both reflect and produce social ideas about interracial relations, their implementation should give us a good representation of the normative climate towards intergroup marriage in general (Middleton, 1976; Pascoe, 1996). Only few states like Hawaii, New Jersey or Wisconsin never had such laws, while the last states (e.g., Florida, Kentucky, Texas) repealed anti-miscegenation laws by the end of the 1960s (Fryer, 2007). Thus, marrying across racial boundaries after the 1960s was at least legally unsanctioned. We therefore expect that immigrants will be more likely to marry exogamously after a state has abolished these laws.

Researchers frequently refer to the consequences of intermarriage when justifying the study of this kind of marital behavior. Kalmijn (1998) identified two key consequences of intermarriage for spousal selection of later generations. First, children of exogamous parents are less likely to identify themselves with a single group (Xie and Goyette, 1997; Kalmijn, 2010). Consequently, the salience of cultural distinctions gradually loses significance and cultural barriers between groups become more permeable over time. Second, intermarriage may also reduce prejudice and negative stereotypes towards other groups as it gives people the opportunity to realize the individuality of members of the other group (Brown, 2010). Moreover, the alterations of out-group perceptions invoked through intermarriage potentially affect a wide range of individuals. Exogamy entails blending of ethnically dissimilar networks, thus often not only connecting two individuals but also their extended kin group and social networks. Later generations of origin groups living in an environment where the cultural distinctions and barriers between groups are low as expressed by frequent intermarriage are themselves probably more inclined to marry exogamously than members from comparatively "closed" groups. Following this line of reasoning, we expect that as the frequency of intermarriage within an immigrant group has increased over time in the past, so too are its current members more likely to marry exogamously.

3. Data and methods

In order to investigate the hypotheses we draw on two microdata sources, namely Decennial Census data and pooled data from the March edition of the Current Population Survey (CPS). The period from 1880 to 1970 is covered by decennial census data (King et al., 2010).¹ Microdata for the period from 1994 to 2011 is taken from the Current Population Survey (King et al., 2010; Ruggles et al., 2010). The CPS is an annual representative survey of the total U.S. population.² The sample was restricted to married members of the first and second generation. In the case of first generation immigrants, respondents' country of origin was measured using data on country of birth. To identify the second generation, we relied on information on mothers' country of birth and only if this was not available, data on fathers' country of birth was used instead. We also included migrants with one native-born and one foreign-born parent (the so-called 2.5 generation). Overall, the dataset tracks the marital behavior of 140 national-origin groups over 11 time-points covering the period of 1880–2011.

Although the data are rich in the scope of origin groups and time it covers, there are two drawbacks: (1) information on date of marriage and date of immigration was not available for all time-points and (2) information on respondent's educational attainment was not recorded for data before 1940. While the first issue is likely to lead to an overestimation of the degree of endogamy since first generation immigrants married abroad are included in the analysis (Hwang and Seanz, 1990), the second issue limits the possibility of including an important determinant of exogamy on the individual level (Qian et al., 2001; Fu and Heaton, 2008; Rosenfeld, 2008). More educated people tend to be more likely to intermarry, hence differences between origin groups may partly be explained by compositional differences in terms of education. Although earlier research suggests that the composition of origin groups and communities in terms of individual-level characteristics is only of minor importance (Kalmijn and van Tubergen, 2010), we try to assess the impact of these problems by conducting sensitivity analyses.³ The results of these analyses indicate that both issues bear little influence on the estimated effects of macro characteristics (see Appendix Table A1: Models 3 and 4).

3.1. Methods

We rely on multilevel logistic regression models to analyze immigrants' marital behavior. Within each time-point, immigrants are nested in a cross-classification of origin country and state. This implies a non-hierarchical nesting structure where origin groups are potentially present in multiple states. In addition, respondents are nested in immigrant communities, that is, the specific combinations of origin and state. Examples of immigrant communities would be Mexicans in California, Mexicans in New York but also Italians in New York. In Fig. 1 for instance, each state panel contains three immigrant communities while the whole figure depicts three origin groups and two states.

In order to disentangle cross-sectional and longitudinal effects, we draw on multilevel modeling strategies for repeated cross-sectional data (Fairbrother, 2012). Accordingly, for each of the two theoretically relevant levels an additional time level is introduced.⁴ Hence, to integrate the development of community level predictors over time, we specify a community-time level which is analytically located between the individual and the community level. Community level predictors are subsequently group-mean centered (i.e., centering within clusters) with the group-mean serving as cross-sectional component while the de-meaned values represent the longitudinal component. On the higher community level therefore only cross-sectional effects are situated while the community-time level accommodates only longitudinal effects. Most importantly, the resulting cross-sectional and longitudinal components are uncorrelated, thus allowing us to estimate their effects separately in one combined model.

This approach of introducing a corresponding time level and subsequently group-mean centering predictors on this level is used for all macro levels. Ultimately, doing so yields a regression model in which individuals are nested within four levels, namely two cross-sectional levels (origin and community) whose characteristics aim to explain differences between its units, and two longitudinal levels (origin-year and community-year) whose characteristics aim to explain differences within its units. In total, there are 2,559,592 immigrants nested in 140 origin groups, 4790 communities (i.e., origin \times state), 619 origin-years and 19,448 community-years (origin \times state \times year). The models are fitted using maximum likelihood estimation available in the lme4 package for R (Bates et al., 2012).

3.2. Measures

In the following, the term immigrant encompasses members of both the first and second generation of an origin group, whereas "native-born" refers to individuals who are third generation or higher. The dependent variable measures whether

¹ No data was available for the 1890s and the 1980s.

² In order to have a sufficient number of respondents per origin group, state and immigrant community, we decided to pool the data. Data from 1994 to 2000 is pooled to represent the 1990s while remaining surveys (2001–2011) represent the 2000s.

³ Regarding the issue of couples married abroad, we estimated all models excluding these years for which we do not have information on respondent's date of marriage and year of immigration. We compare the results of these models with models that only include respondents that immigrated before the age of 16. In addition, models were estimated which only used members of the second generation. With respect to the issue of not controlling for respondents education, we follow a similar approach by estimating models excluding data before the year 1940 and then adding education to these models. In all three cases, the results for the macro characteristics are mostly stable (see Appendix Table A1: Models 3 and 4).

⁴ Conceptually, immigrants are also nested in states. However, preliminary analysis shows that only a small fraction of the variation in the dependent variable is attributable to the state level (~1.4%) and the state-year level (~1%). Hence, we decided to leave these two levels unmodeled (see Appendix Table A1: Models 5 and 6).

