Urban Patrilineal Kin Propinquity in the United States, 1880

Matt Nelson
Research Scientist
Institute for Social Research and Data Innovation, University of Minnesota

The United States experienced a long-run decline in patrilineal kin propinquity between 1790 and 1940. While some evidence supports lower kin propinquity in urban areas compared to rural areas, previous estimates included some methodological shortcomings. Geocoded data corrects for some of the previous methodological issues. The urban patrilineal kin propinquity measure is updated using geocoded census data for 39 cities from the 1880 U.S. Federal Census. The results suggest most families with potential patrilineal kin lived within 0.14 miles of someone with the same surname, and 80% of families with potential patrilineal kin lived within 0.5 miles, approximately a ten-minute walk. Previous sequential methods appear to have overestimated potential kin within the same urban enumeration district by four percentage points. Similar life course patterns in the geocoded and sequential results suggest that overall, the sequential method represents a reliable method to estimate potential patrilineal kin within the same enumeration district. Urban to rural comparisons suggest that urban kin propinquity was lower than rural kin propinquity by 4.5 percentage points. Since distances between potential kin were smaller in urban areas, kin networks in urban areas may have operated differently than in rural areas.

Prepared for European Social Science History Conference 2021, Leiden, NL [VIRTUAL].

Version History

1.2-PAA 2019

Methods

-Adapt sequential method to geocoded data

Results

-Method comparisons

-Distance metrics based on community size definition (Talen)

2.3-SSHA 2019

Literature Review

-Urban kinship

-Historical kinship patterns

Methods

-Add equations and description of geocoded vs. sequential methods

Results

Limitations

-Discuss limitations of current methodology

3.3-ESSHC 2021/PAA 2021

Literature Review

-Kin influence hypothesis

-Historical Kinship

-Migration Literature

Methods

-Clarify equations, revise section for clarity

Results

-Clarify robustness section (adjusted name distributions)

-Expand demographic analysis

-Expand urban/rural analysis

Limitations

-Expand and revise limitations section

Future Plans (SSHA 2021)

Literature Review

-East Asia Historical Demography-Kinship patterns

-US Urban Historiography

Methods

-Alternative measures for Urban/Rural comparisons

Results

-Population Density

-Distance metrics by city (Talen?)

-Standardize Rates between cities (age, race, foreign-born)

Limitations

Families in the United States experienced long-run declines in different living arrangements, specifically intergenerational coresidence for the elderly and living near patrilineal kin between 1790 and 1940. Kin propinquity was heavily influenced by the family life cycle where younger generations lived near siblings and parents, while older generations primarily lived near children (Nelson 2020; Ruggles 2007; Smith, 1989). These previous kin propinquity measures relied on the assumption of the sequential enumeration of households in the Census to identify kin using surnames. Increased urbanization explains a substantial part of the decline in kin propinquity, but sequential isonymic (same surname) matching methods likely underreport urban kin propinquity. Because of this underreporting, it is unclear to what degree the decline in patrilineal kin propinquity was due to increased urbanization or measurement error. Further, previous sequential methods cannot measure the actual distance between households, further limiting the interpretation of the measure.

This paper aims to address differences in rural and urban kinship networks. The first step requires answering how reliable were previous methods for measuring kin propinquity in urban areas. Using geocoded 1880 Federal Census data for 39 cities, the results confirm the sequential method is reliable to analyze kin propinquity within an enumeration district, but due to the size of urban enumeration districts in urban areas, likely underreports patrilineal kin propinquity. The results show most urban patrilineal kin propinquity occurred in extremely close proximity, with the median distance between families of the same surname measured at 0.14 miles. Of families with a potential surname match nearby, 80% of those families lived within 0.5 miles of the other family (approximately a ten-minute walk). While there is some nuance in interpreting differences between rural and urban kin propinquity, overall it appears that rural patrilineal kin propinquity was higher than urban kin propinquity, but at the national level, only differ by four percentage points which reinforces arguments on the strength of urban kin networks (Parsons 1943; Wirth 1938). Given urban kin propinquity was more similar to rural kin propinquity rates but occurred in smaller distances between kin, I hypothesize that urban kin networks likely operated differently than rural kin networks.

LITERATURE REVIEW

Some studies have focused on evolutionary theory to describe the influence of kin on reproductive success. Specifically, kin provide more assistance than non-kin in childcare and distributing the costs of parenthood among a familial group (Turke 1989). As families pursue social and economic success, kinship networks break down, which concentrates the costs of childcare on parents. The type of kin matters though as well. Specifically, matrilineal kin are generally associated with improved child survival but lower female fertility, while patrilineal kin do not improve child survival but increase fertility (Mace & Sear 2005; Sear & Mace 2011). Increased proximity and more frequent interaction with kin led to higher reproductive success, and the transition from kin to non-kin based social groups corresponded with these transformations that had weaker associations with high reproduction (Newson et al. 2005; Newson & Richerson 2009). These long-run transformations in kinship networks were correlated more with rules of residence rather than family organization, but also the availability of kin that are affected by fertility and mortality for both different generations and different periods (Gordon 1970; Murphy 2011; Verdery 2015). If we accept what Smith (1993) called the “strong-theory” of biological explanations rather than cultural peculiarities to describe long-run change, simpler nuclear families are closer to natural, biological units and extended households may be examples of coercive institutions or norms.

The kin hypothesis suggests the importance of kin to different demographic and socioeconomic processes, but historical analysis in the United States was largely limited to kin within households due to data limitations. Recent results have emphasized the role of kin within and beyond the household of orientation on fertility and mortality in different time periods and areas. Some work in the United States shows the effect of intergenerational transmission of fertility, specifically for mothers and mother-in-laws. While residence was not established, Jennings et al. (2012) shows a pro-natal effect of a woman's mother-in-law and to a lesser extent maternal mother on women using longitudinal data from the Utah Population Database. Using a similar propinquity method to Smith (1989) but using age and birthplace to identify potential mother-in-law, Hacker and Roberts (2017, 2019) show a positive effect of mother-in-laws on a woman's fertility when the mother-in-law lived within five households. There is also a positive effect from non-coresidential mother-in-laws on fertility and mortality at the turn of the century, but negative effects from coresidential parents, probably indicative of elderly and sick parents (Hacker et al. Cond. Accepted). Other work where the effect of non-coresidential kin (typically parents) on fertility, mortality, and reproductive success include the St. Lawrence River Valley (Engelhardt et al. 2019), Finland (Chapman et al. 2019), Sweden (Dribe and Eriksson 2019), the Krummhörn region (Willfuhr et al. 2018), and comparative work between Scandinavia and North America (Dillon et al. 2020).

The results generally conform to the kin hypothesis, although it's important to note that the effects of kin beyond the household are not necessarily the same in all contexts or kin types. For example, Dribe & Eriksson (2019) found no effect for non-coresidential paternal grandparents on child survival but a positive effect from non-coresidential maternal kin, in contrast to Hacker et al. (Cond. Accept) and Dillon et al. (2020) who found positive effects of paternal grandparents on fertility. However, the methods applied differ because of data availability, and while the effects of non-coresidential kin do vary, the studies all generally find some support for kin assistance on fertility and child survival. Effects of kin also varied between coresidential and non-coresidential parents, with coresidential parents typically having a negative effect on reproduction, which could be evidence of elderly kin in poor health that did not help with success in reproduction. Further, though urban fertility tended to be lower than in rural areas, paternal grandmothers had larger positive effects on fertility in urban environments compared to rural environments. (Hacker et al. Cond. Accepted).

The study of kin proximity at its base is a study of residence and migration. In the United States, most children left the household of their parents and established a new residence per the rules of neolocal residence (Fawver 2012). While neolocality does not require children to base their residence on living close to either the patrilineal or matrilineal kin, it does not forbid it either (Murdock 1949). Establishment of new households in studies including Sweden, the Netherlands, the United Kingdom, and the United States between 1850 and 2013 could lead to children staying near home for many reasons; lack of economic opportunities elsewhere, maintaining intergenerational relations to eventually inherit property, and emotional intimacy are just a few reasons, although it's possible these reasons have changed over time (Bieder 1973; Chan and Ermisch 2014; Egerbladh, Kasakoff & Adams 2007; Malmberg & Pettersson 2007; Michielin & Mulder 2007; Mulder & van den Meer 2009; Spring et al. 2017). Further, migration patterns were often determined by communities and by extension kin. If a member of a community migrated, other members of the same community may migrate to the same place, either at the same time or later (Billingesley 2004; Gjerde 1985; Mulder, Lundholm & Malmberg 2020; Ostergren 1988; Otterstrom & Bunker 2013).

Historical kin propinquity patterns in the U.S. were likewise affected by migration. While families migrated together, typically migrants had lower kin propinquity rates than non-migrants. Migrants who migrated with kin likely left kin behind and thus had fewer potential kin to live near than a family that had stayed in the same area for several generations. This is often why frontier regions have lower kin propinquity than more established areas with a few exceptions such as the Mormon migration to Utah and the Hispanic population around Albuquerque, New Mexico. Regions with lower migration patterns tended to also have higher kin propinquity, especially Appalachia, the U.S. South, and Maine (Bieder 1973; Nelson 2020).

