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A Demographic Base for Ethnic Survival? Blending Across Four Generations of German-Americans

by

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ABSTRACT

New data from the IPUMS (Integrated Public Use Microdata Series) project permit an exploration of the demographic basis for ethnic survival across successive generations. I first explore the degree of ethnic blending among the grandchildren of early- to mid-19th-century German immigrants; second, these descendants' own marital choices; and third, the likely composition of the fourth generation to which they would give birth. Fundamental questions include: How high is the rate of single versus mixed origins after so many generations in America? How large an absolute number of single-origin individuals remain (given the combined impact of out-marriage, on the one hand, and cumulative fertility, on the other)? How much less likely are single-origin individuals of the third generation to in-marry relative to those in the second generation? And how do all these patterns differ across 31,000 local geographic areas? I exploit the full-count 1880 Census dataset and the Linked Representative Sample, which captures males in 1880 as well as in one of the 1900–30 enumerations. Limiting attention to those who were adolescents in 1880, we have three generations' worth of ethnic information on each sample member traced across time (birthplace as well as parents' and grandparents' birthplaces, from their parents' responses) and ethnic information covering two generations for the women they eventually married.

INTRODUCTION

The European immigrants generally married their own, but their children and grandchildren often married out. The ethnic blending that followed these marriages is one of the crucial distinguishing features of American society. True, such blending was not unique to the United States, but rather was shared with other immigrant-receiving countries that granted political equality to new arrivals. By contrast ethnic blending has been much more difficult elsewhere, as in many multinational states that did not arise through free, self-selected immigration. In any case, whatever its prevalence across the world's states, this blending is surely one of the central explanations, along with upward social mobility and the political structure, for the successful absorption of the European immigrants. The situation was very different in the past for racialized immigrants, free or forced; even today, African-American intermarriage rates remain drastically lower than those for other groups, but among contemporary Hispanics and Asians the historical pattern that had existed for Europeans is being repeated (Perlmann and Waters 2007).[1]

The process of blending has an almost inevitable quality about it, built into the very nature of marriage and family. Consider an immigrant group in which only 10% of the immigrants themselves and 20% of the second-generation out-marry. In such a group, about *half* the third-generation descendents will have mixed rather than single ethnic origins. At first sight such a high prevalence for the mixed origin descendents is counterintuitive. To understand it, we need to appreciate the difference between rates of out-marriage and the sources of single- and mixed-origin offspring. When 900 of 1,000 immigrants in-marry (90% in-marriage), they form 450 couples; when the other 100 out-marry they take their 100 spouses from outside the group. The result is that the 1,000 immigrants will be found in 550 couples, of which 100 will produce children of mixed ethnic origin—i.e., 100/550 or 18% of the couples will produce children of mixed origin, a notably higher percentage of couples than the percentage of individuals in the group who out-married. Now for simplicity's sake, assume that each of the 550 couples produced only one child. In the second generation, the 450 single-origin individuals will

[1] Or rather, the process of ethnic blending is being repeated; whether the same holds for the high rates of upward mobility is an open question. See Perlmann (2005).

out-marry at a rate of 20%—90 out-marrying, 360 in-marrying. The former will form 90 couples (with a spouse from another group) and the latter will form 180 couples among themselves. And so the proportion of second-generation couples that will produce children of mixed origin will be 90/270, or 33%—a far higher percentage than the 20% of individuals who out-married. To these couples we must add the 100 other couples already involving mixed marriages in the first generation, making a total of 370 couples to which the grandchildren of the immigrants will be born; of these, 51% (190 of 370 couples) will be of mixed rather than single origin. In sum, even fairly low levels of out-marriage in the first and second generation (10% and 20%, respectively, in this example) will produce a considerable proportion of immigrants' grandchildren with mixed origin. Out-marriage determines the number of couples created and the composition of the next generation is determined by the composition of the couples. Of course, the composition of the next generation is also determined by any fertility differentials that may exist across the various sorts of couples, but it is very unlikely that these differentials will be great enough to overcome the impact of the out-marriage dynamics just described.

Now it is not an iron law that mixed-origin couples will always have less attachment to ethnic concerns than do single-origin couples. There are exceptions to this "law," but it stands to reason that in the absence of unusual circumstances the generalization will indeed hold true. First, of course, the very existence of the mixed-origin couple resulted from an individual's decision to out-marry and this decision already reflects (again, other things being equal) a lower concern for ethnic life than among those who chose to in-marry. Consequently, to some extent the lower ethnic involvement in mixed-origin families simply reflects an earlier assimilative tendency reflected in the act of out-marriage. But it also stands to reason that a couple that does not share the ethnic bond will be less likely to make that bond an important part of family life. Moreover, these considerations also apply, of course, to the way the next generation will be reared. Consequently, the proportion of mixed-origin couples and offspring are a useful measure of the erosion of the demographic base for ethnic survival.

Yet if mixed-origin offspring is indeed a measure of erosion, then the dynamic described above—by which the proportion of mixed-origin offspring reaches dizzying

levels even from two generations of relatively low out-marriage—should lead us to wonder how ethnic groups can survive in any way at all past the second generation. There are at least three demographic factors that work to prolong the demographic basis for ethnic survival. First, the cumulative effect of fertility rates across a few generations tends to raise populations dramatically; specifically, the third- and fourth-generation descendents of a group of immigrants will be far more numerous than was the immigrant generation itself. Consequently, although the *proportion* of single-origin children among all third-generation children is likely to be low, it is possible that the *absolute number* of those single-origin third-generation children will still be high, at least relative to the number of their immigrant grandparents. Second, in many immigrant groups, during a long stretch of the period of high immigration, second-generation members tend to marry recent immigrants of their own age. Moreover, these recent immigrant arrivals do more than increase the number of potential spouses available for in-marriage; they also increase the salience of ethnic issues in the newly formed couples because one member of the couple is an immigrant, rather than a generation removed from the immigrant experience and the old country.[2] Borrowing a term from the sociology of immigration, I apply the term *replenishment* to this feature of cross-generation in-marriage, and describe it in greater detail in a later section of the paper. Third, there is a geographic consideration: ethnic patterns are not the same across the country; rather in-marriage is more likely to occur precisely where ethnic concentration is greatest and ethnic institutions are most developed. Of course, this consideration cannot change the national proportions of single- and mixed-origin descendents, but it means that where in-marriage is occurring it is likely to be buttressed by and, in-turn, to buttress ethnic life.

I propose to explore how these patterns operated among the German-Americans (descendents of mid-nineteenth century immigrants) who were young children in 1880 and reached adulthood, marriage, and parenthood during the early decades of the twentieth century. My exploration rests, as explained in the next section, upon the machine-readable census datasets of the IPUMS series, especially the most recent advances of that digitizing program, namely the complete-count dataset from the 1880

[2] Third-generation members also marry immigrants on occasion, of course, and (in a similar process) also marry second-generation members.

census and the Linked Representative Sample that captures the same individuals in 1880 and in a later census. This paper deals first with national trends, and confirms my earlier work that found high levels of ethnic blending by the third generation. Nevertheless, even the national-level patterns underscore the critical role of one of the countervailing factors just noted—the large ongoing German immigration and the opportunity for the second-generation members to reinvigorate their ethnic ties by marrying an immigrant.

Then the analysis shifts to the local level. The recent IPUMS datasets allow me to compute the German concentration in each of 31,000 local areas. I will focus on the differences between the pockets of high concentration and the rest of the country. This geographic analysis asks, in essence, two opposing questions. First, just how high was in-marriage in these pockets? Behind this question lies the general concern: was life in these pockets distinct enough to perpetuate ethnicity past the second generation? At the same time, I am interested in clarifying just how much of the tendency to in-marriage is determined by the local concentration—not only in order to explore dynamics there, but also to ascertain how strong the prevalence for in-marriage was *net of local concentration.* The simple demography of the marriage market made it much more likely that anyone—including a non-German—would marry a German in these pockets rather than elsewhere. Part of our concern must be to appraise the pull of in-marriage net of this latter contextual pressure. In particular, this appraisal will allow us to compare how German-Americans with different sorts of origins made marital choices *net of the local marriage market*—specifically, those with single origins vs. mixed origins, and most important perhaps, those with single origins in the third generation compared to single origins in the second generation.

This last comparison is especially interesting because it highlights a second factor at work in the survival of ethnicity, over and above the preservation of sufficient numbers to form a demographic base. The minds of the single-origin descendents must remain oriented to ethnic concerns. To what extent was this the case? One measure of that orientation is in fact the choice of a German-origin spouse (once the composition of the marriage market has been taken into account). In particular, we can explore the impact of an additional generation of distance from the immigrant experience and outlook upon the choice of a German-origin spouse among the single origin, net of the marriage market.

Thus, to what extent did the single-origin individuals of the *third* compared to the *second* generation retain a preference for in-marriage?

The reader familiar with the scholarship on ethnicity may well find this discussion too vague because it does not specify what ethnic life consists in—how ethnicity is "lived" or how it comes to be merely "symbolically" acknowledged as a facet of identity that has little meaning beyond a statement relevant to a narrow sliver of one's definition. This would be a fair criticism of my approach here. Nevertheless, I am arguing that we do have one useful measure of what ethnicity means to these people: it means the survival of the pull, especially upon the single-origin descendent, to in-marry. Such a definition is obviously only a very partial answer to how ethnicity is lived—yet it is still a useful measure of survival since it is far from universally obeyed. Moreover, this measure is by no means an arbitrary one; marital choice clearly will affect both the family life of the individual and the prospects that ethnic concerns will remain relevant into the next generation. Thus single-origin standing allows us to define a demographic base and the choice to continue a single-origin existence—especially net of German concentration in the local area—gives us a measure of outlook.

THE DATA

The sociological study of intermarriage tends to focus on patterns at one moment in time, yet many of the big issues that justify the study of ethnic intermarriage are best studied across time. These are questions about assimilation, the rapidity with which peoples intermingle and become one, and about the subgroups that lead or follow in the mingling. Surely the most important reason for the general focus on a single point in time is that the evidence for intensive cross-time work is difficult to come by. The creation of the IPUMS samples, providing as they do individual-level data for a long stretch of American history, may be the best long-term dataset available by which to shift the focus of intermarriage study away from single moments in time (and indeed, contemporary studies of trends across the single moments captured in the public use census samples of 1980–2010 comprise the most important of the cross-time studies that we do have). Nevertheless, the IPUMS datasets include full ethnic information on no more than two

generations and even that for only a few of the decennial censuses: 1880, 1900–1930, and 1960–1970. So tracing blending through the descendents of immigrants remains an elusive goal.