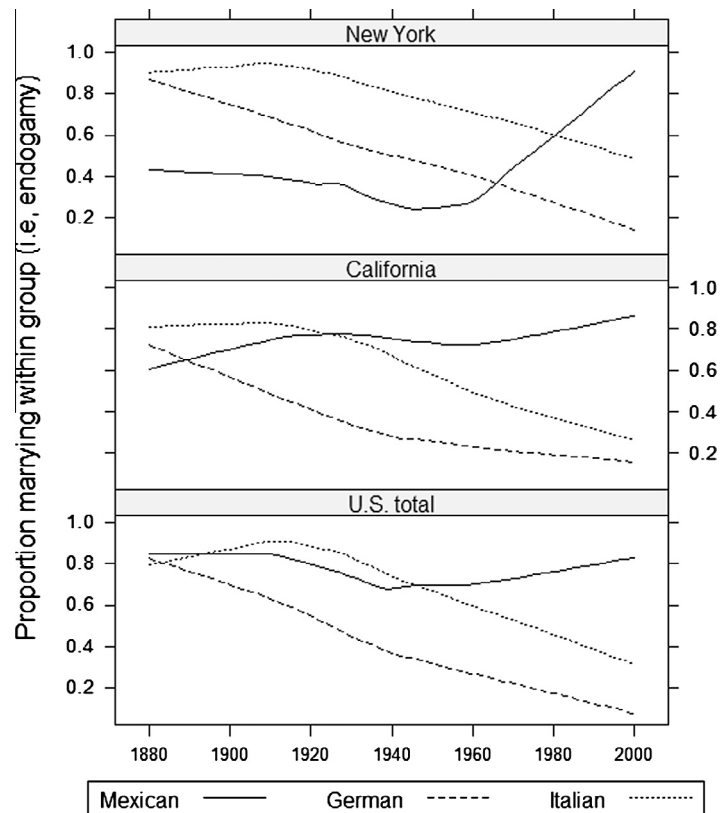


Fig. 1. Variation in endogamy rates across origin groups, states and communities (1880–2011), weighted and smoothed.

immigrants married a spouse from the own origin group (0) as opposed to having married a spouse either from the native-born population or from another immigrant group (1). This endogamy vs. exogamy dichotomy is used to reduce the number of dependent variables in the analysis. Earlier research often differentiated those who marry a native-born spouse or a partner from another origin group vs. endogamy. However, in preliminary analysis we found little difference in the effects and thus decided to combine the two forms of exogamy (see Appendix Table A1: Model 1 and 2). One could still criticize that racial homogamy is likely to affect the results with our definition of the dependent variable. This touches upon the issue that immigrants who marry exogamously might actually be marrying a native-born third or higher generation spouse from the same origin group or the spouse is in fact from another origin group but of the same racial descent (e.g., a Korean immigrant marrying a native-born spouse of Japanese descent). To investigate whether the issue of nonwhites marrying with other non-white minorities rather than whites bears influence on our results, we conducted additional analysis where the dependent variable is reformulated. Accordingly, exogamy for nonwhites is redefined as marrying a native-born white spouse or a different origin spouse with different racial descent. The results presented in Table 2 are consistent with the findings for our endogamy vs. exogamy definition based on national-origin groups, thus indicating that this issue probably has little impact on the results presented in the main part of this article.

In the following, we will discuss each of the contextual measures in turn. Note that some of the origin group measures are only used to explain cross-sectional differences because they are constant over time (i.e., migrating from an English-speaking and/or predominantly non-Christian origin country) (see Table 3).

Structural determinants:

Relative group size is measured as the percentage of a state's first and second generation population aged 16 years and older from one origin group.

Sex ratio is the percentage of a state's male population aged 16 years and older from one origin group. Since an origin group's percentage of males has different implications for male and female respondents, we added an interaction effect with gender.

Origin group heterogeneity was measured using Lieberman's (1969) index of diversity based on a group's composition regarding sex, number of children (no children, one to three children, more than three children), age (0–20, 21–35, 36–55, >55), marital status (married, divorced, widowed, single), industry (agriculture, mining, construction, manufacturing, transportation, wholesale and retail, finance, services, public administration), race (White, Black, Asian, other) and

occupational status⁵ (unskilled, low-skilled, medium-skilled, high-skilled). This index denotes the probability of obtaining unlike characteristics when two individuals are randomly paired. Hence, the higher an origin group scores on this index, the more heterogeneous it is.

The *size of the third generation* is approximated with data on the fraction of second generation respondents 30 years before each time-point.⁶ The fraction of second generation respondents is subsequently weighted for the number of children present in the household who will presumably form the third generation that respondents encounter on the marriage market in later years (Kalmijn and van Tubergen, 2010).

Consolidation is defined as the degree to which membership in one social structural category determines membership in other social structural categories. We estimated state-year regressions of occupational status on origin country, religion, race, age and sex and used the explained variance as proxy variable for consolidation. Higher values of explained variance indicate that ascribed characteristics largely determine occupational attainment and social structural consolidation can be interpreted as being higher.

Cultural determinants:

Early marriage customs are measured as the fraction of an origin group's female respondents who married between the ages of 10 and 14 (Kalmijn and van Tubergen, 2010). To calculate this, we pooled data from time points that contained information on respondents' age of first marriage⁷ and constructed 10 birth cohorts for each origin group. The resulting aggregate data was then used for the origin group cohorts and the respective time-points (e.g., the 1862–1871 cohort is used for the census from 1900 while the 1942–1951 cohort represents the 1990s).

Data on *anti-miscegenation laws* was gathered from Fryer (2007). States scored 1 as soon as they abolished anti-miscegenation legislation and 0 if it was still implemented.

The *rate of exogamy at t_{i-1}* measures the fraction of an origin group's exogamous marriages from the total number of marriages. This variable is measured with a 10 year lag.

Controls:

We include two controls at the origin level, namely whether the origin group is from an *English-speaking origin country* and whether it is from a *non-Christian origin country*. Data on an origin countries official language was obtained from Mayer and Zignago (2006). English-speaking origin is supposed to capture that interaction between individuals is facilitated by a common mother tongue presumably resulting in higher intermarriage between those groups and the U.S. majority population. Data on origin countries' dominant religions was gathered from Brierley (1997) with origin groups scoring 1 if the majority of the origin population adheres to a non-Christian religion. Theoretically, these two controls also represent cultural determinants. However, we decided to denote them as controls since the predominant language and religion of the origin of countries are time-invariant characteristics and thus only explain differences between groups, whereas the main focus of this article is placed on explaining longitudinal differences.