Identifying kinship networks in historical settings typically relies on genealogical data from population registers, death registers, censuses, birth records, and marriage records to identify persons related to one another (e.g., Alter 1996, Koylu et al. 2013, Mineau et al. 2002, Verbeke 2021). Alter (1996) showed 45% of elderly persons with no coresidential children but had children living in Verviers lived less than 500 m (~0.3 miles) from their children., and that high fertility helped provide support for old age. In Sweden, approximately 10% of married women age 20-44 lived in the same parish as their paternal parents, and 19% in the same parish as maternal parents in 1900 (Dribe and Eriksson 2019). While the kinship links themselves are generally correct, the limitation of some genealogical data (especially that based on family reconstitution) is the data is not representative of the broader population (particularly migrants and non-whites in the United States), and limited marriage information does not capture matrilineal kinship networks (Kassakoff and Adams 1995; Ruggles 1992). Genealogical data was often based on parish or population registers in Europe which does not exist at a large scale in the United States. Most U.S. genealogical data relies on census, birth, marriage and death records. Unfortunately, birth, marriage and death records were not consistently recorded in the nineteenth and early twentieth centuries, and the quality of the sources varied by state. Census records are a largely reliable source of demographic data during this time period, but familial kinship links were only enumerated within families since 1880. Given the practice of neolocal residence, many kin relations are lost as they leave the parental household to begin their own household of orientation (Fawver 2012).

To identify kin beyond the household with limited genealogical or kinship information, previous research relied on surnames to identify potential kin. Smith (1989) used this approach to identify potential kin living within five households in 1790 and 1900. Smith's approach required an exact match of surnames, and showed that within five households, the probability of non-random isonymy was below 5% in almost all areas in 1790. Capron (1997) separately used this method with Belgian registers between 1846 and 1911, with no limit on distance between households other than living in the same town, city, or rural area. Capron standardized names but did not measure the probability of non-random isonymy. Because of this, it's highly likely that Capron overestimated potential kin, particularly in urban areas (Van Baelen and Matthijs 2007).

Nelson (2020) adapted Smith's technique but incorporated the probability of non-random isonymy into the measure to better assess nearby kin that lived beyond five households but in the same enumeration district. The limitation of this assumption is that enumeration districts in cities were geographically smaller than in rural areas, suggesting that urban kin propinquity may be underestimated compared to rural areas. All three methods are limited in only measuring patrilineal kin, which requires genealogical data to capture matrilineal kin due to women changing surnames upon marriage. Further, not all true patrilineal kin share the same surname such as a sister who marries. Studies of Montreal and Quebec use geocoded census data and genealogical data to track related individuals within urban areas for example (Olson 2017, Harton et al. 2019).

The United States experienced a long-run decline in patrilineal kin propinquity between 1790 and 1940. Defined as families living within 5 households of another family with the same surname, the decline in patrilineal kin propinquity was particularly associated with declining fertility and changing kin propinquity patterns in New England relative to the rest of the country (Smith 1989). Using complete count U.S. Federal Census data from 1790-1940, recent research uses a more robust measure that captured all potential surname matches within an enumeration district and established the life course nature of the kin propinquity links and geographic clustering of kin propinquity at the county-level. Further, urban kin propinquity appeared to be significantly lower than rural kin propinquity and declines in urban patrilineal kin propinquity accounted for 38% of the total decline between 1850 and 1940 (Nelson 2020). However, if urban kin propinquity was underestimated, it’s possible that the trends are better described by other factors such as changing residential preferences and economic opportunities for younger generations.

Researchers in the mid twentieth century argued that urban kin networks were not isolated nuclear households but had extensive connections to kin networks (Litwak 1960, 1965; Shanas 1961, 1967, 1973; Wirth 1938). Litwak (1960, 1987) argued that propinquity was less important in the role of kinship patterns in the modern day, but historical kin propinquity prior to improved communication and transportation suggest strong mechanisms that may have pushed children to settle near parents. In rural areas, land inheritance patterns in agriculture and lack of economic opportunities encouraged children to remain in the household of their parents or live nearby. In contrast additional economic opportunities via wage labor in urban areas allowed for children to leave the household and not necessarily settle nearby (Ditz 1986; Gjerde 1997; Ruggles 2007, 2015). However, intergenerational exchange of resources, with parents providing financial assistance to younger generations, and younger generations caring for elderly parents, still provided a strong mechanism for urban kin networks (Sussman 1953, 1959, 1965; Shanas 1961, 1967, 1973).

Survey evidence (which directly asks about kin not living in the household of orientation) from the 1950s to present suggests 30-50% of parents living within one mile or ten minutes travel time of their children. A study of Hough, OH in the 1950s found 49% of individuals surveyed (N=401) had parents living within the city of Hough (Sussman 1959). The National Surveys of the Aged in 1962 and 1975, the National Health Interview Supplement on Aging in 1984 and the 1987 National Survey of Families and Households found around 40% of elderly persons within 1 mile or less than 10 minutes away (Crimmins & Ingegneri 1990; Lin & Rogerson 1995; Shanas 1961, 1967, 1973; Wolf 1994). In the Panel Study of Income Dynamics, 32% of the observed person periods had nuclear or extended kin living within 1 mile between 1980 and 2013 (Hofferth & Iceland 1998; Spring et al. 2017).

DATA/METHODS

This paper uses the complete count 1880 Federal Census data from IPUMS (Ruggles et al. 2020). Beginning in 1880, the Census designated "enumeration districts" enumerators were to canvas. Going door-to-door, enumerators recorded the information of all persons within the household. This sequential ordering is preserved in the final forms of the census and in the IPUMS data. Sequential measures of kin propinquity rely on the sequential ordering of census returns to capture potential patrilineal kin propinquity within enumeration districts. By comparing surnames of families living near each other, same surname families are considered potential kin. This methodological approach, while illuminating, is imperfect, particularly for urban areas. Sequential ordering does not arrange city blocks accurately, as a household on the opposite side of the street was not necessarily enumerated sequentially. Further, distances between households in urban areas compared to rural households is far smaller, leading to potentially misleading results on kin propinquity with low distance thresholds (e.g., five households) used in previous research. One approach to alleviate these two issues is to use geocoded data.

With geocoded data, the sequential ordering assumption is not required. For this study, I use geocoded data from the Urban Transition Project which geocoded the street addresses for 39 cities in the 1880 census data (Logan et al. 2011). Once data with missing addresses and group quarters are removed, the sample size is approximately 6.5 million persons, or 97% of the population if all cases from the 39 cities were analyzed.[1] This represents approximately 13% of the national population and 51% of the national urban population. Using the *geodist* package in Stata, I calculate the distance between the closest isonymic households (Picard 2010). Because this is not genealogical data, I cannot verify whether a particular surname match were actual kin. Instead, I measure the probability that two surnames living where they do occur non-randomly. While not a direct measure of kinship, a high probability of non-random isonymy does suggest potential familial kinship.

$$P(K_{rsi}) = \begin{cases} \left(1 - \left(\frac{F_{rsi} - 1}{T_{rs} - 1}\right)\right)^{D_i}, & F_{rsi} > 1 \\ 0, & F_{rsi} = 1 \end{cases}$$

(1)

Equation 1 from Nelson (2020) describes the calculation of the probability of non-random isonymic (same surname) families using the sequential and geocoded methods. The probability can be measured by taking the surname distribution (F_{rsi}-number of families with surname *i* of race r within city s divided by the T_{rs}, the total number of families of race *r* within city *s*) and calculating the number of households between families of the same surname (D_i). In the original sequential method, D_i is the number of households as close sequentially as the nearest same surname family.

[1] Group quarters are defined as institutions and dwellings with 10 or more unrelated individuals.

For example, if a same surname family was three households away, D_i would equal 6 (search three households above and below the household of orientation). The geocoded method operates similarly, except that D_i is based on the number of households as close in physical distance as the nearest same surname family. If the nearest same surname family lived 0.05 miles away, D_i would be equal the number of households that are 0.05 miles away or closer to the household of orientation. The other difference from Nelson's original sequential method is the distribution of F_{rsi} and T_{rs} is based on the city population, not the enumeration district population.

INSERT FIGURE 1

Figure 1 shows an example of the sequential and geocoded methods for a family with a surname match within the same enumeration district. The blue blocks represent a city block, and the smaller squares within each block represents a household (for simplicity, let's assume each household is a single-family household). Each number refers to the sequential order of the households from the Census, and households 1 and 25 have the same family surname. In this example, sequential ordering does not represent geographic space well, as household 25 is just across the street from household 1. In this hypothetical example with a name distribution of 346 families of the same surname within the city of 134,578 families, the probability of non-random isonymy between these two households is estimated at 88.0%.

Using the geocoded data, if household 1 and household 25 were a surname match, only households 2, 3, 8, and 9 were within the distance calculated between households 1 and 25. Given this with a name distribution of 346 families within the city of 134,578 families, the probability of the matching surname families non-randomly living where they did increases to 98.7%. In this case, the enumerator path/sequential method biased the probability down. Given multi-unit households, it's also possible the geocoded method will drive the probability of kin propinquity down rather than up.