Still, the census datasets do allow us to learn something about the composition of the third generation and the grandchildren of the immigrants as well. To do so, we must be willing to limit ourselves to children of the second generation young enough to still be living with their parents.[3] We can then obtain ethnic data about the children's four grandparents (and about both parents) from the parents' lines in the enumeration, as well as the child's own birthplace from his or her own line in the schedule. I have been working for some time with this three-generation record (Perlmann 1998, 2000; Perlmann and Waters 2004, 2007).

The creation of the full-count 1880 census dataset (hereafter IPUMS80a) and the Linked Representative Samples (hereafter LRS) permits us to push the analysis farther back still. In this paper I exploit these newer sources to focus on German intermarriage across four generations of the same families. I selected children 0–14 years of age in 1880 (the birth cohort 1866–1880) from the 1880 IPUMS80a, as well as the boys from the same cohort found in the LRS. The IPUMS80a provides a gigantic base from which to study children's ethnic composition through three generations in 1880. The LRS provides the information on the boys who were successfully linked forward in time to the IPUMS datasets drawn from the decennial censuses of 1900–1930. Most of the men of the birth cohort (a substantial minority in 1900, a large majority in later years) were married at the time these later censuses caught up with them and we therefore have ethnic information covering two generations on their wives. Moreover, given three-generation ethnic information on the entire cohort of the husbands and two-generation ethnic information on that of the wives, I am able to make some estimates of the wives' third-generation standing as well. Finally, knowledge about these couples allows me to say something also about the origins that would characterize their children, the fourth generation.

Accurate geographical information on very small areas, another boon of the full count IPUMS80a, has been critical to the second part of this paper. Specifically, I have

[3] And we must limit our attention to two-parent families for complete third-generation data of this kind.

calculated the number of: a) first and second Germans, b) the total population, and then c) the percentage German in that total population (100*a/b) for each of the approximately 31,000 enumeration districts (hereafter EDs) defined by the 1880 census enumerators. I appended this information on the German concentration of the ED to the IPUMS80a and the LRS record for each member of the age cohort I am tracking (born 1866–1880), thus I am able to situate each individual in the cohort in terms of the German concentration of the neighborhood in which each was living in 1880. The average ED included about 1,700 people.[4]

In this paper *in-marriage* refers to marriage with anyone having German origins. *Single-origin* individuals were descended from four grandparents born in Germany; however if the grandparents stayed in Germany and only the individual's *parents* were immigrants, then the individual did not have third-generation, but only second-generation, German origins. *Second generation* refers to anyone born in the United States to one or two immigrants from the relevant country—mixed- or single-origin second generation, respectively. *Third generation* refers to anyone who had been born in the United States to at least one US-born parent who in turn had at least one immigrant parent born in Germany. Thus, a second-generation individual could have two, three, or four grandparents born in Germany; a third-generation person could have one, two, three, or four grandparents born there. Crucially, a person could have *both* second- and third-generation German origins—if a second-generation parent had married a German immigrant. Consequently, *exclusively third-generation* individuals are those whose German origins come from their German immigrant grandparents only. *Exclusively third-generation single-origin* individuals were the children of two single-origin second-generation parents—the grandchildren of four German-born immigrants.

One issue which the reader should bear in mind throughout is that adults listed in the census as native-born of native parentage had German origins in earlier generations than that of their parents. The German immigration had been in progress for some two centuries by 1880; consequently, there were individuals who had distant German progenitors in their family tree, but these German origins remain unobserved. If such

[4] I am very grateful to Rebecca Vick, Ronald Goeken, and Steve Ruggles at IPUMS for responding to needs and questions of the single user (this single user) with great alacrity.

individuals had no more recent German progenitors, they end up being counted as non-German in the analysis. I consider the substantive implications of this issue in the last section of the text. Suffice it to say here that I conclude the most relevant of these unobserved German origins are those closest in time to the observed origins (not, for example, early colonial German roots). Moreover, these recent unobserved origins do not much affect analysis at the national level; they will play a more intriguing role in the local areas of the highest German concentration. [5]

A. The National Pattern

A1. Children of German Origin in 1880: Their Ethnic Composition

Perhaps the most important point to notice about the German-American children of 1880 is their generational status—a substantial majority were the children rather than grandchildren of German immigrants. There were nearly 2.2 million children, 0–14 years of age, who reported German origin in the 1880 enumeration (table 1, column c). The vast majority had *no* third-generation status at all. Fully 49% were the American-born children of two German immigrants, and an additional 15% had one German-immigrant parent and another who was *not* a second-generation German-American. Another 12% did have third-generation status through one parent but also had second-generation status through the other—that is, one parent was a second-generation German and the other a German immigrant. Only 19% reported exclusively third-generation German origins. Four percent of the 2.2 million children had been born in Germany themselves.

[5] A related complexity concerns the definition of in-marriage as limited to a spouse with origins in Germany, rather than in German-speaking Europe. The difficulty with using the latter definition (if we were to decide it better represents endogamy) is that virtually every country other than Germany that included numerous German speakers also included numerous *non*-German speakers. Still, initial perusal of wives origins from such countries suggested no great changes in results would follow were the German-speaker definition to be used.

Table 1. The Cohort of Children, 0–14 Years of Age in 1880 (birth cohort 1866–80), by Type of German Origins (if any)

Observed German origins (through grandparents' generation)	N (000s)	Percentage of children by origin			
		all	German-origin only		
			any	3rd generation origins	
				any	only
	a	*b*	*c*	*d*	*e*
None	13917	86			
Some German origins: Child born in the U. S.					
German-born grandparents only					
1 German-born grandparent only	114	1	5	16	27
2 German-born grandparents	205	1	9	30	48
3 German-born grandparents	16	0	1	2	4
4 German-born grandparents	93	1	4	13	22
One German-born parent					
2 German-born grandparents only	337	2	15		
3 German-born grandparents	26	0	1	4	
4 German-born grandparents	241	1	11	35	
Two German-born parents, child	1073	7	49		
Child born in Germany	81	1	4		
Total: all children 0-14 years of age	na	100	100	100	100
Total N in 000s (100% of column):	16104	16104	2187	696	429

Source: Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. Integrated Public Use Microdata Series: Version 5.0 [Machine-readable database]. Minneapolis: University of Minnesota, 2010 (hereafter: IPUMS 80a).

This pattern testifies to both the long duration and increasing scale of German immigration across the decades leading up to 1880 (shown in figure 1 and table 2). Most German immigrant grandparents of the third-generation children probably arrived in the United States between 1830 and 1855[6]—some even before the first great wave of the 1840s and 1850s (figure 1) and the rest during that wave. Figure 1 also is a useful reminder of differences in the timing of Irish and German arrivals. The Irish modestly outnumbered the German arrivals through the Civil War years, but during the next three decades the Germans greatly predominated. We might therefore expect a somewhat different ratio of second to third generation in the cohorts of 1880 German-American and Irish-American children.

[6] This conclusion is based on estimating from mothers' ages at birth of the children and working back to the mothers' parents.

Figure 1. Annual Immigration, Germans and Irish, 1820–1910

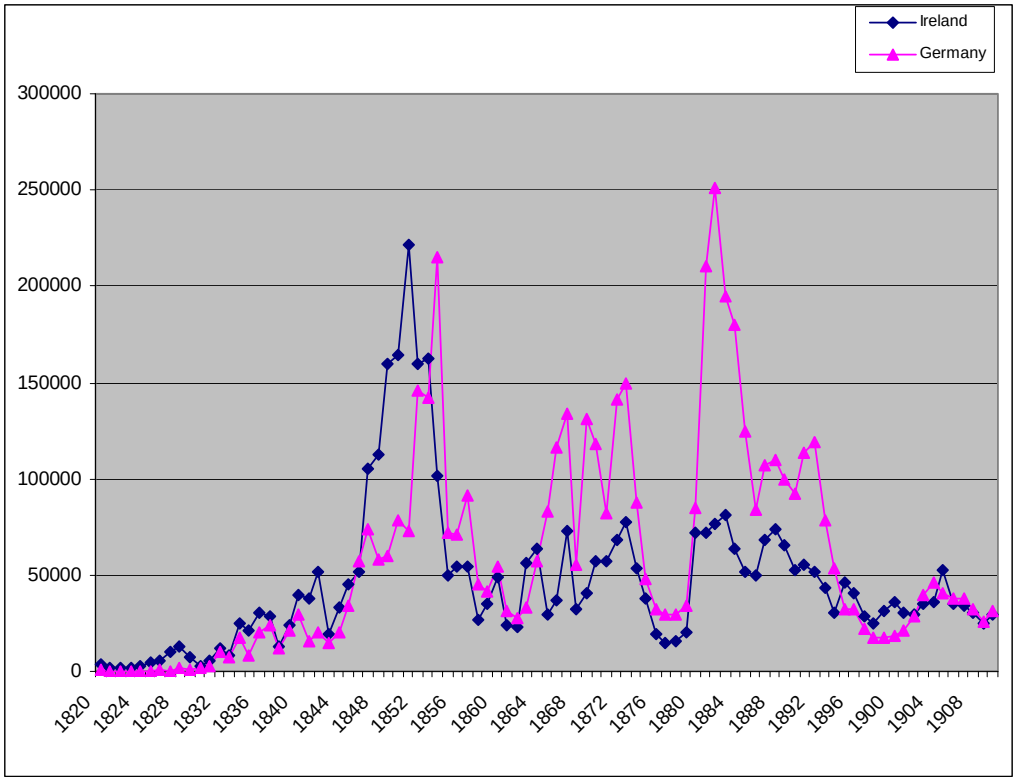

Table 2. Birth Cohorts: Situating the Third-generation Boys of 1880 in the Context of Nineteenth-Century Immigration

Generation	ages in 1880	birth years	ages in 1880	birth year
3rd generation boys	0 to 14	1866-1880	5	1875
*Their mothers**				
Germans	22 to 35	1845 to 1858	23 to 34	1846 to 1857
Irish	23 to 38	1842 to 1857	24 to 36	1844 to 1856
grandparents:		probable years of immigration: **ca. 1830-1855**		

* All figures for mothers' ages and birthyears exclude the 10% oldest and 10% youngest mothers in each cell.