To control for the possibility that differences in the marital behavior across origin groups, communities and time are due to compositional differences of these units, we include a number of individual level control variables: age (in years), a dummy variable to indicate whether the respondent is nonwhite (vs. white), generational status (with first generation as reference category) and gender. Note that estimating separate models for males and females shows only minor differences in the effects, hence justifying the decision to pool males and females. Moreover, a linear time effect is added with respondents in the 1880s scoring 0 and respondents in the 2000s scoring 12.⁸

Table 1 presents the descriptive statistics for all dependent and independent variables.⁹

4. Results

4.1. Descriptive results

Some descriptive findings are presented in Fig. 1, however the reader should keep in mind that the degree of endogamy is likely to be overstated due to the data limitations discussed in the data section. Therefore, the main goal of Fig. 1 is to further illustrate the analytical approach. The figure plots curves, smoothed by loess regressions, portraying the proportion of endogamous marriages for three selected origin groups. We focused on German, Italian and Mexican immigrants since they represent origin groups with a sizable number of respondents over most of the 120 year time frame. Moreover, the figure also shows endogamy rates for two U.S. states as well as the overall situation in the United States in the bottom panel. From

⁵ Whenever there is reference to respondent's occupational status we used occupational titles based on the 1950 Census Bureau occupational classification system which were provided to enhance comparability between the Decennial Census data and the CPS data (King et al., 2010; Ruggles et al., 2010). These titles are subsequently transferred to International Socio-Economic Index of Occupational Status (ISEI) scores to arrive at a commonly used measure for occupational status (Ganzeboom et al., 1992)

⁶ We would like to thank Mathijs Kalmijn for providing us with the data.

⁷ This information was available in censuses from 1930 to 1980.

⁸ Propensity of exogamy increasing at a linear rate may arguably be a strong assumption. However, adding time dummies shows an almost linear increase. Moreover, likelihood ratio tests indicate that using the dummy specification over the linear one does not provide a significant fit improvement ($\chi^2(9) = .01$, $p = .99$). Hence, we use the more parsimonious linear time effect specification.

⁹ We used multiple imputation techniques to deal with missing information for three variables on the origin level (Enders, 2010). 20 imputed datasets were generated using multilevel imputation (van Buuren and Groothuis-Oudshoorn, 2011).

Table 1
Descriptive statistics for dependent and independent variables ($N = 2,559,595$).

	Range	Mean	SD	% Imputed	Level
Dependent variable					
Exogamy vs. endogamy	0–1	.56			Individual
Structural variables					
Relative group size	.00–.47	.08	.08		Community
Sex ratio	.44–1.00	.51	.03		Community
Group heterogeneity	.00–.60	.51	.03		Origin group
Consolidation	.02–.35	.07	.04		State
Cultural variables					
Early marriage customs	.00–.50	.02	.03	6.44	Origin group
Anti-miscegenation laws	0–1	.81			State
Exogamy rate at t_{i-1}	.00–1.00	.42	.22	17.33	Origin group
Controls					
Size of third generation	.00–1.00	.39	.22	12.87	Origin group
English origin group	0–1	.34			Origin group
Non-Christian origin group	0–1	.03			Origin group
Nonwhite	0–1	.11			Individual
Age	15–110	43.98	14.07		Individual
Female	0–1	.49			Individual
Generational status					
First generation	0–1	.56			Individual
Second generation	0–1	.29			Individual
2.5 Generation	0–1	.15			Individual

an analytical perspective, Fig. 1 provides insights into three macro sources of variation in immigrants' propensity to marry endogamously: origin group differences, immigrant community differences and states differences.

The bottom panel of Fig. 1 puts the focus on origin group differences and their development over time. Accordingly, at the end of the nineteenth century all three origin groups were fairly closed, with roughly 80% marrying endogamously. Over time, German endogamy rates steadily declined, with not even 10% marrying endogamously 120 years later. This pattern is mirrored by the situation of Italians, albeit with the decline in endogamy starting roughly 40–50 years later. Endogamy patterns of Mexican immigrants are in stark contrast to those of the two preceding European origin groups. Over the whole study period Mexican endogamy rates remain on a fairly stable level with a slightly u-shaped trend showing a low of approximately 70% marrying a Mexican spouse in the 1940s.

Studying the two top panels provides insights into community differences and their development over time. Communities are the specific combinations (e.g., Mexicans in New York) between an origin group (Mexicans) and a state of residence (New York). Each panel contains three immigrant communities such as New York's Mexican, Italian and German communities portrayed in the uppermost panel. Community differences are visible when we compare, for instance, the Mexican community in California with the Italian community in New York. While the former shows an increase of endogamy by roughly 15 percentage points from 1880 to 2000, endogamy rates of Italians in New York indicate a steady decline by more than 70 percentage points after 1910. Thus, as opposed to the increased prevalence of intergroup relations in New York's Italian community, the Mexican community in California became more closed over time.

Lastly, differences in endogamy rates might be present between U.S. states. To investigate this idea, we would have to compare the state-specific endogamy rates (not depicted in Fig. 1). Doing so shows only minor differences. The two states show a slight u-shaped trend with around 60–70% of immigrants marrying endogamously in 1880 which is reduced to between 40% and 50% in 2000. Preliminary analyses investigating the partition of variance of the dependent variable with respect to the different sources of variation (i.e., origin group, community and state) also support this observation with only little variation between states (see footnote 4).

Table 2 presents additional descriptive figures showing the five groups with the highest and lowest rate of endogamy for 1900 and 2000 data. Two findings are striking in this table. Accordingly, certain origin groups portray little change over time with respect to the ranking. In both 1900 and 2000, Mexicans rank among the most closed groups, whereas immigrants from France and the UK are among the groups with the lowest endogamy rates. However, the level of group closure required to rank among the lowest or highest groups has changed substantially over time. Groups with two in five members married endogamously in 1900 (i.e., migrants from Canada or Denmark) still ranked among the most open groups, while 100 years later not even ten percent could marry endogamously for a group to rank among the five lowest levels of endogamy. This trend is also mirrored by the high-endogamy groups, however, the trend towards less group closure was substantially less pronounced. Which characteristics of immigrant's origin (e.g., early marriage customs), community (e.g., relative group size) or state of residence (e.g., anti-miscegenation legislation) can explain the patterns identified in the descriptive analysis is the subject of the subsequent sections.

Table 2
Top 5 origin groups with the highest and lowest endogamy rate (weighted).

