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DIVERSITY WITHIN NON-ENGLISH LANGUAGE COMMUNITIES: CHICAGO IN 2000

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ABSTRACT

With the 2000 Census data, I identify non-English language (NEL) communities (defined as spatial concentrations of speakers) and investigate the linguistic, demographic, and socioeconomic characteristics of these communities in Chicago. I seek to answer two research questions. First, do non-English language speakers live close enough to form spatially bounded communities? Second, what are these communities like? For example, are they linguistically homogenous (comprised of one non-English language group) or linguistically diverse (comprised of multiple non-English language groups)? I use exploratory spatial data analysis to describe and visualize distributions of NEL neighborhoods (as represented by census tracts). I then use spatial autocorrelation analysis to identify spatial clusters of NEL neighborhoods. The findings suggest that there are NEL communities in central cities. Inconsistent with spatial assimilation theory, the findings also show that there are NEL communities in suburbs and that there is a language group specific pattern in NEL communities.

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In the United States, the absolute number and the percentage of non-English language speakers increased dramatically over the last two decades. In 2000, 18 percent of the population reported speaking a non-English language at home, which is an increase of 7 percent from 1980 (U.S. Census Bureau 1982; 2002). The number of non-English language speakers increased from 23.1 million in 1980, to 31.8 million in 1990, and to 47 million by 2000 (Shin and Bruno 2003). However, no research has yet systematically examined the spatial distribution of non-English language speakers, or identified non-English language communities.

In this paper, I investigate the linguistic, demographic, and socioeconomic characteristics of non-English language communities in Chicago, defined as spatial concentrations of speakers. Two specific research questions are addressed. First, do non-English language speakers live close enough to form spatially bounded communities? Second, what are these communities like? For example, are they linguistically homogenous (comprised of one non-English language group) or linguistically diverse (comprised of multiple non-English language groups)? Identifying *where* and *which* non-English language groups concentrate is important since the characteristics of communities may differ by non-English language groups. For example, Stevens and Garrett (1997) found that Spanish speakers were more geographically concentrated and more likely to live in socio-economically disadvantaged areas than other non-English language speakers in New Jersey.

Whether non-English language speakers live close to other speakers of the same language has implications for the provision of numerous social services such as educational programs for language-minority children, voting materials as mandated by the Voting Rights Act, and language assistance in health care. The provision of services may differ by characteristics of non-English language communities, such as linguistically homogenous communities or

linguistically diverse communities. Non-English language communities may foster minority language maintenance, ethnic identity, and ethnic institutions (Fishman 1985). Spatially bounded non-English language communities provide the context where a non-English language is used and influences the vitality of non-English language populations with the assumption that a language produces a sense of 'being' that is unique among non-English language speakers and separate from members of the outgroup.

In addition, it is also possible that non-English language communities retard the integration of immigrants and their acquisition of English. For instance, the degree of non-English language diversity within a segment of a city's population influences the acquisition of English among immigrants (Lieberson and Curry 1971). The more homogeneous immigrant populations are the less likely that immigrants to acquire English, because immigrants have more opportunities to communicate in a shared non-English language than in English. Conversely, the more heterogeneous immigrant populations are the more likely they are to acquire English given that diverse non-English language speakers need a lingua franca, English, to communicate. Thus, the process of language shift (i.e., shift from speaking a non-English language to speaking only English) is not only influenced by institutional pressures supporting English in American society, but also by the need to communicate between immigrant groups with different non-English languages (Lieberson and Curry 1971).

BACKGROUND

Language Shift

While previous studies have focused on understanding the effects of individual characteristics to explain language shift from non-English language to English among

immigrants and their descendants (e.g., Alba et al. 2002; Bean and Stevens 2003; Espenshade and Fu 1997; McConnell and LeClere 2002; Mutchler and Brallier 1999; Oropesa and Landale 1997; Stevens 1985, 1992, 1999a), few studies consider spatial and geographic factors associated with this process. Economists study the determinants of language shift from a human capital framework, in which they argue the higher the concentration of non-English language speakers, the lower the opportunity cost of maintaining a non-English language, and the lower the English acquisition (Grenier 1984). In the sociological literature, it is consistently suggested that the characteristics of geographic context are associated with English acquisition (Espenshade and Fu 1997; Lieberson and Curry 1971; McConnell and LeClere 2002; Mutchler and Brallier 1999), and with non-English language use (Stevens 1992). The members of a larger sized language group or of highly segregated language groups are more likely to speak a non-English language (Stevens 1992). Older Hispanics who live in concentrated Hispanic population areas are less likely to be fluent in English (Mutchler and Brallier 1999). The framework often used to explain the patterns of language use is the exposure to pressures and incentives to acquire English and exposure to incentives and opportunities to use a non-English language. Lieberson, Dalto, and Marsden (1975) demonstrated that a low level of spatial isolation of language groups is related to the low level of linguistic diversity. They explained that spatial isolation generates social isolation, which results in more contact with the same non-English language speakers, and less pressure to acquire English.

Neighborhood and Community

Since the early 20th century, neighborhood and community has been a focus in urban sociology. However, there is little agreement on the definitions of these two concepts. In the

sociological literature, "neighborhood" has been defined through four elements: 1) geographic boundaries, 2) ethnic or cultural characteristics of the inhabitants, 3) psychological unity among people who feel that they belong together, and 4) concentrated use of an area's facilities for shopping, leisure, and learning (Keller 1968: 87). Thus, neighborhood has physical and social components. Similarly, the classic definition of community is geographically bounded as well. The four elements of community, defined by Zimmerman (1938), are social fact (i.e., action or conduct involving two or more people), definite specification (i.e., each community is unique), association (i.e., face-to-face and non-face-to-face interrelation of individuals), and limited area (i.e., a relatively compact geographic base).