Source: IPUMS80a

Despite being a decided minority among all German-American children in 1880, those with third-generation status numbered nearly 700,000 (columns d and e). Almost 40% of them also had one parent born in Germany, leaving some 429,000 with only third-generation origins. By describing in more detail the particular composition of this last group we can understand the pattern of earlier-generation in- and out-marriages from which they descended. Just over a fifth were conceptually the simplest: they were exclusively third-generation German, having two American-born parents who were, in turn, both the children of two German immigrants. Nearly half the children had *one* such parent, but that parent had out-married. Fully 27% more had only one German immigrant grandparent, indicating that this German immigrant grandparent had out-married, as had the part-German-origin parent. The last 5% were made up of rarer mixtures.[7]

These percentages only provide a rough indication of out-marriage rates in each earlier generation, because fertility rates may not have been the same in each type of ethnic union, and the number of eventual offspring reflect both factors—types of union and fertility rates. On the other hand, our principal aim is to view the long-term patterns of mingling and to that end it is the aggregated, not the disaggregated, impacts of these factors that matter.

Barely one in four with a German-immigrant grandparent (and no second-generation origins) were of single origin. All the rest were the products of some out-marriage. Indeed a slightly larger percentage had only one German grandparent—implying out-marriage in the first and second generation. The rest, about half the group with third-generation and no second-generation origins, were the products of second-generation out-marriage. We will soon ask how these patterns varied across localities. Nevertheless, it is the national pattern that describes what happened to the ethnic descendents of the immigrants taken as a group. Local areas of ethnic concentration provide exceptions where ethnic continuity was more common, but these local patterns are, by definition, exceptions to the majority's situation since the local patterns do not dominate the national aggregate.

[7] Four percent had one single- and one mixed-origin second-generation parent, and 1% had one German-origin grandparent through each parent.

However, if one salient feature of third-generation status is that only a quarter of the exclusively third-generation individuals were of single as opposed to mixed origin, another feature is the large number of unions that occurred between second-generation and German immigrant parents. Fully two-fifths of all with third-generation German roots were the products of such unions (column d). Surely, without the large German immigration the demographic result would have been that many second-generation members after 1860 would have married out instead of marrying someone of German origin. Moreover, even if they had all married each other they would have produced only half as many couples, and thus fewer offspring than we actually find in the 1866–1880 birth cohort.[8] Finally, couples that include an immigrant and a second-generation member from the same country of origin radically increase the likelihood that children, who are third-or-later-generation through one parent, will be of single origin and preserve ethnicity both for that reason and because they are relatively close to the ancestral country through the immigrant parent. Students of immigration sometimes refer to a related phenomenon as *replenishment*—the prolongation of ethnic cultural outlooks and institutions through the later immigrant arrivals of a long immigration wave. If the immigration wave continues for an extended period of time—two, three, four, or more generations—then immigrant institutions are likely to remain in demand. Perhaps the newly arrived immigrants keep the second- and third-generation descendants of the earliest arrivals interested in ethnic themes, but this factor is probably the less-important result of replenishment; it also operates directly because the newly arrived immigrants reinvigorate institutions by using them for themselves. In this paper I use the term *replenishment* in a demographic context to mean the preservation of German in-marriage and single-origin status brought about by the availability of large numbers of later-period German immigrants in the pool of potential spouses for the second- and third-generation German-Americans.

[8] Consider for a moment a definition of in-marriage that includes only second-generation Germans marrying each other. In that case, when a second-generation German-American marries a German immigrant, we observe the same numerical impact as when the former marries a non-German (described in the introduction). Namely, more couples are formed by "out" marriage than by "in." However, whether the spouse is a German immigrant or a non-German makes a great deal of difference in terms of ethnic continuity.

A2. Later Marriages of the 1880 Cohort of Boys

Not surprisingly, the single-origin compared to mixed-origin individuals in-married and also married single-origin German wives at higher rates (table 3, rows A4, B2, and D compared to others). We also have evidence of replenishment in boosting in-marriage rates because the columns defining wives' German origins are limited to first or second rather than third generation. Indeed this is the fundamental problem with the data summarized in table 3; we do not know how many of the wives classified as non-German actually had exclusively third-generation German origins that went unreported in the census data.

Table 3. From the LRS: Marital Choices of the 1866–80 Sample of Men

Husband's German origins (observed at age 0-14 in IPUMS80a: 3 generations) *Information about 3rd gen in italics*	Wife's German origins (observed in adulthood in a later IPUMS: 1900-1930; 2 generations of German origin observed)				
	A) none	B) One German-born parent	C) Two German-born parents	D. German-born wife	TOTAL
A) No 1st or 2nd generation German origins	17113	381	457	94	18046
0 no 3rd generation origins	*16675*	*352*	*384*	*84*	*17495*
1 One German-born grandparent	*137*	*5*	*6*	*2*	*151*
2 Two German-born grandparents	*204*	*14*	*32*	*4*	*254*
3 Three German-born grandparents	*14*	*0*	*6*	*0*	*19*
4 Four German-born grandparents	*83*	*10*	*30*	*4*	*127*
B) One German-born Parent	392	72	145	25	634
0 no other German-born grandparents	*236*	*34*	*60*	*16*	*345*
1 one other German-born grandparent	*19*	*5*	*9*	*0*	*32*
2 two other German-born grandparents	*138*	*34*	*76*	*9*	*257*
C) Two German-born Parents	516	159	495	114	1284
D) German-born husband	57	8	52	31	147
E) TOTAL	18078	620	1149	264	20111

Note: Most Husbands in row A0 were native born; others were foreign-born but not from Germany. Virtually all husbands rows B0-B2 and C were U.S.-born (and none were born in Germany). Most wives in column A were native born, and none were born in Germany. Virtually all wives in columns B and C were U.S.-born (and none were born in Germany).

Source: Linked Representative Sample and IPUMS80a (citation: see Table 1). Includes men of the 1866-80 birth cohort first observed in 1880, successfully linked to a later census and found to be married to a present spouse in the latter year.

We can estimate the proportion of such women with a good deal of confidence, because the proportion in each third-generation category must be about the same as for the men. We can also estimate, albeit with less confidence, whom these third-generation women married—by observing first- and second-generation marriage patterns of the

women and making some assumptions about the marital choices of the third generation. I present the estimation process and cell count results in appendix table 1. However, for purposes of discussion we can rely on the summary results in tables 4a and 4b. With these results in hand, we are in a position to say much more about the marital patterns of our cohort of third-generation husbands.

Table 4a. Selected Men of the 1866–80 Birth Cohort Successfully Linked across Time in the LRS: Men with Third-generation German Origins Found with Wife

type of 3rd generation origins	Total number N *a*	in marriage rate % of col. a *b*	inmarried men only: wife single-origin all single-origin wives % of col. a *c*	 *replenishment* : single-origin wives, 1st or 2nd generation German only % of col. a *d*
single				
3rd origins only	127	46	37	32
2nd and 3rd	257	58	45	40
mixed				
3rd origins only	424	22	16	14
2nd and 3rd	32	55	41	35
total	840	38	29	25

Table 4b. The Expected Fourth-generation German Children, Based on Couples that Include a Third-generation Man or Woman

Type of 4th-generation children	From couples observed above (includes est. for wife)		
	all couples with 3rd gen. GER Husband	additional couples: wife is only 3rd gen	total
4th generation (part or all) on BOTH sides of the family:			
a SINGLE origin, 4th generation *only*	6	0	6
b SINGLE origin, *some* 4th generation both sides	36	0	36
c MIXED 4th generation both sides	86	0	86
d subtotal: at least some 4th gen both sides of family	129	0	129
4th generation (part or all) on ONE side of the family only:			
e SINGLE German origin, through both parents	119	161	279
f ANY German origin, through both parents (includes row e)	318	262	580
g MIXED German origin, through one parent only	522	501	1022
h subtotal : SOME 4th generation German origins, 1 side of the family	840	762	1602
i TOTAL: any 4th generation German origins on either side of the family	969	762	1731
j All offspring above with SINGLE origins (subtotal: rows a, b and e)	162	161	321

Source: Data from LRS (see table 3). Estimation of wife's third-generation German origins based on appendix table 1.

First, overall, just under two-fifths (38%) in-married in the terms available to us (i.e., married immigrant, second-generation, or third-generation German women). Second, in-marriage rates were higher when the husband was of single origin, and third, they were also higher when the husband had both third and more recent generational German origins—that is, one German-born parent. They were highest of all when the husband had both single origins and an immigrant parent. Nevertheless, even in this situation, it is striking that the in-marriage rate did not exceed 58%. At least two in five with third-generation status out-married.

A considerable majority of the in-marriages are to single-origin German women (column c). However, that is largely a reflection of the high proportion of first-generation and especially second-generation individuals among the wives—again the replenishment factor created by the high levels of German immigration in the recent decades preceding 1880. This can be seen in column d, which presents the proportion of wives who were of single origin and whose German origins were not exclusively third generation. The figures are almost identical to those in column c, which includes all single-origin individuals, without regard to generational standing; the trivial differences between the proportions in the two columns corresponds to the proportion of wives with only third-generation German origins, those with single origins not created by replenishment.

Again, we cannot assume that if the immigration had ceased none of the husbands who married the single-origin wives from the first and second generation would have married a single-origin wife, but surely many would not have done so. In general, the impact of the immigration on preserving the demographic base for German ethnicity cannot be overstated.

The same points can be reformulated in terms of the children that these husbands and wives of table 4a would produce, children with at least some fourth-generation German origins through their parents (table 4b). We do not know, of course how many children will be produced by each type of couple, but fertility *levels* do not matter to the proportions of single- and mixed-origin individuals that we want to examine. Only fertility *differentials* matter—that is, differences in fertility levels across ethnic subgroups can affect the conclusions. While such fertility differentials are probably not terribly large, they are probably not zero either. Nevertheless, for purposes of this paper, I am

assuming that they are zero in order to examine the effect of the marriage patterns alone in determining ethnic outcomes.