Year	High levels of endogamy		Low levels of endogamy	
	Origin country	Endogamy rate	Origin country	Endogamy rate
1900	Poland	.866	France	.165
	Russia	.819	Switzerland	.215
	Italy	.802	United Kingdom	.266
	Mexico	.786	Canada	.378
	Finland	.757	Denmark	.424
2000	Pakistan	.667	Sweden	.028
	Mexico	.644	France	.037
	Laos	.632	Switzerland	.045
	India	.630	United Kingdom	.057
	Vietnam	.581	Germany	.060

Note: Only origin groups with more than 2000 (weighted) members considered. In order to reduce the extent to which endogamy may be overestimated due to including couples married abroad, the calculations exclude first generation immigrants that entered the U.S. after the age of 16. Since no data was available on years since immigration for the 1880 census, we used data for the 1900 census instead.

4.2. Variance partition

The results of the null model presented in the first column of Table 2 provide insights into the relative partition of the variance in intermarriage. We calculated the intraclass correlation based on the variance components of the null model. Note that the variance component of the individual level is fixed to $\pi^2/3$ in logistic multilevel regression models (Snijders and Bosker, 2011). Overall, the bulk of variation (roughly 54%) is attributable to interpersonal differences. Most of the variation on the macro levels, around 17%, is attributable solely to differences between origin groups ($1.035/[\pi^2/3 + 1.035 + .806 + .633 + .294]$). Considering Fig. 1 as a whole, this supports the observations already made in the descriptive analysis: the differences between Germans, Italians and Mexicans are more marked than the differences across immigrant communities (roughly 10% of the total variance) or the differences between the development of single communities over time (around 5% of the total variation). An additional 13% of the total variation is solely attributable to how the development of endogamy patterns differs within origin groups. This is signified for instance by the divergent pattern of Italian and Mexican immigrants in the bottom panel of Fig. 1. In summary, the differences in immigrants' propensity to marry outside their own group vary more strongly by where people come from (origin group differences) than by where they come from and what they experience locally (community differences). This finding seems reasonable also from an analytical perspective as part of the variation between communities is already absorbed by the variation between origin groups. Remember that immigrant communities are effectively a cross-classification of origin group and state of residence.

4.3. Multivariate results

The results of the full logistic multilevel model used to investigate longitudinal and cross-sectional effects are presented in Table 2. Continuous macro-level variables have been standardized after group-mean centering in order to facilitate comparison of the effects' magnitudes and to provide readers with an indication of their relevance. Note that the focus of this article is on the longitudinal components; cross-sectional components are solely reported for completeness.

We start by discussing the results for the structural determinants. The relative size of an immigrant community has a comparatively substantial effect with respect to longitudinal differences. The results suggest that as the size of an immigrant community increases by one standard deviation, the odds of marrying exogamously decrease by 24% ($e^{-.273} - 1$ (Wooldridge, 2008)). Thus, our findings provide clear evidence that living in co-ethnic communities that increase in size hinder interethnic marriages over time.

Our results provide further support for the structural explanations when we consider an immigrant communities' gender composition. Growing imbalance of a community's gender composition leads to an increase in the odds of exogamy by 14% over time for males. The corresponding figure for females points to an increase by 29%. These findings provide support for the idea that a shortage of marriageable partners is likely to induce individuals to search outside their community for suitable partners. We further anticipated that as an origin group grows more heterogeneous, immigrants would be more likely to marry exogamously since structural opportunities to meet similar others are smaller. The findings in Table 2 support this idea. We find that increasing the heterogeneity of an origin group by one standard deviation leads to a 20% increase of the odds of exogamy for members of that origin group. The results regarding group heterogeneity are robust to changes in its operationalization. Using alternative measures of group heterogeneity such as the coefficient of variation (longitudinal component: $b = .152$, $s.e. = .041$, $p < .001$, cross-sectional component: $b = -.057$, $s.e. = .058$, $p = .329$) or the degree of an origin group's occupational diversity (long. comp.: $b = .119$, $s.e. = .029$, $p < .001$, cross-sec. comp.: $b = -.054$, $s.e. = .087$, $p = .534$) likewise suggest that group heterogeneity matters in explaining longitudinal differences but not cross-sectional differences. The findings further indicate that increases in the size of the third generation promote exogamy. An increase in the size of the

Table 3
Multilevel logistic regression of immigrants' marital choices in the United States, 1880–2011.

	Married exogamously vs. married endogamously						Hypothesized effect
	Null model	s.e.	Full Model	s.e.	Alternative definition of exogamy	s.e.	
Constant	-.635**	.161	-.720**	.081	-.594**	.154	
Structural explanations							
Relative group size (cross-sectional)			-.565**	.031	-.608**	.048	-
Relative group size (longitudinal)			-.242**	.014	-.241**	.023	-
Sex ratio (cross-sectional)			.175**	.004	.057**	.004	+
Sex ratio (longitudinal)			.134**	.003	.080**	.004	+
Sex ratio (cross-sectional) × gender			-.343**	.008	-.128**	.006	-
Sex ratio (longitudinal) × gender			-.219**	.006	-.106**	.007	-
Group heterogeneity (cross-sectional)			.013	.027	.032	.031	+
Group heterogeneity (longitudinal)			.179**	.018	.163**	.025	+
Consolidation (cross-sectional)			.029	.023	.022	.018	-
Consolidation (longitudinal)			-.018**	.007	-.092**	.011	-
Size of third generation (cross-sectional)			.120**	.023	.366**	.045	+
Size of third generation (longitudinal)			.121**	.026	.068*	.037	+
Cultural explanations							
Early marriage customs (cross-sectional)			-.015	.024	-.011	.040	-
Early marriage customs (longitudinal)			-.072**	.011	-.123**	.040	-
Anti-miscegenation laws (cross-sectional)			.027**	.010	.029*	.015	+
Anti-miscegenation laws (longitudinal)			.005	.008	.010	.012	+
Exogamy rate at t_{i-1} (cross-sectional)			.479**	.030	.232**	.058	+
Exogamy rate at t_{i-1} (longitudinal)			.242**	.020	.195**	.028	+
Micro-level controls							
Time	.117**	.012	.073**	.009	.154**	.011	
Nonwhite			-.157**	.016			
Age			-.020**	.001	-.017**	.001	
Female			-.259**	.004	-.025**	.009	
Second generation			1.325**	.004	.786**	.012	
2.5. generation			2.135**	.005	1.127**	.013	
Macro-level controls							
English-speaking origin group (cross-sectional)			.412**	.165	.451**	.176	
Non-Christian origin (cross-sectional)			-.370**	.081	-.501**	.164	
Variance components							
Origin	1.035		.509		.428		
Origin-Time	.806		.308		.275		
Community	.633		.231		.296		
Community-Time	.294		.186		.309		
Deviance	2,867,848		2,557,409		417,288		

Note: due to low variance, state levels not estimated. Continuous variables are standardized. Observations: 2,559,592 immigrants, 140 origin groups, 4790 communities, 619 origin-years and 19,448 community-years.