RESULTS

INSERT TABLE 1

The results will be presented as either Sequential results (based on Nelson 2020)[2], Geocoded-Same ED (geocoded surname match within the same enumeration district) and Geocoded (geocoded surname match within the same city). Table 1 shows the overall kin propinquity rates by method for the 39 cities. The unadjusted rate represents the percentage of persons with another family with the same surname within the geographic unit (similar to Capron 1998, excluding name standardization). The adjusted rate represents the estimated kin propinquity rate when estimating the probability of non-random isonymic families living nearby. Overall, kin propinquity for the geocoded method within the same enumeration district is 19% compared to 23% for the sequential method. This difference is slightly larger than the using city level name distribution rather than the enumeration district name distribution for the sequential method (4.3% points vs. 3.7% points). Using all geocoded cases doubles the patrilineal kin propinquity rate in the 39 cities to 44%. While the sequential method in general appears to be relatively accurate, it does appear that the sequential assumption overestimates potential patrilineal kin propinquity slightly. This is due to the sequential method underestimating the number of families within the distance between same surname families.

75% of individuals in the United States lived in a minor civil division, town, or city represented by only one enumeration district. This was not true of the largest cities. Geocoded addresses allow us to disregard the previous enumeration district boundaries for the 39 large cities, leading to 88%

[2] To limit confounding, the family name distribution (F_{rsi}/T_{rs}) for the sequential method are based on the same city name distribution as used in the geocoded method. Using the original method and calculations from Nelson (2020) these 39 cities have a 19.4% patrilineal kin propinquity rate. Using the city name distribution rather than the enumeration district name distribution raises the kin propinquity rate for the 39 cities to 23.2%.

of people living in an area represented by a single enumeration district or geocoded city. The geocoded results confirmed the general accuracy of the sequential method within enumeration districts, and assuming this is true for rural areas, the sequential kin propinquity method reliably estimates potential patrilineal kin propinquity for most of the United States. Overall, the national kin propinquity rate increased from 35.7% using the sequential method to 38.9% when using the geocoded method for the 39 cities and the sequential method for all other areas. It's likely geocoded data will affect the sequential rates more between 1900 and 1940 due to larger urban populations.

At the individual level, the kin propinquity rates between the sequential and geocoded within same ed probabilities are relatively similar. While there are cases of drastic changes, these are certainly outliers. 49% of the cases saw a less than 5%-point difference between the same ED geocoded probability and the sequential probability, and this figure rises to 61% that saw less than a 10%-point difference. 81% of persons living within the same ED as someone with the same surname had a less than 25%-point difference. 15% of all cases saw no change in their individual kin propinquity probabilities.

INSERT FIGURE 2

Figure 2 shows the patrilineal kin propinquity rate by 5-year age group for each method. The sequential and Geocoded-Same ED rates are on the left vertical axis while the Geocoded rates are on the right vertical axis. In this graph, we are not interested in the overall rate differences, but the patterns of kin propinquity. The scale of the two axes are the same (0-30% on the left axis, 20-50% on the right). What we see is that the three methods show virtually identical patterns in kin propinquity rates by 5-year age group.

INSERT FIGURES 3-5

Figures 3-5 show the age difference between reference persons (the first person for a family) and the reference person of the same surname family they are matched to. The results appear to confirm a general life course pattern. 20-24 year old persons are most likely to link with siblings, with a minor uptick of linking with potential parents who are older than themselves. 40-44 year old persons primarily link with younger siblings, and 60-64 year old persons primarily link with persons between the ages of 20-44, likely children. The distributions are similar across all three methods. All in all, this suggests that the sequential method is reliable for estimating non-random isonymy within the same enumeration district.

INSERT FIGURE 6

While the Geocoded-Same ED results closely mirror the sequential results between cities, the Geocoded results display several changes, specifically that urban patrilineal kin propinquity was far higher because the small enumeration district boundaries have been removed (Figure 6). Southern cities experienced lower kin propinquity compared to Northeastern and Midwestern cities. There is some evidence to suggest that cities with higher kin propinquity rates had smaller median distances between kin, were cities founded earlier by Europeans or Americans, and had higher populations. This last correlation between total population and kin propinquity may be suggestive of a limitation with the method; living in a larger city suggests there's a higher chance of someone with the same surname, so there are more non-zero potential kin in higher populated areas leading to inflated kin propinquity rates in these larger cities with no limitations on distance.

Looking at the geocoded kin propinquity rates, there are several interesting differences to note for different racial and foreign-born groups.[3] Native-born white and Irish persons had the highest kin propinquity rates of any group. This is likely a byproduct of migration for native-born whites;

[3] When referring to foreign-born population, I generally am referring to first generation immigrants, although the rates/patterns are very similar to second generation immigrants too.

they did not migrate from Europe recently and potentially have many kin, while migrants left some kin behind. This is generally true except for the Irish population. The most likely explanations are Irish ethnic enclaves clustered closer together in some cities, leading to more potential kin and the Irish had common surnames (the 5 most common Irish surnames were Murphy, Sullivan, Ryan, Kelly, and Smith). While Scandinavians had on average more common surnames than the Irish, the Scandinavian population was significantly smaller and the Scandinavian migration more recent than the Irish migration.

Some groups had higher kin propinquity rates than native-born whites in select cities. For example, Minnesota today is known for its high Scandinavian ancestry population, and Scandinavian persons had higher kin propinquity rates in both Minneapolis and St. Paul compared to native-born whites in 1880. These same patterns can be seen for the English (Allegheny, PA, Cleveland and Columbus, OH, Kansas City, MO, and Memphis, TN) and Blacks in the South (Atlanta, GA, Charleston, SC, Memphis, TN, and Richmond, VA). Germans, French, and Canadians had lower kin propinquity than native-born whites in all cities. Occupational structure does not appear to have any relationship with kin propinquity, though this should be investigated further. The only occupational group that stood out were non-household service workers with lower kin propinquity rates than other occupational groups. This group was primarily female and non-white, who had lower kin propinquity suggesting a demographic rather than occupational connection. All other occupational groups had similar kin propinquity rates.

INSERT FIGURE 7

Most kin propinquity occurred within a very small distance in urban areas (Figure 7). For families with a surname match within the same enumeration district, the median distance between surname matches was 0.05 miles. 98% of families with a same surname family living in the same enumeration district were within 0.5 miles, approximately a ten-minute walk for the average person. 9% of families with potential patrilineal kin nearby lived in the same building as the other family with the same surname. For all geocoded cases, the median distance between matches was 0.14 miles, with 80% of families living within 0.5 miles of each other. 4% of families lived in the same building. The median distance between potential patrilineal kin varied by city, although it tended to be shorter distances in Northeastern cities compared to the rest of the nation (Figure 8).

INSERT FIGURE 8

We need to be cautious about these distance results though. The distance results could be a product of the methodology. Since the probability measure for geocoded data is partially based on distance (number of families within the distance of two same surname families, which will be correlated to the actual distance) and the distance results are weighted by the probability of non-random isonymy, lower distances will be biased towards potential kin. I still hypothesize though that there are theoretical reasons for support to live close by. Intergenerational assistance between generations suggests reasons for kin to not live far away from one another. In urban areas, living extremely close to kin was not only possible, but provided a means for families to interact more easily. Further, these results appear consistent with other urban kin proximity studies for the nineteenth and twentieth centuries (Alter 1996; Dribe & Eriksson 2019). Finally these results are limited to only patrilineal kin, but if the decline of patrilineal kin were also true for matrilineal kin, these findings (while speculative) appear consistent with the narrative of the decline of kin propinquity to rates seen in the mid to late twentieth-century surveys, which measured kin propinquity between parents and children and all potential kin, not only patrilineal kin (Crimmins & Ingegneri 1990; Hofferth & Iceland 1998; Lin & Rogerson 1995; Shanas 1967; Spring et al. 2017; Sussman 1959; Wolf 1994).

INSERT TABLE 2

Currently, geocoded rural data does not exist for the 1880 Census at a national scale. However, if we accept that the sequential kin propinquity rate is a reliable indicator of non-random isonymy, we can compare kin propinquity rates of most rural areas since rural minor civil divisions tended to be enumerated in a single enumeration district. Table 2 compares urban and rural kin propinquity rates for each city.[4] Comparing urban and rural kin propinquity rates in the same county has the benefit of comparing areas extremely close to each other, but some counties for these cities were entirely urban (e.g., New York City). Surrounding counties allows us to compare nearby rural areas to urban areas. I also provide urban to rural comparisons using the same state, same region, and a national comparison.

Urban and rural differences were more nuanced than previous arguments that urban kin propinquity rates were lower than rural areas. In the Northeast, many urban areas had higher kin propinquity rates than the surrounding rural areas. Only urban areas around Albany, Boston, Hartford, and New Haven had lower kin propinquity rates than the surrounding rural areas. In the South and Midwest however, urban areas generally had lower kin propinquity rates than surrounding rural areas. Urban areas in the West had higher kin propinquity rates than rural areas but given this was still a frontier region of the U.S., it is likely this pattern is not representative of most cities, not to mention the two areas with the highest sequential kin propinquity rates in the West (Utah and New Mexico) are not in the geocoded data. Using a larger scale (such as the state or region) shows higher rural kin propinquity rates in many areas, suggesting that rural areas around urban areas may have had lower kin propinquity, or been more likely to be enumerated in multiple enumeration districts.