There were 1,731 couples in our sample who could produce fourth-generation German children (couples from the LRS dataset in which the husband was born in 1866–1880 and he or his wife had third-generation German origins). Of these, only seven couples could produce children who would be exclusively fourth-generation single-origin individuals (with eight German immigrant great-grandparents, four American-born grandparents, and two American-born parents; table 4b, row a). Perhaps more striking, only 37 couples would have children of single origin who would have at least one German-immigrant great-grandparent *on each side of the family* (row b). Indeed, only children from an additional 281 couples would have any other form of single German origins (row e). Thus the total number of couples who could produce single-origin children numbered 321 (row j and k), while the rest—four in five of the 1,731 couples—would produce part fourth-generation children with mixed origins.

B. Geographic Contexts: German Concentration and the Rural-Urban Continuum

Where Germans were more concentrated they were more likely to have expressed a German ethnic culture in institutions—whether church, school, other-language instruction, newspaper, clubs, or food stores. Attitudes, both cultural and political, related to German concerns were likely to be stronger and more often discussed. And last, but far from least, new German immigrants were likely to prefer such places as those they knew about, or in which they had relatives or simply would feel more comfortable. All these factors would have increased the sense that ethnic origin was important and increased the likelihood that choosing a German-origin spouse would be important. Moreover, the simple matter of probabilities would operate in the same direction. Where there were more Germans in the marriage market, anyone was more likely to end up with a German.

We may also wonder whether the vast differences in lifestyle that the rural-urban continuum imposes also affected ethnic marriage patterns, quite apart from the ethnic concentration in an area. However, the direction of the independent impact we should expect along the rural-urban continuum is far from clear. The city may increase familiarity with a range of ethnic groups, or afford more opportunity to branch out

beyond the immediate proximity of neighbors. If so, perhaps we should expect a negative association between city residence and in-marriage—holding constant ethnic concentration, and yet at high levels of immigrant concentration such opportunities may always operate, in which case the impact of location along the urban-rural continuum may not matter much once concentration has been taken into account. All in all, the importance of ethnic concentration seems much more straightforward. Typically urban concentration may indeed be associated with high in-marriage, but whether that association is independent of ethnic concentration is another matter. In the case of the Germans, who lived in considerable numbers all along the rural-urban continuum, we can explore this issue.

B1. Creating Measures of Concentration and the Rural-Urban Continuum

As I have already explained, my measure of ethnic concentration is based on the proportion of first- and second-generation Germans found among the entire population of the ED in which the sample member was found in 1880. Besides adding this information to each sample member's record, I also sorted the 31,000 EDs in terms of the proportion of the German population in each. Two cumulative running totals indicated respectively the number of German and total residents found in all EDs with a lower proportion of Germans than found in a particular ED. I then created five categories of German concentration based on the proportion of all Germans in the United States who lived in EDs at or below a given level of concentration. The five levels were: the bottom fifth, the remainder of the bottom third, the middle third, the lower part of the top third (that is, 67th through 80th percentiles), and the top fifth. The four lowest categories respectively included all EDs with less than 11.5%, 18.6%, 42.9%, and 57.8% Germans, and the highest category included all EDs in which at least 57.8% of the population was German.

It is crucial not to forget that most Americans did not live with high proportions of Germans, and so the proportion of all Americans living in each of the five categories of German concentration varies dramatically from the proportion of all German-Americans in each. Thus whereas 20% of German-Americans lived in the lowest of the five categories of German concentration, fully 73% of all Americans lived in those EDs. For the next four categories the corresponding figures respectively are: 10%, 11%, 3%,

and 3%. In other words, only 6% of all Americans lived in the EDs that included the highest third of German-Americans ordered in terms of the level of German concentration of their neighborhood—in this case, EDs above 42.9% German.

Another option for measuring the effect of context was to choose a larger area as the unit; in particular county-level data would be available. Since there were under 2,600 counties in 1880, the average unit would include some twelve times as large a population as the ED and of course typically a much larger area. Generally, as will be seen, the explanatory power of the ED is much greater, and almost completely accounts for anything the county level of concentration can explain.[9] Nevertheless, I include both measures in the analysis in the appendix for methodological reasons.[10]

The classification used to capture the rural-urban continuum is much more straightforward because it rests on URBAN and METRO, two variables created by the IPUMS project and available for each sample member. The place in which each individual lived is accordingly either: 1) rural (under 2,500 inhabitants), 2) urban, but outside metropolitan areas, 3) in a metropolitan area, but outside its central city, or 4) in the central city of a metropolitan area.

B2. Distribution across Local Contexts: A Closer Look

The German immigrants and their children comprised about a tenth of the population in 1880. The Germans were much more urbanized than the American population as a whole, with just about half living in urban areas, and a third in the central cities of metro areas (table 5, panel C, cols. k–n). This fairly even split between rural and urban areas also existed across most levels of ethnic concentration, except that in the lowest concentration areas more of the Germans lived in rural areas and at the highest concentration level more lived in urban areas (row 2, cols. a, b, i, j). The children with more distant German

[9] The cut points dividing levels of ethnic concentration are much lower at the county level, at least for the more-concentrated half of the German population. Thus the percentage Germans in the county population were 11%, 17%, 30%, and 35% respectively for the lowest fifth, bottom third, second third, and fourth fifth of the German population ranked in order of the county-level German concentration among which they lived.

[10] Few if any studies have ever had the opportunity to compare the impact of geographic context in different sizes of place; also in the other IPUMS datasets that are not full counts, it may well be that only the county provides adequate accuracy for such an analysis of ethnic concentration so it seemed worth offering the comparison.

origins—exclusively third generation rather than second or first—were somewhat differently distributed than the others. Their families had been residents of the United States a generation longer, had more time to assimilate, as well as move around, and, in any case, some of them had only minimal German origins even in their grandparents' generation. In general, the proportion of Germans found in the total population of a rural or urban ED at any of the five concentration levels was quite similar.[11]

Table 5. Children 0–14 in 1880, by Areas of German Concentration and Rural-Urban Characteristics (population size Ns in 000s)

Children's origin	densityE=0		densityE=1.5		densityE=2		densityE=3		densityE=3.5		Total (all areas)		Grand total	Central cities only	central cities, areas of highest German concentration
	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Panel A. Selected types of German origin															
1. G. immigrant grandparents, no G. immigrant parents															
1a. 4 G. immigrant grandparents	9	3	5	4	15	16	8	8	12	14	48	45	93	31	13
1b. 1-4 G. immigrant grandp. (includes #1a)	133	31	34	28	56	61	17	21	20	28	261	168	429	110	24
2. All German-origin children (includes #1b)	366	121	151	135	325	372	123	152	174	268	1139	1048	2187	691	234
3. Non-German children	10030	1318	592	494	563	624	84	103	43	66	11313	2605	13917	1272	57
4. Total	10396	1439	743	629	888	996	208	255	217	334	12452	3653	16104	1963	290
Pane` B. Selected types of German origin as % of all children in area (column %)															
1a. 4 G. immigrant grandparents	0.1	0.2	0.7	0.7	1.7	1.6	3.6	3.1	5.4	4.2	0.4	1.2	0.6	1.6	4.3
1b. 1-4 G. immigrant grandp. (includes #1a)	1.3	2.1	4.6	4.4	6.3	6.1	8.4	8.1	9.1	8.3	2.1	4.6	2.7	5.2	8.3
2. All German-origin children (includes #1b)	4	8	20	21	37	37	59	60	80	80	9	29	14	35	81
Panel C. Selected types of German origin as % of all such children in U. S. (row %)															
1a. 4 G. immigrant grandparents	9	3	6	5	16	17	8	9	13	15	52	48	100	34	14
1b. 1-4 G. immigrant grandp. (includes #1a)	31	7	8	6	13	14	4	5	5	6	61	39	100	26	6
2. All German-origin children (includes #1b)	17	6	7	6	15	17	6	7	8	12	52	48	100	32	11

Source: IPUMS80a

Notice finally that at the highest two levels of ethnic concentration together the rural areas include 297,000 German-origin children or 14% of all German children in the country (row 2 in panels a and c). These rural areas no doubt comprised fewer German cultural institutions than urban centers of German-Americans, but they afforded a greater chance for isolated ethnic life, in which about 7 out of 10 people their own age had German roots. The top two concentration categories that were urban included a further 420,000 German-origin children.

[11] While 17% of the first- and second-generation Germans lived in rural areas of the lowest ethnic concentration, the same was true for 31% of the children with only third-generation origins. Most of these were children of mixed origin, and their origin status reflected the lower opportunities for marrying German in the earlier generation (or the lower desire to do so that allowed progenitors to move there). By contrast, among the single-origin third-generation, a mere 9% lived in rural areas of such low concentration.

Where were these areas? There are no surprises here. Thirty-seven percent of the German-American children in the category of the most concentrated rural EDs were found in Wisconsin. Between 8% and 11% were found in each of five other states—Illinois, Minnesota, Indiana, Iowa, and Missouri. The last 17% were spread across EDs in 9 other states. It is striking that the entire middle-Atlantic region included only 2% of these highest-concentration rural EDs.[12] The reason probably has something to do with urbanization there, but more to do with the timing of immigration and the limitation of our information on ethnicity to three generations. The descendents of colonial-era Germans may still have been found in strength in western Pennsylvania, but they were described in our records as the native born of native parentage.[13]

At the other end of the rural-urban continuum are EDs in the highest concentration category located in the central cities of metropolitan areas. A high proportion of the German-American children living in such EDs were found in a half-dozen cities. Forty percent were living in greater New York City (including Brooklyn); 21% were in Cincinnati, and 17% to 13% each in Chicago, Milwaukee, Detroit, and Buffalo.

B3. The Logic of Controlling Local Context

Multivariate method. The subjects analyzed are the LRS male sample members in the 1866–1880 birth cohort who were married when found in the later census year. The dependent variable is the ethnic origin of the woman each man had married: a woman without observed German origin, with mixed German/non-German origins, or single (only German) origins. For the regression analysis we rely only on the observed two generations of information about the wives' German origins (no estimation of wives' third-generation origins is included).[14] Husband's type of German origin (defined in terms of three-generation information) is a prior variable; controls for geographic context (concentration level and urban-rural status) are also included.

[12] Texas included just under 5%.