* $p < .05$ (two-sided).

** $p < .01$ (two-sided).

third generation by one standard deviation over time increases the odds of exogamy by 13%. This measure also serves to reduce the overestimating the degree of exogamy by trying to account for the availability of co-ethnics in the third generation.

Finally, we explored the idea whether the consolidation of social structural positions creates structural conditions that inhibit intergroup relations. Our findings indicate that when socioeconomic positions become more tightly connected to where people come from, which language they speak and to which religion they adhere to, the less likely they are to marry a spouse from either the native-born population or from another origin group. Note however, that this effect is comparably small with one standard deviation increase resulting only in a 2% decline in the odds of marrying exogamously. Alternative measures of this concept¹⁰ provide us with a similar picture: it is the *changes* in the degree to which a group's social structural positions are consolidated that matter with respect to immigrants' propensity to intermarry.

Compared to structural determinants, cultural explanations are also important, albeit to a lesser degree. When investigating how changes in the strictness of early marriage customs exercised by one group affect the odds of marrying exogamously for that group's members, we see our expectations confirmed. A one-standard-deviation increase in the percentage of an origin group that married between the ages of 10 to 14 (as a proxy for early marriage customs) leads to a decrease on the odds of marrying exogamously by 7%. Hence, the more third party (i.e., parental) influence increases over time, the less likely people are to marry across group boundaries. Next, we turn to the influence of the state as a third party on immigrants' marital decisions. Our results do not indicate that instances of exogamy increase significantly as soon as anti-miscegenation laws are abolished. The coefficient of the longitudinal component of the presence/absence of legislation prohibiting interracial relations does not reach statistical significance. Finally, our results provide insights into the question whether exogamous marriages in the past exert long-term influence on later marital decisions. With respect to the longitudinal component, we find our expectations confirmed. As instances of exogamy increase longitudinally within an immigrant group, so too does the likelihood of marrying exogamously. A one standard deviation increase in the rate of exogamy at t_{i-1} leads to a comparatively substantial increase of the odds of marrying outside one's own group by 27%.

Although only of secondary interest to this article, results for the cross-sectional effects are overall in line with prior research (Hwang et al., 1997; Lievens, 1998; Okamoto, 2007; Kalmijn and van Tubergen, 2010). On the structural side, the findings indicate that members of larger immigrant groups and groups with more balanced sex ratios are less likely to marry exogamously. Additionally, exogamy is found to be more prevalent in origin groups with a larger third generation stock. Also in line with earlier research, members of more diverse groups are *not* more likely to marry exogamously (Hwang et al., 1997; Lievens, 1998; Okamoto, 2007). Results for the two macro control variables provide cross-sectional evidence for cultural explanations. In accordance, the odds of immigrants marrying exogamously are substantially reduced in case they migrated from non-English speaking and non-Christian origin countries.

Judging from the standardized coefficients, the findings indicate that neither structural nor cultural explanations are superior in explaining longitudinal differences. In total, there are also differences in the extent to which the statistical model can explain longitudinal and cross-sectional in intermarriage.¹¹ Regarding cross-sectional differences, around 59% of the variance between origin groups and 68% of the variance between immigrant communities are explained. Likewise, 63% of the variance in longitudinal origin-group differences and 47% of longitudinal community differences are explained suggesting that we are somewhat less successful in explaining temporal patterns. In order to give these figures some perspective, the reader should keep in mind that the majority of the macro level variation was associated with origin group differences and their development (~30%) with only around 20% of the total variation being on the community and community-time level. Moreover, we were not able to include education as an important individual level determinant of intermarriage in the analysis. Compositional effects are therefore most likely underestimated and the extent of explained variance on higher levels might consequently be overstated.

4.4. Illustrating the multivariate findings

We started investigating temporal patterns of intermarriage by presenting descriptive figures for three origin groups. The results of the multivariate models now provide us with insights into the potentially underlying mechanisms that may have brought the different origin group trajectories about. Consequently, the increase of endogamy for the Mexican community in California is likely to be a result of the increase in relative size of the Mexican population (from 2% to 22%), the slight reduction of sex ratio imbalance (from 1.04 to 1) and the increased consolidation of social structural positions (from .071 to .193).

¹⁰ We used bivariate correlations (i.e., Cramer's V) of occupational status with origin, race or religion which were also used by Blau and Schwartz (1984). None of these different ways of approximating the concept of consolidation led to fundamental changes in the results. The standardized coefficients of the longitudinal components range from $-.644$ for the correlation of occupational status and respondent's race to $-.988$ for the corresponding correlation with immigrants' religious denomination. The coefficient for the correlation of occupational status and respondent's country of origin does not reach statistical significance. The same holds true for all cross-sectional components.

¹¹ In order to calculate R^2 's in logistic multilevel models, we followed the approach discussed by Hox (2010: 135–139). Accordingly, the proportion of explained variance is defined as the variance of the linear predictor divided by the sum of the lowest level residual variance, the higher level intercept variances and the variance of the linear predictor. However, since the lowest level variance is always fixed, rescaling of higher level variance components takes place when individual level variables are added. Hence, in order to compute the explained variance for separate levels, variances on higher levels need to be rescaled. In the model discussed in this article, the scale reduction factor was .916. The variance components of the origin level in the final model for instance are then rescaled by the squared scale correction factor in order to compute the R^2 on this level: $(1.035 - (.916 * .916 * .509)) / 1.035 = .587$.

At the same time however, changes in the diversity of the Mexican origin group should have promoted intermarriage (from .421 to .522) but the aforementioned determinants appear to outweigh this effect (which seems reasonable given the relative magnitude of the other effects). Our model is however less suitable in explaining the strong increase of endogamy of the Mexican community in New York. The structural determinants developed similarly in New York albeit not to such a strong degree that it could account for the observed pattern. There seem to be residual processes at work that are not well covered by the multivariate model.

While the structural conditions Mexican immigrants faced developed in such a way that it created opportunities to marry endogamously, most of the influential macro characteristics shaping the marital behavior of German and Italian immigrants changed towards condition that promote exogamy. Most notably, the size of German and Italian communities declined sharply over the study period coupled with a significant increase in group diversity.