---

[4] Urban kin propinquity rates are based on the geocoded method except for urban areas that were not geocoded by Logan et. al. These non-geocoded urban areas and all rural areas use the sequential method to estimate kin propinquity.

LIMITATIONS

The geocoded method for identifying potential patrilineal kin has its own limitations. The method cannot control for households at the edge of a city (similar to the problem of enumeration districts, but less so since cities are significantly larger than an enumeration district). This method can only be used to measure potential patrilineal kin, and the measure used here is not based on genealogical data. It is a measure of non-random isonymy, and therefore is not a direct measure of kinship but a proxy. The geocoded data comes from 39 large cities and may not be representative of smaller urban areas. Regarding this urban specific study, one issue with this measure is that while rural and urban kin propinquity rates were compared here, the two rates were calculated using slightly different methods. Thus, we don't have a strict control group to compare urban kin propinquity against (Ferraro 1974). One possibility is to use plat maps to geocode nearby rural areas which may allow for a better comparison of rural and urban areas using more similar data.

One limitation to the rural/urban comparison is the slight over reporting of sequential kin propinquity in geocoded areas. If sequential rates overreported kin propinquity by 4 percentage points in the urban geocoded areas, and this same over reporting holds true in rural areas, then rural kin propinquity may have been lower than urban kin propinquity in most cases. Further, distances between urban kin were extremely small. Even the smallest rural kin propinquity rates were unlikely to be less than 0.25 miles. This suggests that we need to focus less on the rates of urban/rural kin propinquity and more on individual level effects of potential kin on demographic outcomes to better describe the differences in urban and rural kin networks.

Even though the measure accounts for the probability of non-random isonymy, urban areas as a byproduct of their larger populations have more non-zero potential kin families (Van Baelen & Matthijs 2007). 74% of persons living in an urban geocoded area had at least one other family with the same surname in the same city compared to 54% of rural persons. One reason to suspect this limitation is an issue is when we select potential kin based on the probability of non-random isonymy.

INSERT TABLE 3

Table 3 shows the percentage of persons with potential kin when using cutoffs by urban and rural areas. For example, if instead of weighting by the probability of non-random isonymy to estimate the aggregate potential kin, but instead just measure the percentage of people with at least a greater than 50% chance of non-random isonymy, 36% of urban persons had potential kin compared to 35% of rural persons. More restrictive thresholds show higher rural kin propinquity than urban kin propinquity. This suggests that rural kin were more likely non-random than urban kin, and that some of the urban results were driven by large numbers of persons who live near someone with the same surname, but with a low probability of non-random isonymy.

CONCLUSION

The results confirm the sequential method reliably estimates patrilineal kin propinquity but must be taken into context that by not capturing the entire city, some kin propinquity is not captured. As time goes on and enumeration districts became geographically smaller, by 1940 urban patrilineal kin propinquity rates capture less of the patrilineal kin compared to 1880. Most patrilineal kin propinquity occurred in proximity of less than 0.14 miles, but it’s possible this is an artifact of the methodology. All those limitations aside, urban patrilineal kin propinquity followed the same life course pattern as established by the sequential method. Given only one year of data has been geocoded, we cannot study trends in urban kin propinquity, and geocoding rural data requires plat maps since street addresses were not typically recorded for rural residences in the U.S. Federal Censuses. Finally, comparing the data to genealogical data may help determine the overall accuracy of the method, and possibly ways to improve the method (Kasakoff 2019).

Urban patrilineal kin propinquity was higher than previously estimated, and in some cities, higher than surrounding rural areas. Urban areas did not have significantly lower kin propinquity than rural areas and may require additional study to determine what role urbanization played with the decline of patrilineal kin propinquity. Proximity of kin is not the primary predictor of a strong kinship relationship but is strongly suggestive. Presence of potential kin may require a more nuanced analysis to determine its effects on demographic and economic outcomes and long-run declines in patrilineal kinship networks. For example, if fewer people lived near kin, but those who did lived closer, what does that mean for fertility and mortality outcomes? Do fewer but closer kin imply stronger kinship connections, which may lead to different outcomes on migratory decisions? How do matrilineal kin networks operate differently than patrilineal kinship networks, and did matrilineal networks undergo the same decline as patrilineal kin networks? These questions likely require more detail than currently provided by the patrilineal kin propinquity measure, but geocoded data and linked census data may help answer these questions in the near future in the context of the United States between 1850 and 1950.

BIBLIOGRAPHY

Alter, George, Cliggett, Lisa, & Urbiel, Alex, (1996), "Household Patterns of the Elderly and the Proximity of Children in a Nineteenth-Century City, Verviers, Belgium, 1831-1846," In *Aging and Generational Relations Over the Life Course: A Historical and Cross-Cultural Perspective,* ed. Tamara K. Hareven, (New York: Walter de Gruyter), 30-52.

Bieder, Robert E., (1973), "Kinship as Factor in Migration," *Journal of Marriage and Family* 35:3, 429-439.

Billingsley, Carol E., (2004), *Communities of Kinship: Antebellum Families and the Settlement of the Cotton Frontier,* Athens: University of Georgia Press.

Capron, Catherine, (1998), "Essai de Reconstruction Automatique des Parentés à Partir du Registre de Population Belge," *Revue Informatique et Statistique Des Sciences Humaines* 34:1, 9-49.

Chan, Tak Wing, & Ermisch, John, (2015): "Proximity of Couples to Parents: Influences of Gender, Labour Market and Family," *Demography* 52, 379-399.

Chapman, Simon N., Petty, Jenni E., Lummaa, Virpi, & Lahdenperä, (2019), "Limits to Fitness Benefits of Prolonger Post-reproductive Lifespan in Women," *Current Biology 29, 645-650.*

Crimmins, Eileen M., & Ingegneri, Dominique G (1990), "Interaction and Living Arrangements of Older Parents and Their Children: Past Trends, Present Determinants, Future Implications," *Research on Aging* 12:1, 3-35.

Dillon, Lisa, Chernenko, Alla, Dribe, Martin, Engelhardt, Sacha, Gagnon, Alain, Hanson, Heidi A., Meeks, Huong, Quaranta, Luciana, Smith, Ken R., & Vézina, Hélène, (2020), "Did Grandmothers Enhance Reproductive Success in Historic Populations?: Testing Evolutionary Theories on Historical Demographic Data in Scandinavia and North America," in *Human Evolution Demography*, ed. Oskar Burger, Ronald Lee, and Rebecca Sear (OSF).

Ditz, Toby L. (1986), *Property and Kinship: Inheritance in Early Connecticut, 1750-1820,* (Princeton: Princeton University Press).

Dribe, Martin, & Eriksson, Björn, (2019), "Kin Availability and Fertility in a Historical Nuclear Family Society: Sweden in 1900," Paper presented at the International Seminar on Kinship and Reproduction in Past Societies, IUSSP, Minneapolis, MN, August 22.

Engelhardt, Sacha C., Bergeron, Patrick, Gagnon, Alain, Dillon, Lisa, & Pelletier, Fanie, (2019), "Using Geographic Distance as a Potential Proxy for Help in the Assessment of the Grandmother Hypothesis" *Current Biology* 29: 651-656.

Egerbladh, Inez, Kasakoff, Alice Bee, & Adams, John W., (2007), Gender differences in the dispersal of children in northern Sweden and the northern USA in 1850," *History of the Family* 12, 2-18.

Fawver, Kate, (2012), “Neolocality and household structure in Early America,” *The History of the Family* 17:4, 407-433.

Gjerde, Jon, (1985), *From Peasants to Farmers: The Migration from Balestrand, Norway to the Upper Middle West*, Cambridge: Cambridge University Press.

Gjerde, Jon (1997), *The Minds of the West: Ethnocultural Evolution in the Rural Middle West, 1830-1917*, (Chapel Hill: University of North Carolina Press).

Gordon, Daniel N., (1970), “Societal complexity and kinship: family organization or rules of residence?,” *Pacific Sociological Review* 13:4, 252-262

Grigoryeva, Angelina, & Ruef, Martin (2015), “The Historical Demography of Racial Segregation,” *American Sociological Review* 80:4, 814-842.

Hacker, J. David, & Roberts, Evan (2017), “The Impact of Kin Availability, Parental Religiosity, and Nativity on Fertility Differentials in the Late 19th-Century United States,” *Demographic Research*, 37:34, 1049-1080.

-- (2019), “Fertility Decline in the United States, 1850-1930: New Evidence from complete-count datasets,” *Annales de Démographie Historique* 138:2, 143-177.

Hacker, J. David, Helgertz, Jonas, Nelson, Matt A., & Roberts, Evan, (Conditionally Accepted), “The Influence of Kin Availability on the Reproductive Success of American Couples, 1900-1910,” *Demography*.

Hofferth, Sandra L., & Iceland, John (1998), “Social Capital in Rural and Urban Communities,” *Rural Sociology* 63:4, 574-598.