[13] Most of the individuals found in these highest-concentration rural EDs were located in counties that had been classified into the highest category of county-level German concentration—between 74% and 80% in Wisconsin, Illinois, Minnesota, and Missouri; 60% in Indiana and 47% in Iowa. This detail may be reassuring for county-level analyses.

Table 6. Characteristics of Variables Used in the Multinomial Logistic Regression Analysis

NOTE: N=20,112 couples in which the husband had been successfully linked in the LRS; he had been 0-14 in 1880

Variable name and values	Description	% of sample
GWIFE	*Dependent variable:* the German-origin status of the wife	
2	Single origin German (2 German-born parents, wife born in U.S. or Germany);	6.7
1	One German-born parent, wife born in U.S.;	3.1
0	No German origin through two generations;	90.2
MALEG	The German-origin status of the husband (the male successfully linked in the LRS)	
omitted:	No German origin (through three generations);	87.3
1	One German-born grandparent, no German-born parent	0.8
2	two German-born grandparents, no German-born parent	1.3
3	three German-born immigrant grandparents, no German-born parent	0.1
4	four German-born grandparents, no German-born parent	0.6
12	One German-born parent	1.8
13	One German-born parent, one other German-born grandparent	0.1
14	One German-born parent, two other German-born grandparent	1.2
24	two German-born parents	6.4
40	husband himself was German born (arrived in U. S. in time to be enumerate in 1880 as 0-14 years of age)	0.4
DENSITYE	the percentage of first and second generation Germans among the entire population of the enumeration district in which the husband had been enumerated in 1880	
omitted	Below 11.5% German; includes 20% of German population (73% of total population)	76.4
2	11.5%-18.6% German; includes 13% of the German population (10% of total population)	8.2
3	18.6%-42.9% German; includes 33% of the German population (11% of total population)	9.9
4	42.9%-57.8% German; includes 13% of the German population (3% of total population)	2.4
5	Above 57.8% German; includes 20% of the German population (3% of the total population)	3.2
LOCALE		
omitted	rural	80.1
2	urban, not metropolitan area	8.0
3	metro area, not central city	4.6
4	metro area, central city	7.2
Additional variables included in the models of Appendix T10		
DENSITYC	the percentage of first and second generation Germans among the entire population of the county in which the husband had been enumerated in 1880	
omitted	Below 10.5% German; includes 20% of German population (67% of total population)	69.9
2	10.5%-17.0% German; includes 13% of the German population (9% of total population)	10.8
3	17.0%-29.9% German; includes 33% of the German population (14% of total population)	11.4
4	29.9%-35.0% German; includes 13% of the German population (6% of total population)	3.5
5	Above 35.0% German; includes 20% of the German population (4% of the total population)	4.3

continuous variables:		mean	st. dev
PG	percentage German in the enumeration district;	9.7	16.2
PGSQ	PG squared	358	1073
PGCU	PG cubed	19670	79892
PGQ	fourth power of PG	1278843	6313636

[14] The process I used to estimate wives' third-generation origins in appendix table 1 and in table 4 was based on aggregates; I have not attempted to extend it to individuals.

Given the three-category dependent variable, a multinomial logistic regression analysis is appropriate. It deals with the odds of marrying in versus out and the odds of marrying a single-origin German woman versus anyone else. The coefficients on terms in the model report the change in these odds between the omitted category of the prior variable and the category to which the coefficient refers. The change is calculated to be the same across categories of the prior variable for both dependent-variable outcomes (in versus out, single versus all other). Logit analysis presents the odds and the coefficients in natural log form. In that form, the model involves additive changes; when exponentiated the intercepts are odds and the coefficients on prior variable categories are odds ratios. The prior variables are all categorical rather than continuous.[15]

Limitations. Self-selection is involved in the choice of residence. Presumably German-Americans who chose to stay among many other Germans were on average more committed to their origins than out-migrants, other things being equal. Consequently, in controlling for geographic area to observe the net effect of German ethnic origins upon marital choice we may be controlling too much. Somewhat similarly, German ethnic origins are partly a result the geographic situation of progenitors; when we control present location, we do not control for location's earlier role in creating the husband's ethnic origins in the first place. Of these two problems, I think the first is the more serious because the second concerns earlier historical processes only, without confounding the interpretation of those being measured by the regression analysis.

The conundrum posed by the former can be acknowledged, however, without dismissing that we still need to do the best job we can in taking the impact of local area into account. True, some of the impact we find to be related to local area may be related to husband's German ethnic status (via self-selection). However, it is easy to show that much of the impact of local area is independent of husband's German status. The first model in table 7 omits all husbands with any observed German origin; only the marital choices of non-German husbands are at issue, and only German concentration and rural-urban differences are affecting marital choices. The impact of moving across the local contexts from areas of lower to higher German concentration is of course less than it is

[15] However, appendix 2 introduces a linear variable for the percentage German concentration of the ED.

when the German husbands are included (compare model 0 and model 4 in table 7). Nevertheless, that impact is strong even in the first model 0: the odds of marrying a German-origin woman climb steeply across the local contexts with rising German concentration.

Table 7. The Multinomial Logit Analysis of Marital Choice

Note: the dependent variable is the wife's German origin; see Table 5 for variable and category definitions

		Model 0		MODEL 1		MODEL 2		MODEL 3		MODEL 4		MODEL 5			MODEL 6
		no German-origin			Standard		Standard		Standard		Standard		Standard		
Parameter	DF	*husbands included*		Estimate	Error	Estimate	Error	Estimate	Error	Estimate	Error	Estimate	Error		Estimate
Intercept 2	1	-4.0689	0.0581	-3.5412	0.041	-3.7156	0.0462	-2.9799	0.0345	-3.7555	0.0472	-3.907	0.0486		-3.9381
Intercept 1	1	-3.4727	0.049	-3.014	0.0358	-3.2296	0.0423	-2.5653	0.0308	-3.2689	0.0433	-3.3562	0.0436		-3.3875
maleG 1	1			0.6755	0.2897							0.3225	0.2982	*ns**	0.2887
maleG 2	1			1.6171	0.1605							0.89	0.1686		0.8755
maleG 3	1			2.3264	0.4738							1.3508	0.4913		1.3001
maleG 4	1			2.4255	0.1851							1.218	0.1965		1.2144
maleG 12	1			2.2509	0.1194							1.6089	0.1273		1.6029
maleG 13	1			2.6597	0.3508							1.4978	0.3648		1.4753
maleG 14	1			2.8622	0.1259							1.7296	0.1377		1.7201
maleG 24	1			3.4255	0.0649							2.3579	0.0781		2.3472
maleG 40	1			3.6655	0.1632							2.6269	0.1731		2.6148
densityE 1.5	1	0.9867	0.1109			1.526	0.0806			1.4318	0.0829	1.0427	0.0872		0.9849
densityE 2	1	1.3799	0.1002			2.2646	0.0648			2.1592	0.0683	1.4646	0.0753		1.4104
densityE 3	1	1.8312	0.2055			3.0537	0.0958			2.9328	0.0992	1.63	0.1143		1.5686
densityE 3.5	1	1.956	0.2579			3.6292	0.0849			3.5053	0.09	1.9904	0.1045		1.9435
locale 2	1	0.6272	0.1117					0.9729	0.0733	0.316	0.0815				0.2133
locale 3	1	0.5885	0.1403					0.7982	0.0983	0.2504	0.1079				0.3163
locale 4	1	0.29	0.1273					1.6827	0.061	0.2857	0.0723				0.1301
measure of explained variation: -2 Log L															
intercepts only				15673											
model				12299		12795		14932		12769		11781.9			11770
difference				3374		2878		741		2904		3891			3903
% explained over intercepts				21.5		18.4		4.7		18.5		24.8			24.9

NOTE: all coefficients are statistically significant, p. < .05 unless noted: ns: .1 > p. >= .05 *ns**: p. >= .1 SOURCE: LRS (see Table 3).

A second limitation concerns the control for context at a particular moment in time, namely childhood residence in 1880. Families may have moved before or after, and recall that some of these children were infants in 1880 so there was ample time available for a change at critical ages. Moreover, the context in which an LRS husband was later found with his spouse may be different from that in which he grew up. All these considerations limit the completeness of the analysis of context, but they suggest that whatever impact our measure has can be considered a minimal one for the impact of context. This consideration will be frustrating, especially in connection with our effort to observe the effect of husband's ethnic origin upon marital choice. Still, this sort of

limitation in the quality of measures is important to acknowledge, but it is hardly so great as to lead us to reject the strategy of analysis.

Moreover, the IPUMS project provides a migration variable in the LRS sample, which allows us identify individuals who were found in a different county of the same state or in a different state in the later census year. About a quarter of the sampled husbands in the LRS had made each type of move. Yet adding a control for these moves to the regression models shown in table 7 revealed that both types of migration had insignificant coefficients, and had no impact on the other terms of the model. This outcome is less surprising than it at first seems; migration generally may have been to places similar in nature to those in which the migrant grew up, or migration may have occurred after marriage in a substantial fraction of cases. Both considerations apply not only to the specific migration variable used, but to the substance of the concern about limiting the measure of context to 1880.

A third limitation is that in the highest category of German concentration, the distribution of wives' German status is restricted: most women have observed German origins. Still, such a pattern of shared attributes is often the case in regression analysis. Moreover, when I reran regressions omitting everyone living in the areas found in the highest category of German concentration, coefficients for husband's German origins (and for the other areas of concentration) were very similar to those shown in the final models of table 7 model 6. Again, this outcome is not as surprising as it may appear at first sight: only 20% of the German-origin men and only 3% of other men lived in the category of place omitted from the analysis.[16]

B4. Controlling for Local Context: Analysis

The first three models each include only one variable—husband's German origins, German concentration in the 1880 ED of residence, and type of place (on the rural-urban continuum). The differences in husband's German origins, before any controls are imposed (table 7, model 1; see table 6 for variable and category definitions) are very large. The odds that a non-German will marry a German-origin wife are about 3 in 100

(expressed in log form in the coefficient for the first intercept); the comparable odds for the American-born son of two German immigrants are some 31 times as great—an odds ratio of 31 (expressed in logged form in the coefficient for husbands in group H2.4, single-origin second-generation).[17] Shifting attention to geographic concentration (model 2) shows similar intercepts and coefficients rising to the similarly high levels of model 1. By contrast, the variation explained by the rural-urban factor is much lower than either of the two other variables. So too, adding the rural-urban continuum to German concentration (model 4) only slightly reduces the coefficients for concentration or increases total variation explained.