5. Conclusion

This study has investigated the explanatory potential of structural and cultural determinants with respect to long-term patterns of immigrant intermarriage as one form of intergroup relations. To do so, we analyzed a large-scale dataset comprised of Decennial Census data and pooled Current Population Surveys which enabled us to conduct a comparative analysis of 140 origin groups over the period from 1880 to 2011. For the first time, the multilevel analysis presented in this article showed that structural and cultural factors matter in explaining the longitudinal development of intermarriage exhibited by immigrant groups.

The results presented in this article provide clear evidence to support the propositions of structural explanations in a longitudinal perspective. According to our findings, an immigrant group becomes more open over time when its relative size decreases as well as when socioeconomic achievement tends to become less dependent on group-based attributes such as its racial and religious composition (i.e., social structural consolidation decreases over time). Moreover, instances of exogamy become more frequent over time as the immigrant group grows more heterogeneous, the size of the third generation co-ethnic stock increases and when the group's gender composition becomes increasingly imbalanced. Albeit putting the focus on differing aspects, these results confirm the general idea that as structurally generated opportunities for endogamy decline over time, intimate intergroup relations are promoted. Cultural explanations also matter when trying to explain trends in immigrant intermarriage. Our findings indicate that as the prevalence of early marriage customs decreases over time, immigrants tend to become more likely to marry exogamously. Likewise, increases in the exogamous marital behavior of an origin group in early periods exert long-term effects by also increasing the likelihood of exogamous marriage for "present" origin group members. However, our results do not support the idea that as soon as the state retracts from sanctioning intermarriage, instances of exogamy will increase. The underlying argument referred to the presence of anti-miscegenation laws as being generally indicative of the normative climate towards intermarriage. It might be a strong assumption that changes in legislation are immediately mirrored by changes in endogamy norms. However, our findings suggest that those immigrants that settled in states where interracial marriages were legally prohibited were found to be less open than comparable groups living in states without these laws. It might however be possible that this effect is overstated. In case peoples' preference for intermarriage is denied in a state with anti-miscegenation laws, they may simply move to a state without legal sanctions. Almost half of the U.S. states had already repealed their respective laws by 1900 (Fryer, 2007). Patterns of selective out-migration could increase the contrast between states with and states without anti-miscegenation laws where individuals with strong exogamous preferences would tend to be overrepresented in the latter states.

In total, our findings suggest that some of the longitudinal and cross-sectional effects differ. On the one hand, cross-sectional effects were found to show a stronger association with intermarriage than the corresponding longitudinal effects. On the other hand, many of the determinants under investigation mattered only in one of the two analytical perspectives. This appears to be especially the case for determinants that have received less attention in the literature as opposed to the effects of relative group size and a group's sex ratio which are standard factors in studies using structural reasoning. Hence, researchers need to pay special attention to which level of analysis the underlying theory makes reference. For instance, while the theoretical mechanism for the effect of group heterogeneity relies heavily on cross-sectional arguments, the empirical findings presented in this article point to a purely longitudinal effect. To put this finding in context, earlier (cross-sectional) research found either no effect of group diversity on intermarriage or even a negative effect (Hwang et al., 1997; Lievens, 1998; Okamoto, 2007). In general, theoretical models are often not detailed enough or concerned with empirical situations where cross-sectional and longitudinal effects may take different directions or, in extreme cases, even be directly opposed. Investigating longitudinal and cross-sectional differences simultaneously can therefore help to identify theoretical weaknesses and set the stage for more careful theorizing.

The analysis conducted in this article also has some shortcomings. We were not able to consistently identify cohabiting couples in both the Decennial Census data and the CPS data. We encountered similar problems with respect to the issue of couples married before migrating and missing information on education, but we were able to investigate their effect on the results, and found them to have only a minor impact. With respect to excluding cohabiting couples, we can only speculate how this might have influenced the results. Cohabitation was still rather uncommon in the 1960s and 1970s and increased rapidly with more than half of the marriages formed between 1990 and 1994 being preceded by cohabitation (Kennedy and Bumpass, 2008). Qian and Lichter (2007) argued that cohabitation may reflect and reinforce social distance between groups.

Table A1

Robustness checks, additional specifications.

	1 Married native-born stock partner vs. endogamy		2 Married other origin partner vs. endogamy		3 Married exogamously vs. endogamy (controlling for education)		4 Married exogamously vs. endogamy (immigrants arrived before the age of 16 + second generation)		5 Married exogamously vs. endogamy (state-level modeled)		6 Married exogamously vs. endogamy (state-level modeled)	
	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Constant	-1.635**	.099	-1.306**	.096	-.164	.151	-.010	.077	-.596**	.155	-.652**	.082
Structural explanations												
Relative group size (cross-sectional)	-.535**	.031	-.591**	.037	-.813**	.054	-.591**	.030			-.566**	.031
Relative group size (longitudinal)	-.273**	.015	-.153**	.013	-.392**	.037	-.175**	.012			-.230**	.014
Sex ratio (cross-sectional)	.195**	.005	.191**	.006	.165**	.006	.224**	.010			.179**	.003
Sex ratio (longitudinal)	.159**	.004	.148**	.004	.131**	.006	.144**	.007			.151**	.003
Sex ratio (cross-sectional) × gender	-.399**	.010	-.322**	.010	-.373**	.010	-.367**	.016			-.335**	.008
Sex ratio (longitudinal) × gender	-.248**	.007	-.218**	.007	-.280**	.010	-.194**	.010			-.222**	.007
Group heterogeneity (cross-sectional)	.067	.038	-.024	.019	.019	.019	.015	.018			.005	.026
Group heterogeneity (longitudinal)	.307**	.022	.075**	.018	.086**	.037	.304**	.022			.195**	.019
Consolidation (cross-sectional)	.025	.049	.034	.027	.031	.029	.019	.012			.024	.024
Consolidation (longitudinal)	-.040**	.008	-.032**	.007	-.024**	.010	-.021**	.008			-.023**	.007
Size of third generation (cross-sectional)	.179**	.028	.093**	.028	.189**	.026	.101**	.021			.144**	.024
Size of third generation (longitudinal)	.068*	.036	.325**	.026	.042	.029	.059	.029			.162**	.025
Cultural explanations												
Early marriage customs (cross-sectional)	-.092	.069	-.043	.036	-.019	.024	-.043	.029			-.028	.023
Early marriage customs (longitudinal)	-.078**	.015	-.056**	.012	-.061**	.016	-.026*	.014			-.066**	.011
Anti-miscegenation laws (cross-sectional)	.122**	.010	.092**	.012	.019**	.009	.032**	.012			.033**	.012
Anti-miscegenation laws (longitudinal)	.038	.070	.013	.007	.007	.011	.014	.009			.006	.010
Exogamy rate at t_{i-1} (cross-sectional)	.386**	.037	.571**	.037	.385**	.034	.539**	.028			.437**	.028
Exogamy rate at t_{i-1} (longitudinal)	.347**	.024	.160**	.020	.166**	.026	.324**	.024			.227**	.019
Micro-level controls												
Time	.115**	.010	.038**	.008	-.045**	.014	.108**	.009	.125**	.012	.089**	.009
Nonwhite	-.417**	.020	-.329**	.022	.529**	.019	.096**	.024			-.156**	.017
Age	-.025**	.001	-.016**	.001	-.024**	.001	-.016**	.001			-.020**	.001
Female	-.383**	.004	-.106**	.004	-.260**	.006	-.269**	.005			-.257**	.004
Second generation	1.648**	.005	.974**	.005	1.457**	.006	.641**	.007			1.320**	.004
2.5. generation	2.604**	.006	1.423**	.007	2.043**	.008	1.492**	.008			2.135**	.004
Education					.096**	.001						
Macro-level controls												
English-speaking origin group (cross-sectional)	.253**	.113	.346**	.111	.239**	.103	.113	.082			.420**	.174
Non-Christian origin (cross-sectional)	-.492**	.102	-.294**	.100	-.580**	.093	-.718**	.077			-.393**	.090
Observations												
Origin	137		137		132		134		140		140	
Origin-Time	610		611		391		594		619		619	
Community	4505		4134		4712		3707		4790		4790	
Community- Time	18,155		15,994		13,521		15,506		19,446		19,446	
State									51		51	
State-Time									549		549	
Individuals	2,129,612		1,868,869		1,066,665		1,313,532		2,559,592		2,559,592	
Deviance	1,742,045		1,623,885		1,043,194		1,370,293		2,867,086		2,556,892	