Harton, Marie-Éve, Laurent, Richard, Marcoux, Richard, & St-Hilaire, Marc, (2019), “Social space and family reproduction among Quebec City leather workers in 1911,” *Annales de Demographie Historique* 138: 2, 55-82.

Heath, Kathleen Marie, (2003), “The Effects of Kin Propinquity on Infant Mortality,” *Social Biology* 50:3, 270-280.

Jennings, Julia A., Sullivan, Allison R., & Hacker, J. David, (2012), “Intergenerational Transmission of Reproductive Behavior during the Demographic Transition,” *Journal of Interdisciplinary History* XLII:4, 543-569.

Kasakoff, Alice Bee (2019), “The Changing Space of Families: A Genealogical Approach,” *Social Science History*, 43:1, 1-29.

Kassakoff, Alice Bee, and Adams, John W., (1995), “The Effect of Migration on Ages at Vital Events: A Critique of Family Reconstitution in Historical Demography,” *European Journal of Population* 11: 199-242.

Koylu, Caglar, Diansheng, Guo, Kassakoff, Alice, & Adams, John W., "Mapping family connectedness across space and time," *Cartography and Geographic Information Science*, 41:1, 14-26.

Lin, Ge, & Rogerson, Peter A, (1995), "Elderly Parents and the Geographic Availability of Their Adult Children," *Research on Aging* 17:3, 303-331.

Litwak, Eugene (1960), "Geographic Mobility and Extended Family Cohesion," *American Sociological Review*, 25:3, 385-394.

-- (1965), "Extended Kin Relations in an Industrial Democratic Society," in *Social Structure and the Family: Generational Relations*, ed. Ethel Shanas, & Gordon F. Streib, (Englewood Cliffs: Prentice-Hall, Inc.), 290-325.

Logan, John R., Jindrich, Jason, Shin, Hyoungjin, & Zhang, Weiwei (2011), "Mapping America in 1880: The Urban Transition Historical GIS Project," *Historical Methods* 44:1, 49-60.

Logan, Trevon, & Parman, John M. (2017), "The National Rise in Residential Segregation," *Journal of Economic History* 77:1, 127–170.

Mace, R. & Sear, R. (2005). "Are humans cooperative breeders?" In E. Voland, A. Chasiotis & W. Schiefenhoevel (Eds.) *Grandmotherhood: The evolutionary significance of the second half of female life* (New Brunswick, NJ: Rutgers University Press), 143-159.

Malmberg, Gunnar, & Pettersson, Anna, (2007), "Distance to elderly parents: Analyses of Swedish register data," *Demographic Research* 17, 679-704.

Michielin, Francesca, & Mulder, Clara H., (2007) "Geographical distances between adult children and their parents in the Netherlands," *Demographic Research* 17, 655-678.

Mineau, Geraldine P., Smith, Ken R., and Bean, Lee L., (2002), "Historical trends of survival among widows and widowers," *Social Science & Medicine* 54, 245-254.

Mulder, Clara H., Lundholm, Emma, & Malmberg, Gunnar, (2020), "Young Adults' Migration to Cities in Sweden: Do Siblings Pave the Way?," *Demography* 57:, 2221-2244.

Mulder, Clara H., & van der Meer, Marieke J., (2009), "Geographical Distances and Support from Family Members," *Population, Space and Place* 15, 381-399.

Murdock, George Peter, (1949) *Social Structure*, New York: The Free Press.

Murphy, Michael, (2011), "Long-term effects of the Demographic Transition on Family and Kinship Networks in Britain," *Population and Development Review* 37, 55-80.

Nelson, Matt (2018), *Relieved of These Little Chores: Agricultural Neighbor Labor, Family Labor,* *and Kinship in the United States, 1790-1940,* (Dissertation: University of Minnesota).

-- (2020), "The Decline of Patrilineal Kin Propinquity in the United States, 1790-1940," *Demographic Research* 43, 501-532.

Newson, L., Postmes, T, Lea, S. E. G., & Webley, P. (2005). "Why are modern families small? Toward an evolutionary and cultural explanation for the demographic transition." *Personality and social psychology review*, 9, 360-375.

Newson, L. & Richerson, P. J. (2009). "Why do people become modern? A Darwinian explanation." *Population and Development Review,* 35, 117-158.

Olson, Sherry, (2017), "Setting the census household into its urban context: Visualizations from 19th-century Montreal," *Demographic Research*, 36, 1399-1434.

Ostergren Robert C., (1988) *A Community Transplanted: The Trans-Atlantic Experience of a Swedish Immigrant Settlement in the Upper Middle West, 1835-1915*, Madison: University of Wisconsin Press.

Otterstrom, Samuel M., & Bunker, Brian E., (2013) "Genealogy, Migration, and the Intertwined Geographies of Personal Pasts," *Annals of the Association of American Geographers* 103:3, 544-569.

Picard, Robert (2010), "GEODIST: Stata Module to Compute Geographical Distances," *Statistical Software Components* S457147, Boston College Department of Economics.

Ruggles, Steven, (1992), "Migration, marriage and mortality: Correcting sources of bias in English family reconstitutions," *Population Studies* 46: 507-522.

— (2007), "The Decline of Intergenerational Coresidence in the United States, 1850 to 2000," *American Sociological Review,* 72:6, 964-989.

-- (2015), "Patriarchy, Power, and Pay: The Transformation of American Families, 1800-2015," *Demography,* 52:6, 1797-1823.

Ruggles, Steven, Fitch, Catherine A., Goeken, Ronald, Grover, Josiah, Hacker, J. David, Nelson, Matt A., Pacas, Jose, Roberts, Evan, & Sobek, Matthew (2020), *IPUMS Restricted Complete Count Data: Version 2.0* [dataset]. Minneapolis: University of Minnesota.

Sear, Rebecca, & Coall, David, (2011), "How much does family matter? Cooperative breeding and the demographic transition," *Population and Development Review* 37, 81-112.

Sear, Rebecca & Mace, Ruth, (2008), "Who keeps children alive? A review of the effects of kin on child survival," *Evolution and Human Behavior,* 29, 1-18.

Shanas, Ethel (1961), "Living Arrangements of Older People in the United States," *The*

Gerontologist, 1:1, 27-29.

-- (1967), “Help Patterns and Social Class in Three Countries,” *Journal of Marriage and Family,* 29:2, 257-266.

-- (1973), “Family-Kin Networks and Aging in Cross-Cultural Perspective,” *Journal of Marriage and Family,* 35:3, 505-511.

Smith, Daniel Scott (1989), “‘All in Some Degree Related to Each Other’: A Demographic and Comparative Resolution of the Anomaly of New England Kinship,” *The American Historical Review*, 94:1, 44-79.

— (1993), “The Curious History of Theorizing about the History of the Western Nuclear Family,” *Social Science History* 17:3, 325-353.

Spring, Amy, Ackert, Elizabeth, Crowder, Kyle, & South, Scott J. (2017). “Influence of Proximity to Kin on Residential Mobility and Destination of Choice: Examining Local Movers in Metropolitan Areas.” *Demography* 54:4, 1277-1304.

Sussman, Marvin B. (1953), “The Help Pattern in the Middle Class Family,” *American Sociological Review* 18:1, 22-28.

-- (1959), “The Isolated Nuclear Family: Fact or Fiction?” *Social Problems* 6:4, 333-340.

-- (1965), “Relationships of Adult Children with Their Parents in the United States,” In: Shanas, Ethel, & Streib, Gordon F. (ed.). *Social Structure and the Family: Generational Relations.* Englewood Cliffs: Prentice-Hall Inc., 62-92.

Turke, Paul W., (1989), “Evolution and the Demand for Children,” *Population and Development Review* 15:1, 61-90.

Van Baelen, Hanne, & Matthijs, Koen, (2007) “Comparing Two Methods to Reconstruct the Kin Network Outside the Household with Nineteenth-Century Antwerp Data,” *Journal of Family History* 32:2, 149-160.

Verbeke, Anke, (2021), “Lonely last days? Social networks and formal care at the deathbed of urban elderly in Antwerp, Brussels and Ghent, 1797,” *The History of the Family* 26:1, 123-148.

Verdery, Ashton M., (2015), “Links between demographic and kinship transitions,” *Population and Development Review* 41:3, 465-484.

Willführ, Kai Pierre, Johow, Johannes, & Voland, Eckart, (2018), “When the mother-in-law is just as good: Differential mortality of reproductive females by family network composition,” *PLoS ONE* 13:3, 30193252.

Wirth, Louis. (1938), “Urbanism as a Way of Life,” *American Journal of Sociology* 44:1, 1-24.

Wolf, Douglas A. (1994), "The Elderly and Their Kin: Patterns of Availability and Access," In: Martin, L.G., & Preston, S.H. (ed.). *Demography of Aging*. Washington, D.C.: National Academy Press, 146-194.