The crucial models follow, adding the two measures of geographic control to the husband's type of German origins. Model 5 includes German concentration and husband's origins. The variation explained rises considerably over model 1. More important for our purposes, the strength of the coefficients on both variables fall appreciably. For example four categories of husbands have single German origins (H0.4, H1.4, H2.4, Hg). When the neighborhood's German concentration is taken into account, the coefficients for these four categories of husbands drop from 2.43, 2.86, 3.43, and 3.66 to 1.22, 1.73, 2.36, and 2.63, respectively. While all remain very significant, substantively and statistically speaking, these are large drops. We saw earlier that the odds of marrying a German-origin woman were 31 times as great for the American-born son of two German immigrants (H2.4) compared to a non-German; with neighborhood's German concentration taken into account the odds ratio falls to 11.[18]

Model 6 adds the control for the rural-urban continuum; the added impact adds very little to the variation explained and hardly affects the coefficients on the other two variables at all. The difference between living in central cities and living in rural areas

[16] A second test involved restoring the omitted cases and creating an interaction term for the association between high concentration and husband's German origin (I tried several different definitions of the latter), but its coefficient was insignificant and again did not affect the other terms in model 6.

[17] The exponentiated form of the first intercept, -3.5412, gives an odds of marriage of about 3. The odds are converted to a percentage as odds/(1+odds) or again about 3%. For single-origin second-generation husbands, the coefficient is 3.4255 (exponentiated: an odds ratio of about 31). Adding the coefficient to the first intercept and then exponentiating gives an odds of 0.89. These, in turn, correspond to the in-marriage rate (percentage in-marrying in the group, .89/1.89) of about 47%.

[18] The coefficients for the concentration categories have likewise fallen sharply as a result of including husband's origin in the model—and this is distinctly so for the highest levels of concentration,

(the omitted category) is statistically insignificant in this model. The regression analysis confirms our expectation that it is the independent effect of concentration and not of location on the rural-urban continuum that matters for marital choice, at least among the Germans, who are liberally distributed across all the relevant categories of both variables.

Consider again the role of German husband's origin type in either of the last two models (5 or 6), this time focusing on the importance of generational standing. We have already noted the coefficients from model 5 on the four categories of single-origin husbands when neighborhood German concentration was controlled. In exponentiated form these coefficients correspond to odds ratios of 3, 6, 11, and 14. Note now that these coefficients refer to different generations of single-origin men: exclusively third, part third/part second, exclusively second, and immigrant respectively. Thus even among men with only German in their ethnic makeup, having had even one parent rather than only grandparents born in Germany doubles the odds of choosing a German spouse (odds ratios of 3 and 6); having two German-born parents about doubles them again (to 11). The odds do not climb as steeply when we shift from the second generation to the first (odds ratio of 14). Recall however, that these foreign-born husbands from the LRS sample I selected (males 0–14 years of age in 1880) were, by definition, living in the United States by the time they were 14 and some were living there before their first birthday. The small odds ratio increase between our second- and first-generation single-origin husbands, therefore, actually is consistent with the other odds ratios: the exception is explained by the special meaning of generational standing for the immigrant husbands in the sample.

The fundamental conclusion is that generational standing, even more than single origin, is the critical determinant of ethnic marital choice among these men. The exclusivity implied by having only single origins in the third generation, even when most third-generation members were not single origin, simply does not have an impact comparable to that of being closer to the immigrant experience and to things German as were the American-born children of German immigrants. Thus the single-origin men of exclusively second-generation origins were nearly four times as likely to have taken a

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underscoring the difficulties of disentangling origins and context in those areas (discussed in the preceding section).

German-origin wife than the single-origin men with exclusively third-generation origins (exponentiated coefficients of 11:3).[19]

Here again we also have evidence of the impact of replenishment. The ongoing German immigration not only made for a larger demographic base for ethnicity's survival; it also meant that more part third-generation men were also part second-generation, and closer in orientation to things German. Such men were twice as likely to have taken German-origin wives than men of exclusively third-generation single-origin.

C. By Way of Conclusion: How Great a Buffer Were the EDs of High German Concentration against National Out-marriage Rates?

Single-origin couples with some third-generation origin: Turning back from the regressions to the cross-tabulations will prove illuminating for understanding the distinctive role of high-concentration areas in German ethnic endogamy. Tables 8a–c are arranged to present marital patterns for the entire sample and for the different levels of concentration; Tables 8a–b expand part of the earlier tables 4a–b that covered the sample as a whole. Although the sample sizes here are frustratingly small for historians accustomed to working with the IPUMS, we can still learn a good deal.

[19] Indeed the model shows a higher (although not quite statistically significant) coefficient for husbands with mixed origin, but one German-immigrant parent, than for single origin, all in the third generation. At the other extreme, note that once context has been controlled, men with only one German grandparent and

Table 8a. A Comparison of In-marriage for the Entire Sample and Those from the Areas with the Highest German Concentration

Type of husband's 3rd generation origins	Total number of husbands (N) and *in-marriage rate (%)*									
	entire sample		by level of German concentration in the ED of residence, 1880							
			lowest 3rd		middle 3rd		highest 3rd		highest 5th (included in highest 3rd)	
	N	%	N	%	N	%	N	%	N	%
	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
single										
3rd origins only	127	*46*	24	*19*	35	*37*	68	*59*	46	*62*
2nd and 3rd	257	*58*	60	*32*	76	*51*	121	*75*	78	*80*
mixed										
3rd origins only	424	*22*	267	*9*	101	*30*	56	*62*	34	*73*
2nd and 3rd	32	*55*	6	*	12	*	15	*	9	*
total	840	*38*	357	*14*	224	*39*	259	*68*	168	*74*

* percentage not calculated when sample size LT 20.

Table 8b. The Expected Fourth-generation German Children: Comparisons by Level of German Concentration in 1880, Based on Couples That Include a Third-generation Man or Woman

Type of 4th-generation children	total number of couples (or % in last two rows)				
	entire sample	by level of German concentration in the ED of residence, 1880			
		lowest 3rd	middle 3rd	highest 3rd	highest 5th (included in highest 3rd)
	a	*b*	*c*	*d*	*e*
4th generation (part or all) on BOTH sides of the family:					
a SINGLE origin, 4th generation *only*	6	0	1	6	1
b SINGLE origin, *some* 4th generation both sides	36	2	7	27	19
c MIXED 4th generation both sides	86	7	41	38	30
d subtotal: at least some 4th gen both sides of family	129	9	49	71	50
4th generation (part or all) on ONE side of the family only:					
e SINGLE German origin, through both parents	279	32	69	178	123
f ANY German origin, through both parents (includes row e)	580	82	159	339	236
g MIXED German origin through one parent only	1022	633	253	136	67
h subtotal :SOME 4th generation German origins one side of the family	1602	715	412	476	304
i TOTAL: any 4th generation German origins on either side of the family	1731	724	460	547	354.1693249
j All offspring above with SINGLE origins (subtotal: rows a, b and e)	321	34	77	211	143
			%s:		
k Single origins as percent of all in column (percentage row j of row i)	*19*	*5*	*17*	*39*	*40*
l Single origins in column as percent of all with single origins (cell in column as percentage of row k, column a)	*100*	*10*	*24*	*66*	*45*

no other German origins in-marry at such low rates that they are statistically indistinguishable from the rates at which non-Germans married Germans.

Table 8c. Missed German Origin in Areas of High German Concentration: A Test

Subgroup of couples selected from LRS sample*	total number of couples (or % in last two rows)				
	entire sample	by level of German concentration in the ED of residence, 1880			
		lowest 3rd	middle 3rd	highest 3rd	highest 5th (included in highest 3rd)
	a	*b*	*c*	*d*	*e*
All 2nd-generation wives (one or two German immigrant parents) whose husband and his parents were not German-born	838	557	184	98	51
The percentage of these husbands with a German-born grandparent	12	4	16	54	70

*The sample includes couples whose husband was in the 1866-80 birth cohort.

Source: data from LRS (see table 3).Estimations of wife's third-generation German origins from appendix table 1.

As the regressions showed us, the level of in-marriage rises sharply with concentration. Here I focus on exclusively third-generation men of single origin. In the EDs where the least and most concentrated third of German-Americans lived, 19% and 59%, respectively, in-married (table 8a). For those with more recent origins, closer to the immigrant generation, rates are some 10–15 percentage points higher in each case. In the low-concentration areas, even men who had: a) two German immigrant grandparents on one side of the family, and b) a German immigrant parent on the other side had seven chances in ten to *out*-marry. In the high-concentration areas even those: a) of mixed origin and b) without a German immigrant parent had six chances in ten to *in*-marry.

As we might expect, in-marriage rates in the middle areas of concentration fell roughly at the midpoint between those for low and high areas (37% for single origin, with third-generation roots only). These rates were not very high and the upshot is that in-marriage rates across the areas where two thirds of German-Americans lived were quite low overall (about three in ten for the single-origin, third-generation roots only). And consequently, if there was a buffer against the assimilative trend in those areas it would be found in the most concentrated German areas, where the third or fifth of Germans who lived among the highest proportion of other Germans lived. In those areas we find in-marriage rates between 60 and 80%.

We can see the implications for the fourth generation fairly clearly as well, when we highlight the couples formed with a third-generation husband from the cohort we have followed (men born 1866–1880 and found in the LRS; table 8b). The proportion of men with third-generation single-origins who married women of the same background was miniscule everywhere (rows a and b). A more appreciable minority, if still small, includes single-origin couples with at least some third-generation origins on at least one side of the family (row j). There are 321 of these couples in the sample, spread across the country,

but such couples were nearly eight times as common in the highest compared to the lowest areas of German concentration (row k), and fully two-thirds of them (211/321) were in fact living in the high concentration areas. Again, if endogamy is the bulwark of ethnic continuity, then it would be found mostly in these areas and in these single-origin couples with third-generation roots.

More-distant German origins not observed in the census. I stressed at the outset that German immigration had been going on for more than two centuries prior to the 1880 census. By that year, many people reporting as native born of native parentage surely had German origins from earlier progenitors that we cannot observe. How ought we to think about the importance of such more distant, unobserved origins?