Continuous variables standardized. The model including education excludes data for 1880–1940 due to missing information. The total variance in Model 5 is 5.902 with the state-level variance component estimated at .088 and the state-year-level variance at .058.

* $p < .05$ (two-sided).

** $p < .01$ (two-sided).

It may reflect social distance in the sense that cohabitation may be a sign of the relationship being too stigmatized or viewed too unfavorably to enter the stage of marriage, and it may reinforce social distance in the sense that cohabitation is often-times short-lived and unstable. Based on these ideas, one would expect that the openness of some origin groups may be underestimated. Only if all groups had comparable rates of cohabitation and a comparable fraction of these couples eventually made the transition to marriage would we be able to ignore this issue. However, cohabitation as well as transition differentials by origin groups seem more reasonable (e.g., Osborne et al., 2007). Another limitation of this study relates to the possibility that migrants facing structural constraints towards satisfying endogamous preferences might well be looking for a suitable mate outside their community (e.g., in another state or in their country of origin). Census data is usually not detailed enough to allow for an in-depth investigation of this limitations,¹² though we believe that this is an interesting route for future research since origin group differences are bound to materialize in these situations.

Lastly, the focus of this study has been on how changes in the structural or cultural characteristics affect immigrants host country integration in terms of intermarriage. One topic that remains to be addressed by future research is the question whether the effects of structural or cultural characteristics themselves change over time. The process of modernization and the associated innovations in transportation and communication may have reduced the relevance of traditional meeting places such as the workplace, neighborhood, church or social networks (e.g., Rosenfeld and Thomas, 2012). To some extent, this development also frees individuals from intervention of third parties. It is therefore reasonable to expect that the process of modernization has reduced the degree to which the structure of spatially defined marriage markets shapes people's meeting and mating opportunities and to which third parties interfere in spousal selection.

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Appendix A

See Table A1.

References

- Alba, Richard, Nee, Victor, 2003. *Remaking the American Mainstream: Assimilation and Contemporary Immigration*. Harvard University Press, Cambridge.
- Angrist, Josh, 2002. How do sex ratios affect marriage and labor markets? Evidence from America's second generation. *Quarterly Journal of Economics* 107, 997–1038.
- Bates, Douglas, Maechler, Martin, Bolker, Ben, 2012. *lme4: Linear Mixed-effects Models using Eigen and Variance-Covariance*. R Package Version 0.999999-0. <<http://CRAN.R-project.org/package=lme4>>.
- Bean, Frank D., Stevens, Gillian, 2003. *America's Newcomers and the Dynamics of Diversity*. Russell Sage Foundation, New York.
- Blau, Peter M., Schwartz, Joseph, 1984. *Crosscutting Social Circles: Testing a Macrostructural Theory of Intergroup Relations*. Academic Press, New York.
- Brierley, Peter., 1997. *World Churches Handbook*. BPC Wheaton, Exeter.
- Brown, Rupert, 2010. *Prejudice: Its Social Psychology*. Wiley-Blackwell, Chichester.
- Castles, Stephen, Miller, Mark J., 2003. *The Age of Migration. International Population Movements in the Modern World*. Guilford Publications, New York.
- Chen, Juan, Takeuchi, David T., 2011. Intermarriage, ethnic identity, and perceived social standing among Asian women in the United States. *Journal of Marriage and Family* 73, 876–888.
- Curran, Patrick J., Bauer, Daniel J., 2011. The Disaggregation of Within-Person and Between-Person Effects in Longitudinal Models of Change. *Annual Review of Psychology* 62, 583–619.
- Enders, Craig K., 2010. *Applied Missing Data Analysis*. The Guilford Press, New York.
- Fairbrother, Malcom, 2012. Two Multilevel Modeling Techniques for Analyzing Longitudinal Survey Datasets. <<http://seis.bris.ac.uk/~ggmhf/research.html>> (accessed May 2012).
- Fairbrother, Malcom, Martin, Isaac W., 2013. Does inequality erode social trust? results from multilevel models of U.S. States and Counties. *Social Science Research* 42, 347–360.
- Fryer, Roland G., 2007. Guess who's been coming to dinner? Trends in interracial marriage over the 20th century. *Journal of Economic Perspectives* 21, 71–90.
- Fu, Vincent K., 2007. How many melting pots? Intermarriage, pan ethnicity, and the black/non-black divide in the United States. *Journal of Comparative Family Studies* 215, 237.
- Fu, Vincent K., 2010. Remarriage, delayed marriage, and Black/White intermarriage, 1968–1995. *Population Research and Policy Review* 29, 687–713.
- Fu, Xuanning, Heaton, Tim B., 2008. Racial and educational homogamy: 1980 to 2000. *Sociological Perspectives* 51, 735–758.
- Furtado, Delin, Theodoropoulos, Nikolaos, 2011. Interethnic marriage: a choice between ethnic and educational similarities. *Journal of Population Economics* 24, 1257–1279.
- Ganzeboom, Harry B.G., De Graaf, Paul M., Treiman, Donald J., 1992. A standard international socio-economic index of occupational status. *Social Science Research* 21, 1–56.
- Gullickson, Aaron, 2006. Black/White interracial marriage trends, 1850–2000. *Journal of Family History* 31, 289–312.
- Hox, Joop J., 2010. *Multilevel Analysis: Techniques and Applications*. Routledge, New York.