Figure 1: Example of Sequential and Geocoded methods for Household 1

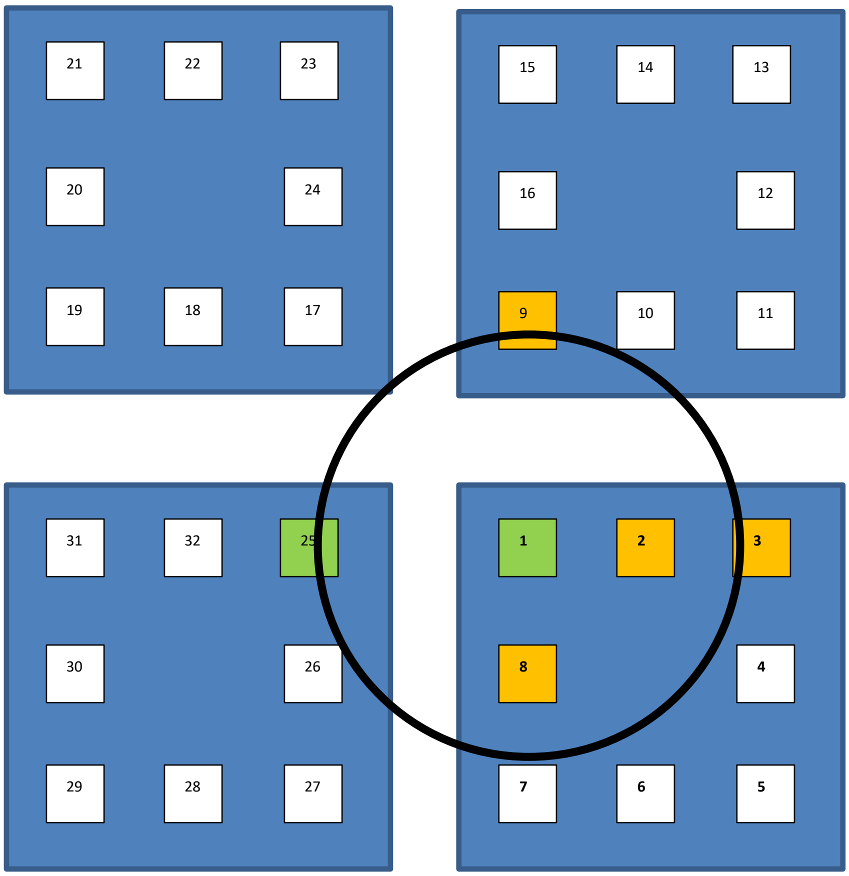

Table 1: Unadjusted and Adjusted Kin Propinquity Rates by Method

	Sequential	Geocoded-Same ED	Geocoded
Unadjusted	27.6%	24.7%	73.8%
Adjusted	23.3%	18.9%	43.2%

Figure 2: Kin Propinquity Rate by 5-Year Age Group and Method

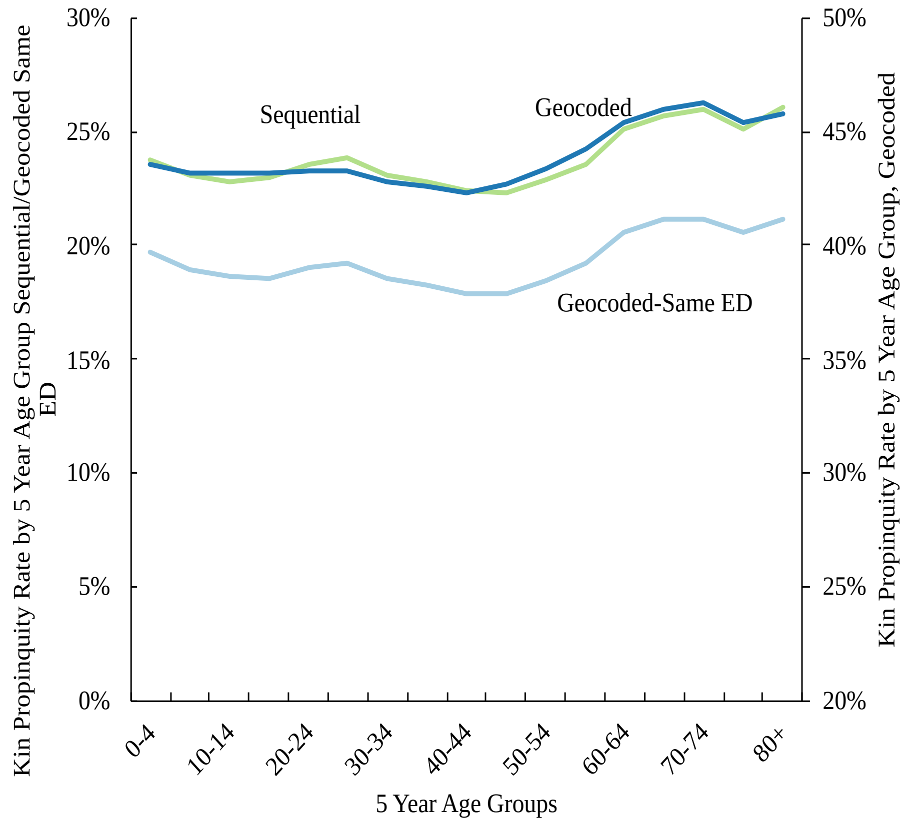

Figure 3: Age Difference Between Potential Kin and 20-24 Year Old Reference Persons by Method

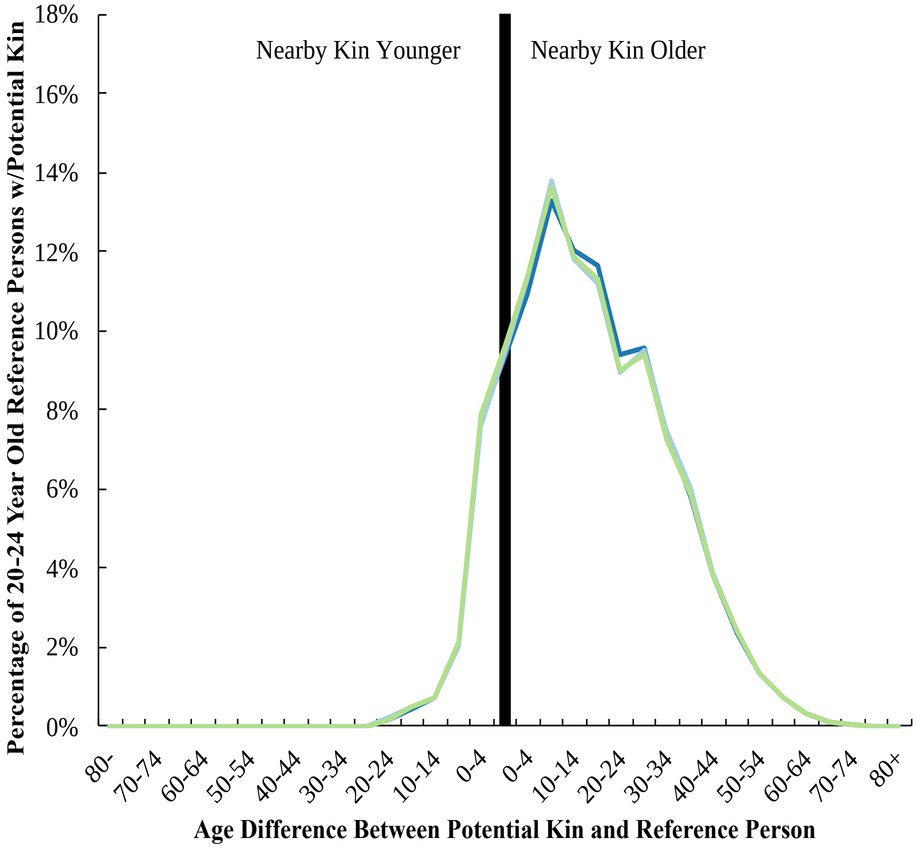

Figure 4: Age Difference Between Potential Kin and 40-44 Year Old Reference Persons by Method

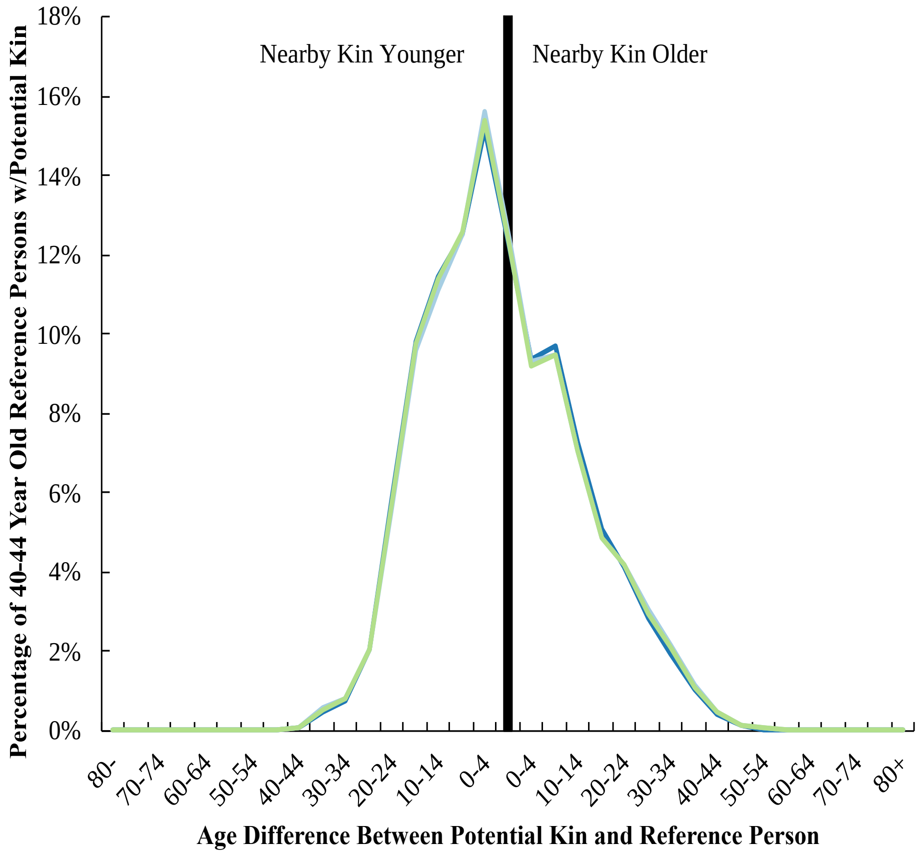

Figure 5: Age Difference Between Potential Kin and 60-64 Year Old Reference Persons by Method