The first consideration, I think, must be that the most important unobserved origins are those prior, *but near in time to*, the reported origins. I assume, in other words, that the farther back in time we probe past the grandparents, the less likely it was that German origin had any significance for the families involved. True, thus is an untestable assumption, and one directly related to the very process I am trying to study. Nevertheless, two obvious considerations give some confidence in the assumption. First, after many generations of cultural assimilation, memories of ancestral culture are likely to be much reduced, even in the absence of out-marriage; that is the import also of the comparison of marital choice in the second and third generation discussed at the end of the preceding section. Second, dilution of those memories through out-marriage is in fact extremely likely to have occurred over the course of many generations. Again, the evidence of preceding sections of the paper make just that point (see, for example, table 4).

If we can accept the assumption that recent unobserved origins matter most, we can make some progress where it is most useful. We can gauge the prevalence of unreported German origins among the wives one generation farther back in time than the third-generation origins already estimated. Unobserved (and unestimated) German origins will raise in- compared to out-marriage rates and (to a lesser extent) single compared to mixed origins among the couples producing the next generation.

The prevalence of these unobserved origins can be assessed as follows. We have

three generations of ethnic information on the husbands in our LRS sample of the 1866–1880 cohort. If we ignore the information on the grandparents of these men, and classify them based on two generations of ethnic information only, how great is our error rate in classifying Germans as non-Germans? Table 8c shows that the rate climbs stunningly across the categories of EDs' German concentration. If this is the situation for unobserved third-generation origins based on two-generation data, we should assume that a similar situation would be found for unobserved fourth-generation origins based on three-generation data. Probably however, the proportion of unobserved origins were somewhat smaller in this latter case both because the farther back we glance, the lower the level of German immigration. Moreover, the impact of the error upon observed marital choices can be expected to be smaller in the latter case because the additional generation of cultural assimilation will have passed over the descendants' families. Nevertheless, the direction of any correction is clear: it will raise the estimate of ethnic continuity expressed in the choice for in-marriage.

A demographic base for long-term German ethnic continuity? In the light of all this we can regard the results from several perspectives. Overall, we have seen a very considerable level of out-marriage over the generations. At the same time, we see dramatic differences in marital patterns across geographic areas; precisely where German cultural institutions were likely strongest, single-origin descendents are more prevalent and more likely to in-marry. Moreover, the number of single-origin descendents in the fourth generation can be thought of not only in comparison to the much larger number of mixed-origin fourth-generation descendents, but in relation to the number of German immigrants who produced them; cumulative fertility rather than only cumulative rates of out-marriage are relevant. Is the numeric base for long-term German ethnic continuity (measured as the number of descendents with single origins) roughly of the same magnitude as the immigrant population had been? The calculations are tedious, and I have banished them to appendix 1. The conclusion from these calculations is that after taking unobserved fourth-generation German origins into account, perhaps a quarter of all the 1,731 couples of third-generation origins had single origins (up from a fifth reported in tables 4b and 8b). This estimate means in turn that the that next generation offspring

that these third-generation couples produced had to number about four times their immigrant great-grandparent progenitors to produce in the one in four of single origin a group as large as the immigrant progenitors. In fact, the result of still-more estimation in appendix 1 suggests that the fourth-generation descendents did not quite reach such magnitudes. However they did come close, reaching perhaps 70–75% of that number. This then suggests that insofar as German ethnicity faded across the generations it is the cultural processes operating even within the single-origin couples that was determinative—more than the absence of a single-origin base of plausible magnitude. We have seen some hint of these cultural processes in our regression analysis, when we observed that the odds that single-origin men would in-marry were almost four times less for exclusively third-generation compared to second-generation men.

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APPENDIX 1. ESTIMATES OF THE NUMBER OF SINGLE-ORIGIN FOURTH-GENERATION DESCENDENTS COMPARED TO IMMIGRANT PROGENITORS.

Unobserved German Origins in the Fourth Generation

As explained in the text, we have three generations of ethnic information on the LRS birth cohort of men. We ignore for a moment the information pertaining to the third generation back and ask how high an error rate we would encounter if we relied only on information covering two generations. Nationally, the answer is 12%.[20] However, misclassification rises drastically with the degree of German concentration in the area, from 4% to 16% to 54% and finally to 70% where the highest concentrated fifth of the German population lived.

As also mentioned in the text, error rates for the fourth generation back based on information covering three generations of data were probably lower than those just discussed because of the lower magnitude of immigration earlier in the century and because another generation of assimilation could have promoted out-marriage.

The misclassification rate for third generation using two-generation information was 54% in the EDs with the highest third of the German population ordered by concentration. Assume that the comparable figure for a generation farther back in time was lower but still high—let us say 25%–40%. Assume farther that the reclassification would shift about a third of the descendents in mixed-origin couples with German ancestors on both sides of the family to single-origin couples (rows c and f of table 8b).

[20] A second, albeit less important, test also suggested that at the national level German origins one generation farther back than the observable origins were not prevalent enough to transform observed patterns. Our evidence on third-generation origins in the IPUMS80a comes from the child's parents' lines of the census, where they report on "mother's place of birth" and "father's place of birth." For a German immigrant the entry will read "Germany"; if that immigrant married an American-born spouse, the entry will state only that fact (specifically, the state of birth). How often were such individuals (grandparents of our sample members) actually second-generation Germans? We can approach an answer by examining a proxy group, elderly couples, in the IPUMS80a. I have focused on couples in which the husband was 70–79 years of age in 1880. Some 18,000 such couples included a husband or wife who was German-born. In 15,000 of these couples, both were German-born. However, 952 husbands and 2,026 wives had not married fellow German immigrants—1,729 of these spouses were American-born and 231 of them were second generation Germans. Another 150 were the children of immigrants from other countries—1,348 members of this great-grandparent cohort were American-born themselves.

The single-origin couples in the high-concentration areas would then be corrected from 221 (row j) to 283–322. In the rest of the country the correction factor would be drastically lower. Assume therefore that the figure for single origins among our 1,731 couples with some third-generation origin would rise from 321 to 407–460—raising the single origin from 19% to 24%–27% of all fourth-generation descendents, or roughly one-quarter of all descendents.

Immigrant Progenitors and Single-origin Fourth Generation Descendents

Would a single-origin population comprising one-quarter of the great-grandchildren of immigrants have been large enough to sustain ethnic life? Needless to say, such a question involves much more than numbers, yet the numbers will be part of the answer. While the proportions involved are low, we know that the number of descendents has likely grown in each generation since the immigration. So we can reasonably ask whether the absolute number of the single-origin descendents might still comprise a group roughly as large as the immigrant population that produced them. If all adult descendents were four times as numerous as the immigrant progenitors had been, then the quarter among them with single-origins would indeed have been as numerous as those progenitors. Thus we need a rough estimate of the total number of descendents to determine whether it was roughly four times the magnitude of the immigrant great-grandparents. The best parameters we have, I think, are far from perfect: measures of fertility and survival rates into adulthood for all white women in America in various years. I used figures for 1850, 1880, and 1910, respectively, to proxy for the immigrant, second- and third-generations' characteristics. Specifically, I exploited total fertility rates to crudely estimate the net reproduction rate (NRR) for women in these years. The former is an estimate of what completed fertility of a woman would be if she followed the fertility patterns of successive five-year cohorts of women; the latter limits this estimate to female offspring who would survive to the age of each successive five year cohort (I simplified further by using the female survival rate to age 25). The NRR provides a rough measure of how many adult-women offspring succeeded each woman of the preceding generation. I multiplied the three successive NRRs thus obtained – 1.67*1.29*1.37 = 2.96; roughly

three fourth-generation female adult descendents had replaced each female immigrant; a related estimate yielded similar results (2.83).[21] In our estimates at least, the cumulative fertility gains over the generations were not quite great enough to balance out the losses to single origin from out-marriage; nevertheless there were still nearly three single-origin descendents for every four of their immigrant great-grandparents (2.83/4 =.71 and 2.96/4 =.74).

[21] Haines (2000: 158–63) gives the total fertility rate for whites in 1850, 1880, and 1910, respectively, as 5.42, 4.24, and 3.42. I multiplied these by 0.49 to limit the rates to female births, and by 0.63, 0.62, and 0.82, respectively, to limit them to females who survived to age 25. The female survival rates were taken from Haines (2006: 451). Haines cautions that NRRs "are not indicators of future population growth. They do not take into account such factors as nuptiality, marital duration, and size of family, and they assume the continuation of the age-specific rates in a given year throughout the lifetime of a cohort of women" (425). Nevertheless, in the context of my other heroic assumptions these limitations seem acceptable. I also made a second estimate from the number of children ever born to women ever married (5,278, 5,082, and 3,270 for women born 1835–39, 1850–54, and 1880–84, respectively). Haines (2006: 434) assumed 0.05 had never married, and applied again the decimals for female births and survival to age 25. This estimate bypasses synthetic cohorts at the cost of relying on reports of women in a single five-year birth cohort past the end of their childbearing years. It produced a very similar second estimate of 2.83 (instead of 2.96) female descendents per immigrant woman.

APPENDIX 2. CONTROLLING LOCAL ETHNIC CONCENTRATION: ADDITIONAL ANALYSES

Controlling for County vs. Enumeration District

We can control for German concentration at either the ED or county level (appendix table 2; see text table 6 for variable and category definitions). The control at the ED level captures more of the variation in marital choice and explains more of the total observed association (without controls) between husband's origin type and marital choice. Still, the county-level control alone does account for a substantial fraction of the variation that can be controlled with any form of the variable. Since the ED information will often be impossible to use in the absence of a full count dataset, the fact that the county captures much of what the ED can (at least in the analysis of German marriage patterns) should come as good news. For example, the logit coefficient for single-origin second-generation husbands (compared to non-Germans) is 3.43 with no controls, 2.67 when county concentration is controlled, and 2.36 when the ED level is controlled. Even the difference between the two latter coefficients is statistically significant; so too is the added amount explained when concentration at the ED level is added to the model already including concentration at the county level. By contrast, adding county after the ED has explained all it could reduces the coefficient by an insignificant amount. If there are some social processes for which local area must be measured at a higher level of geography than the ED, it does not appear that German-American marital choice is such a process (at least if the alternative is county).