¹² We tried to assess this issue by estimating models with random slopes for the structural characteristics with the assumption that for origin groups with strong endogamous preferences and the means to satisfy them, the effects of structural determinants should be weaker than for other groups. The results do show variation in the slopes, albeit not to an extent that the coefficients change signs.

- Huijnk, Willem, Liefbroer, Aart C., 2012. Family influences on intermarriage attitudes: a sibling analysis in the Netherlands. *Journal of Marriage and Family* 74, 70–85.
- Hwang, Sean-Shong, Seanz, Rogelio, 1990. The problem posed by immigrants married abroad on intermarriage research: the case of Asian Americans. *International Migration Review* 24, 563–576.
- Hwang, Sean-Shong, Saenz, Rogelio, Aguirre, Benigno E., 1997. Structural and assimilationist explanations of Asian American intermarriage. *Journal of Marriage and Family* 59, 758–772.
- Kalmijn, Mathijs, 1993. Trends in Black/White intermarriage. *Social Forces* 72, 119–146.
- Kalmijn, Mathijs, 1998. Intermarriage and homogamy: causes, patterns, trends. *Annual Review of Sociology* 24, 395–421.
- Kalmijn, Mathijs, 2010. Consequences of racial intermarriage for children's social integration. *Sociological Perspectives* 53, 271–286.
- Kalmijn, Mathijs, van Tubergen, Frank, 2010. A comparative perspective on intermarriage: explaining differences among national-origin groups in the United States. *Demography* 47, 459–479.
- Kennedy, Sheela, Bumpass, Larry, 2008. Cohabitation and children's living arrangements: new estimates from the United States. *Demographic Research* 19, 1663–1692.
- King, Miriam, Ruggles, Steven, Trent Alexander, J., Flood, Sarah, Genadek, Katie, Schroeder, Matthew B., Trampe, Brandon, Vick, Rebecca, 2010. Integrated Public Use Microdata Series, Current Population Survey: Version 3.0. [Machine-readable Database]. University of Minnesota, Minneapolis.
- Lichter, Daniel T., Carmalt, Julie H., Qian, Zhenchao, 2011. Immigration and intermarriage among Hispanics: crossing racial and generational boundaries. *Sociological Forum* 26, 241–264.
- Liebertson, Stanley, 1969. Measuring population diversity. *American Sociological Review* 34, 850–862.
- Liebertson, Stanley, Waters, Mary C., 1988. From Many Strands: Ethnic and Racial Groups in Contemporary America. Russell Sage Foundation, New York.
- Lievens, John, 1998. Interethnic marriage: bringing in the context through multilevel modelling. *European Journal of Population* 14, 117–155.
- Mayer, Thierry, Zignago, Soledad, 2006. Notes on CEPII's Distance Measures. CEPII. <www.cepii.fr/anglaisgraph/bdd/distances.htm> (accessed April 2012).
- McPherson, Miller, Smith-Lovin, Lynn, Cook, James M., 2001. Birds of a feather: homophily in social networks. *Annual Review of Sociology* 27, 415–444.
- Middleton, Russell, 1976. Regional differences in prejudice. *American Sociological Review* 41, 94–117.
- Okamoto, Dina G., 2007. Marrying out: a boundary approach to understanding the marital integration of Asian Americans. *Social Science Research* 36, 1391–1414.
- Osborne, Cynthia, Manning, Wendy D., Smock, Pamela J., 2007. Married and cohabiting parents' relationship stability: a focus on race and ethnicity. *Journal of Marriage and Family* 69, 1245–1366.
- Pascoe, Peggy, 1996. Miscegenation law, court cases, and ideologies of 'race' in twentieth century America. *The Journal of American History* 83, 44–69.
- Qian, Zhenchao, Lichter, Daniel T., 2007. Social boundaries and marital assimilation: interpreting trends in racial and ethnic intermarriage. *American Sociological Review* 72, 68–94.
- Qian, Zhenchao, Lichter, Daniel T., 2011. Changing patterns of interracial marriage in a multiracial society. *Journal of Marriage and Family* 73, 1065–1084.
- Qian, Zhenchao, Blair, Sampson L., Ruf, Stacey D., 2001. Asian American interracial and interethnic marriages: differences by education and nativity. *International Migration Review* 35, 557–586.
- Rosenfeld, Michael J., 2008. Racial, educational and religious endogamy in the United States: a comparative historical perspective. *Social Forces* 87, 1–31.
- Rosenfeld, Michael J., Thomas, Reuben J., 2012. Searching for a mate: the rise of the internet as a social intermediary. *American Sociological Review* 77, 523–547.
- Ruggles, Steven, Alexander, J. Trent, Genadek, Katie, Goeken, Ronald, Schroeder, Matthew B., Sobek, Matthew, 2010. Integrated Public Use Microdata Series: Version 5.0 [Machine-readable Database]. University of Minnesota, Minneapolis.
- Singh, Susheela, Samara, Renee, 1996. Early marriage among women in developing countries. *International Family Planning Perspectives* 22, 148–157.
- Snijders, Tom A.B., Bosker, Roel, 2011. *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Sage, Thousand Oaks.
- Sohoni, Deenesh, 2007. Unsuitable suitors: anti-miscegenation laws, naturalization laws, and the construction of Asian identities. *Law and Society Review* 41, 587–618.
- Van Buuren, Stef, Groothuis-Oudshoorn, Karin, 2011. Mice: multivariate imputation by chained equations in R. *Journal of Statistical Software* 45, 1–67.
- Waters, Mary C., Jiménez, Tomás R., 2005. Assessing immigrant assimilation: new empirical and theoretical challenges. *Annual Review of Sociology* 31, 105–125.
- Wooldridge, Jeffrey M., 2008. *Introductory Econometrics: A Modern Approach*. South-Western Cengage Learning, Mason.
- Xie, Yu, Goyette, Kimberley, 1997. The racial identification of biracial children with one Asian parent: evidence from the 1990 Census. *Social Forces* 76, 547–570.