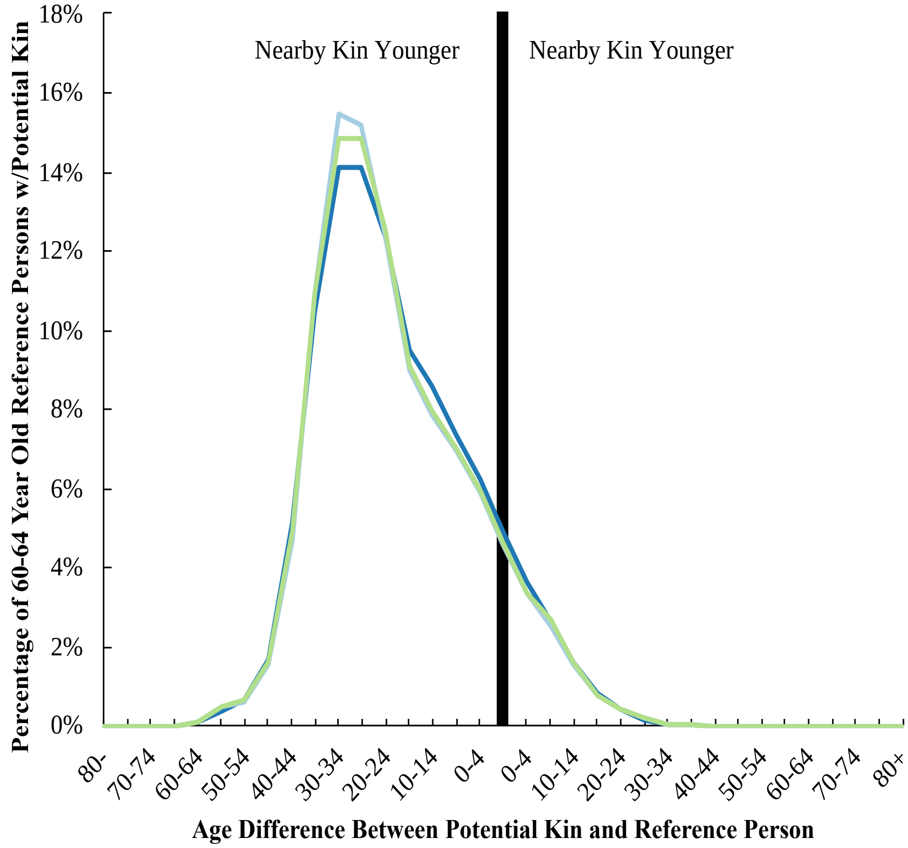

Figure 6: Kin Propinquity Rates by City and Method

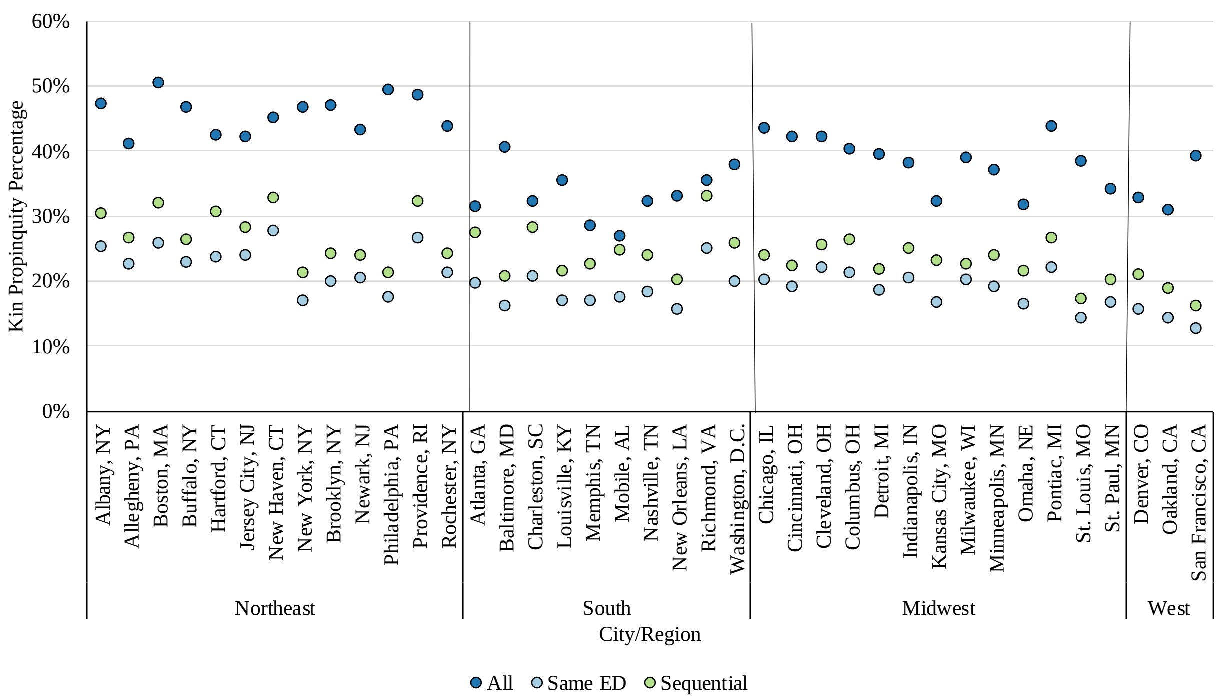

Figure 7: Distance Between Potential Kin by Percentile

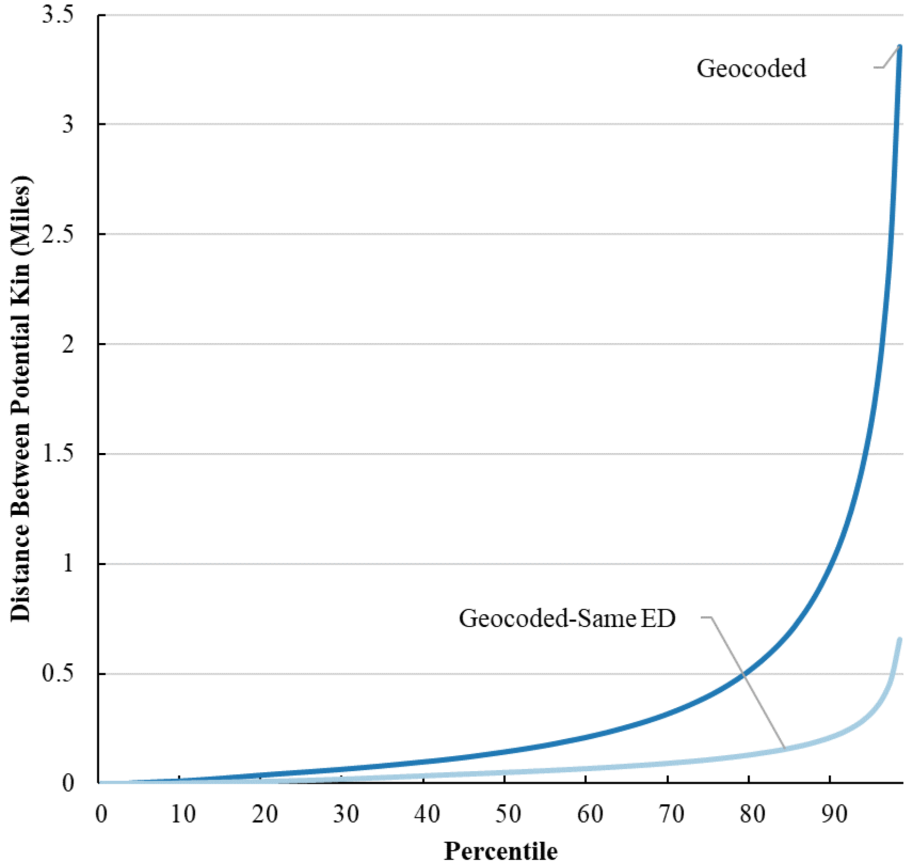

Figure 8: Median Distance (Miles) Between Potetial Kin by City

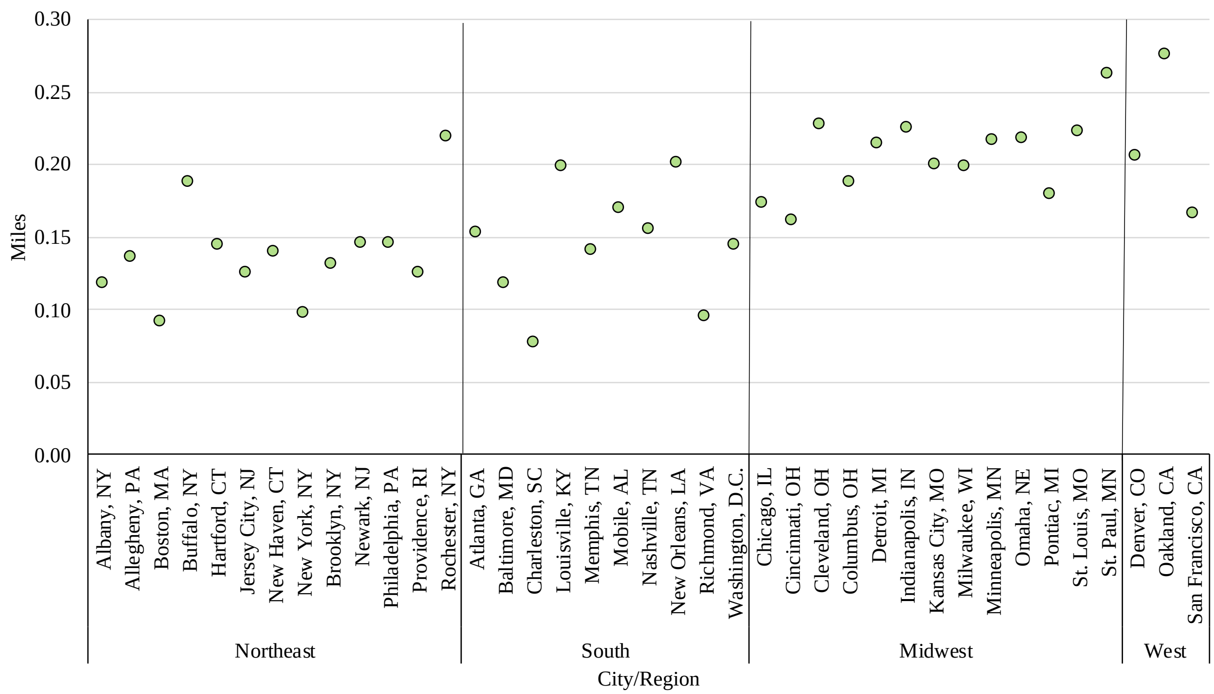

Table 2: Urban/Rural Patrilineal Kin Propinquity Rates at Different Scales

REGION	Same County		Surrounding Counties		Same State		Same Region		Nation	
CITY, ST	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
NORTHEAST										
Hartford, CT	39.9%	41.5%	37.2%	41.4%	37.7%	41.7%	39.8%	43.3%	35.6%	40.1%
New Haven, CT	39.6%	41.9%	37.8%	42.3%	37.7%	41.7%	39.8%	43.3%	35.6%	40.1%
Boston, MA	48.2%	34.4%	41.3%	41.7%	39.2%	42.3%	39.8%	43.3%	35.6%	40.1%
Providence, RI	48.2%	33.5%	47.3%	35.4%	46.4%	37.6%	39.8%	43.3%	35.6%	40.1%
Jersey City, NJ	37.1%	21.5%	43.2%	30.3%	33.8%	40.5%	39.8%	43.3%	35.6%	40.1%
Newark, NJ	41.1%	30.5%	36.4%	30.2%	33.8%	40.5%	39.8%	43.3%	35.6%	40.1%
Albany, NY	42.8%	43.1%	37.4%	43.7%	41.5%	41.4%	39.8%	43.3%	35.6%	40.1%
Brooklyn, NY	46.6%	26.7%	44.1%	31.6%	41.5%	41.4%	39.8%	43.3%	35.6%	40.1%
Buffalo, NY	45.8%	37.9%	42.0%	39.9%	41.5%	41.4%	39.8%	43.3%	35.6%	40.1%
New York, NY	44.9%	-	43.0%	31.6%	41.5%	41.4%	39.8%	43.3%	35.6%	40.1%
Rochester, NY	41.2%	32.5%	40.3%	40.3%	41.5%	41.4%	39.8%	43.3%	35.6%	40.1%
Allegheny, PA	41.1%	32.5%	40.2%	40.1%	44.2%	39.9%	39.8%	43.3%	35.6%	40.1%
Philadelphia, PA	48.0%	-	45.6%	41.5%	44.2%	39.9%	39.8%	43.3%	35.6%	40.1%
Pittsburgh, PA	41.1%	32.5%	40.2%	40.1%	44.2%	39.9%	39.8%	43.3%	35.6%	40.1%
MIDWEST										
Chicago, IL	42.5%	28.8%	41.3%	30.7%	36.5%	39.8%	31.1%	35.9%	35.6%	40.1%
Indianapolis, IN	37.6%	34.8%	37.4%	42.9%	27.9%	41.4%	31.1%	35.9%	35.6%	40.1%
Detroit, MI	38.8%	32.3%	36.7%	36.6%	35.8%	27.9%	31.1%	35.9%	35.6%	40.1%