Linear vs. Categorical Controls for the Ethnic Concentration in Enumeration Districts

A continuous measure for ethnic concentration will capture more of the marital outcomes than five broad categories of concentration. However, the assumption of a linear relationship between the continuous measure of concentration and marital choice will have to be avoided; I have done so by including higher order forms for the continuous variable (squared, cubed, and fourth-power forms). The use of the continuous variable, and its higher order forms sacrifices a relatively intuitive meaning for each level of

concentration, and the ability to relate the discussion of cross-tabulations to the regression results. But it does allow us to say that we have captured all the association between the concentration variable and marital choice.

When the linear control is included, it is more effective than the country measure alone and less effective than the five-strata ED measure alone. However, once the correction of the squared term is added, the pair of continuous variables outperform the five-category variable based on the EDs, and with the cubed and squared terms added, the continuous variable does better still (see models 5–8). Indeed, even after both county and ED strata have been taken into account, adding the linear measure reveals additional statistically significant impact.

In terms of total variation explained (the measure at the bottom of the table), the continuous variable is much more effective. Using county levels explains 3.5% more of the variation in the dependent variable than is explained when only the husband's German origins are included; using only the ED raises this percentage to 4.2%, and using both to 4.6%. Using the linear continuous measure explains only 3.7%. However, adding the squared term raises it to 5.1%, above the level the categorical variables can reach. Adding both county and ED categorical forms along with the cubed and fourth-power forms raises the explained variation to 6.7%.

Of greater interest is the reduction in the coefficients on husband's German origins when the control for geographic context is added. The additional power gained by using the continuous instead of the five-category variable affects our interpretation of husband's origin rather modestly. Compare model 3 (five strata of ethnic concentration at the ED level) to those in model 6 (continuous variable). The differences are not statistically significant.

APPENDIX 3. TABLES

Appendix Table 1. Estimating Marriage Patterns through Three Generations of Ethnicity: The Male Birth Cohort of 1866–80 in the LRS

Husband's German origin: observed in birthplaces of his			Wife's German origins estimated through her grandparents' generation												Wife Total
			None						US-born with 1 German-born parent				2 Ger-b-p	Ger b W	
parents	*grandparents*	row	W0.0	W0.1	W0.2	W0.3	W0.4	**W0.total**	W1.2	W1.3	W1.4	**w1.total**	W2.4	Wg	
None	0	H0.0	16284	132	188	11	61	**16675**	258	11	84	**352**	384	84	17495
			37	*2*	*15*	*2*	*18*	***0***	*11*	*1*	*10*	***0***	*0*	*0*	*0*
	1	H0.1	131	1	3	0	1	**137**	3	0	2	**5**	6	2	151
			2	*0*	*1*	*0*	*1*	***0***	*1*	*0*	*1*	***0***	*0*	*0*	*0*
	2	H0.2	188	3	7	1	6	**204**	7	1	7	**14**	32	4	254
			2	*0*	*1*	*0*	*1*	***0***	*2*	*0*	*1*	***0***	*0*	*0*	*0*
	3	H0.3	12	0	0	0	1	**14**	-1	0	1	**0**	6	0	19
			1	*0*	*1*	*0*	*0*	***0***	*1*	*0*	*1*	***0***	*0*	*0*	*0*
	4	H0.4	68	1	5	1	7	**83**	3	1	6	**10**	30	4	127
			3	*0*	*1*	*0*	*2*	***0***	*1*	*0*	*1*	***0***	*0*	*0*	*0*
1 German-	2	H1.2	210	3	13	1	8	**236**	20	1	12	**34**	60	16	345
			7	*1*	*5*	*0*	*1*	***0***	*2*	*0*	*2*	***0***	*0*	*0*	*0*
born	3	H1.3	14	0	2	0	2	**19**	2	0	2	**5**	9	0	32
			1	*0*	*1*	*0*	*0*	***0***	*1*	*0*	*1*	***0***	*0*	*0*	*0*
parent	4	H1.4	107	2	13	2	13	**138**	14	2	17	**34**	76	9	257
			5	*0*	*4*	*0*	*1*	***0***	*2*	*0*	*2*	***0***	*0*	*0*	*0*
2 German-born parents (4 G gr par)		H2.4	400	9	43	7	57	**516**	56	12	92	**159**	495	114	1284
			31	*1*	*10*	*2*	*17*	***0***	*10*	*1*	*9*	***0***	*0*	*0*	*0*
German-born husband (4 G gr par)		Hg.4	49	1	2	1	5	**57**	-1	1	8	**8**	52	31	147
			1	*0*	*1*	*0*	*1*	***0***	*3*	*0*	*2*	***0***	*0*	*0*	*0*
Total		H Total	17464	154	276	24	160	**18078**	361	29	230	**620**	1149	264	20111

Notes to appendix table 1

Cells shown in larger font involve *no estimation in the marriage patterns of husbands and wives in the table*

Column totals for W0.0-W0.4 and W1.2-W1.4, also shown in larger font, involve estimates of origin (not marriage) as described in #1 below.

Entries in bold contain row subtotals.

Italicized entries below cell counts indicate .4 of the range between the HI and LO estimates averaged in the count (see below).

PROCEDURES USED FOR ESTIMATING CELL COUNTS IN COLUMNS W0.0 - W0.4 AND W1.2 - W1.4 ABOVE

** NOTE that the computation described below was not performed on the rows and columns of the table above.*
Rather the computations were made individually for each of the five ED categories
(defined by German population concentration as explained in part B of the text)
and then results for each cell were summed across the five categories.

1. Column marginals for wives are assumed to have the same distribution as row marginals for husbands
(e.g.: col. W0.2=W0.total * H0.2/H0.total).

2. Cell counts are computed in two ways and the *mean of the two estimations is used* .
2a. LO (estimate based on assumption of low in-marriage)
Cell counts are based on random distribution rc/n: row [sub]total *column total/[sub]table grand total.
(e.g.: cell H0.2/W0.2=(marginal H.t/W0.2 * marginal H0.2/W.0t) / subtable total H.t/W0.t.

2b. HI (estimate based on assumption of high in-marriage)
2b1. Cells in both cols. W1.3 and W1.4 given the same distribution as cells in Col. W2.4.
2b2. Cells in col. W1.2 by subtraction.
2b3. Cells in both cols. W0.3 and W0.4 given the same distribution as the final outcome (mean of HI +LO estimates) for col. W1.4.
2b4. Cells in col. W0.2 given the same distribution as the final outcome (mean of HI and LO estimates) for col. W1.2.
2b5. Cells in col. W0.1 given the same distribution as the mean of i) the LO estimate (random) and the ii) the final outcome (mean of HI and LO estimates) for col. W1.2.
2b6. Cells in col. W0.0 by subtraction.

Source: LRS (see table 3).

Appendix Table 2. Further Regression Models: Linear and Categorical Controls for German Concentration

Note: the dependent variable is wife's German origin; see Table 6 for variable and category definitions.

		MODEL 1		MODEL 2			MODEL 3			MODEL 4			MODEL 5			MODEL 6	
Parameter	DF	Estimate	Standard Error	Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error
Intercept 2	1	-3.5412	0.041	-3.9438	0.0506		-3.907	0.0486		-3.9971	0.0517		-3.8053	0.0446		-4.1165	0.0531
Intercept 1	1	-3.0141	0.0358	-3.3991	0.0458		-3.3562	0.0436		-3.4451	0.0469		-3.2514	0.0387		-3.5632	0.0482
maleG 1	1	0.6755	0.2897	0.4691	0.2953	*ns**	0.3225	0.2982	*ns**	0.3183	0.2989	*ns**	0.4012	0.298	**ns*	0.2482	0.2992
maleG 2	1	1.6171	0.1605	1.1172	0.1657		0.89	0.1686		0.8715	0.1686		1.034	0.1695		0.7955	0.1699
maleG 3	1	2.3265	0.4738	1.666	0.487		1.3508	0.4913		1.3307	0.493		1.3432	0.4957		1.0801	0.4941
maleG 4	1	2.4256	0.1851	1.5909	0.1925		1.218	0.1965		1.1915	0.1968		1.1678	0.2029		0.9775	0.1979
maleG 12	1	2.251	0.1194	1.7693	0.1246		1.6089	0.1273		1.5765	0.1271		1.6907	0.1274		1.4962	0.1277
maleG 13	1	2.6598	0.3508	1.8729	0.3655		1.4978	0.3648		1.4818	0.3678		1.5324	0.372		1.2547	0.3685
maleG 14	1	2.8623	0.1259	2.0069	0.1333		1.7296	0.1377		1.675	0.1374		1.7495	0.1415		1.5317	0.1388
maleG 24	1	3.4256	0.0649	2.6725	0.0727		2.3579	0.0781		2.3237	0.0781		2.4177	0.0791		2.1938	0.0786
maleG 40	1	3.6656	0.1632	2.9767	0.169		2.6269	0.1731		2.6146	0.1737		2.7005	0.174		2.3904	0.1743
densityC 1.5	1			0.8148	0.0857					0.4505	0.0955						
densityC 2	1			1.2146	0.0744					0.5938	0.0946						
densityC 3	1			1.4767	0.0989					0.7176	0.1198						
densityC 3.5	1			1.626	0.0957					0.7282	0.1243						
densityE 1.5	1						1.0427	0.0872		0.7348	0.098						
densityE 2	1						1.4646	0.0753		1.0117	0.0976						
densityE 3	1						1.63	0.1143		1.1045	0.136						
densityE 3.5	1						1.9904	0.1045		1.4261	0.134						
Pg	1												0.0311	0.00146		0.0797	0.00389
Pgsq	1															-0.00064	0.000048
Pgcu	1																
Pgq	1																
locale 2	1																
locale 3	1																
locale 4	1																
measure of explained variation: -2 Log L																	
intercepts only		15673															
model 1 (used for comparison)		12299		11870			11781			11732			11846			11671	
difference over model 1		0		429			518			567			453			628	
% explained over intercepts and maleG variable in Model 1		0		3.5			4.2			4.6			3.7			5.1	

Note: all coefficients are statistically significant, p. < .05 unless noted: ns: .1 > p. >= .05 ns*: p. >= .1 **Source**: LRS (see Table 3).