Cincinnati, OH	41.1%	29.8%	36.6%	36.9%	33.3%	42.1%	31.1%	35.9%	35.6%	40.1%
Cleveland, OH	40.7%	31.4%	38.4%	39.2%	33.3%	42.1%	31.1%	35.9%	35.6%	40.1%
Columbus, OH	39.2%	39.0%	33.6%	42.2%	33.3%	42.1%	31.1%	35.9%	35.6%	40.1%
Milwaukee, WI	37.4%	26.9%	35.8%	32.3%	28.6%	32.5%	31.1%	35.9%	35.6%	40.1%
Minneapolis, MN	35.9%	26.8%	34.2%	29.6%	30.4%	30.7%	31.1%	35.9%	35.6%	40.1%
St. Paul, MN	33.5%	24.2%	33.6%	27.8%	30.4%	30.7%	31.1%	35.9%	35.6%	40.1%
Kansas City, MO	31.0%	28.2%	29.2%	31.2%	32.3%	36.4%	31.1%	35.9%	35.6%	40.1%
St. Louis, MO	37.2%	-	35.2%	29.8%	32.3%	36.4%	31.1%	35.9%	35.6%	40.1%
Omaha, NE	29.5%	24.4%	28.5%	27.4%	26.0%	25.6%	31.1%	35.9%	35.6%	40.1%
SOUTH										
Richmond, VA	35.0%	32.7%	34.6%	39.7%	32.1%	44.9%	31.2%	42.8%	35.6%	40.1%
Mobile, AL	26.7%	28.8%	26.7%	30.6%	27.0%	42.7%	31.2%	42.8%	35.6%	40.1%
Atlanta, GA	30.6%	31.4%	30.6%	41.8%	29.2%	43.7%	31.2%	42.8%	35.6%	40.1%
New Orleans, LA	32.1%	-	32.1%	33.4%	31.7%	41.1%	31.2%	42.8%	35.6%	40.1%
Charleston, SC	31.9%	45.0%	32.2%	45.6%	30.4%	45.0%	31.2%	42.8%	35.6%	40.1%
Louisville, KY	33.7%	28.3%	32.7%	38.9%	28.8%	45.2%	31.2%	42.8%	35.6%	40.1%
Baltimore, MD	39.8%	-	39.8%	32.6%	39.0%	40.9%	31.2%	42.8%	35.6%	40.1%
Memphis, TN	27.9%	35.0%	27.9%	36.7%	28.7%	43.4%	31.2%	42.8%	35.6%	40.1%
Nashville, TN	31.7%	32.1%	31.6%	39.4%	28.7%	43.4%	31.2%	42.8%	35.6%	40.1%
Washington, D.C.	36.0%	24.5%	35.4%	37.3%	36.0%	24.5%	31.2%	42.8%	35.6%	40.1%
WEST										
Denver, CO	32.2%	24.6%	32.2%	26.9%	30.0%	31.0%	30.7%	30.3%	35.6%	40.1%
Oakland, CA	27.5%	26.3%	34.4%	26.4%	31.6%	24.0%	30.7%	30.3%	35.6%	40.1%
San Francisco, CA	37.8%	-	36.1%	26.2%	31.6%	24.0%	30.7%	30.3%	35.6%	40.1%

Table 3: Urban and Rural Kin Propinquity Rates by Cutoff

	Urban	Rural
Unadjusted	73.8%	54.5%
Adjusted	43.2%	40.1%
50% Cutoff	44.9%	43.9%
75% Cutoff	28.6%	31.8%
90% Cutoff	16.6%	21.5%
95% Cutoff	11.4%	15.4%