Initially, scholars considered communities to be geographically bounded. As Wellman and Leighton (1979) explained, the principal emphasis on the physical component and lesser emphasis on the social component led to the identification of "community" with "neighborhood." However, Wellman and Leighton argued that there should be a distinction between the two concepts, given that there are three competing arguments regarding the fate of community. The "communities lost" perspective suggests that the division of labor in urban societies has weakened communal solidarity, thus social ties are sparsely knit and loosely bounded. On the other hand, the "community saved" perspective suggests that densely knit and tightly bounded communities continue to exist (e.g., Gans 1962; Young and Willmott 1986 [1957]). While these two perspectives view communities as geographically bounded, the "community liberated" perspective explores the structure of primary ties not only within but also beyond the local area. This perspective suggests that primary ties are dispersed among multiple, sparsely interconnected social networks (Wellman 1979), and that a community can exist based

on individuals' social networks (Granovetter 1973; Wellman 1979; Wellman and Wortley 1990), given that in contemporary society, distance becomes a weaker constraint in interaction.

The findings in Guest and Wierzbicki's (1999) research suggest that the importance of localized neighborhood ties is slowly declining while the importance of non-neighboring social ties is slowly growing. While the findings indicate a support for the community-liberated perspective, and not for support the community-lost perspective, Guest and Wierzbicki (1999) emphasized that a "community mediated" perspective may describe their findings more realistically. Particularly since their findings suggest that neighboring activity continues to be an important activity. An alternative to the community saved, lost, and liberated perspectives – the "community mediated" perspective argues that both localized neighborhood and non-neighboring social ties are maintained (Guest 2000; Guest and Wierzbicki 1999).

Furthermore, Bender (1978) suggested that communities are not necessarily locally based and the meaning of communities had broadened into communities that do not involve face-to-face contacts (Lamont and Molnar 2002). Bender (1978) emphasized the importance of identifying the social networks in which an individual is embedded. Anderson (1983: 6) argued, "… any communities larger than primordial villages of fact-to-face contact (and perhaps even these) are imagined." People imagine their community in their minds although they will never contact most of their fellow members. The development of new information and communication technologies and mass media permit the uniting of geographically dispersed individuals with shared identity, such as virtual communities through computer-mediated communication (Rheingold 2000), and brand communities among admirers of a consumer brand (Muniz and O'Guinn 2001).

Non-English Language Communities – Geographic Space

Geographic space does not always have an important role in the concept community, as it has been used to refer to both geographically defined communities as well as non-geographically defined communities. Furthermore, the review above reveals that researchers increasingly see community as more than a place.

However, at the same time a number of researchers address the importance of geographic space in sociolinguistics (Britain 2002) and demography (Voss, White, and Hammer 2004). Moreover, Wellman (1996) suggests bringing proximity back into the study of community. As Wellman's study found, the frequency of interaction within local informal networks was greater compared to that of non-local intimate networks. The immigration literature has similarly addressed the importance of bringing the urban context into studies of the incorporation of immigrants (Brettell 2003; Waldinger 1996). "Structural variables are elements of social and economic organization that lie beyond individual control, that are built into the way society is organized… Among the most important structural variables are those that are geographically defined" (Massey and Denton 1993: 149).

Therefore, there is an importance in understanding the mechanisms and processes by which geographically defined communities are formed and changed. Since the neighborhood is "the geographic manifestation of community in urban areas" (White 1987: 6), I use neighborhood, represented by census tract, as an analytical unit to study non-English language communities. I define a non-English language community as geographically bounded location in which a cluster of neighborhoods contains a high proportion of non-English language speakers. The assumption is that in a non-English language community, a language produces a sense of being, unique and separate from the members of the outgroup. This is one of the elements of

community, "consciousness of kind", addressed by Gusfield (1978). Language is a distinctive marker of ethnicity and "language is at the heart, literally and metaphorically, of who we are, how we present ourselves, and how others see us" (Gonzalez 2001: xix); therefore, consciousness of kind is evident to both members and non-members of a community. Both English only speakers and non-English language speakers in the United States identify themselves as not only by what they speak but also by what they do not speak.

However, by no means do I assume there is a "natural" unity among members of a community, as Hymes (1974: 47) denied such a unity based on "solely of identity, or commonality, of linguistic knowledge." It is also important to note that since language is not static, within one language group there is sometimes a divide or variation. For instance, Erdmans' study (1995) on the Polish in Chicago suggested that language specifics divided immigrants from Poland and Polish Americans. Immigrants expressed Polish spoken by the Polish Americans as "archaic Polish." Furthermore, while the largest non-English language group in the United States is Spanish, Spanish speakers are not at all homogeneous, consisting of immigrants and descendants from such places as Cuba, Dominican Republic, Haiti, Mexico and Puerto Rico. There are therefore numerous dialects of Spanish spoken in the United States.

THEORETICAL PERSPECTIVE: MODEL OF SPATIAL ASSIMILATION

Massey (1985) developed a theory of ethnic residential segregation, often referred to as the model of spatial assimilation, which incorporates insights from the Chicago School of Urban Ecology (e.g., Park 1926; Park, Burgess, and McKenzie 1925; Wirth 1928). He argues that the two opposing spatial forces, concentration and dispersion, produce ethnic residential segregation and spatial assimilation, respectively. The concentration of ethnic populations is influenced by

the urban economy, such as the cost and availability of transportation. When the Chicago School's Urban Ecology was developed, immigrant's jobs were located in the inner city, and the cost of transportation was too costly for poor immigrants so that immigrants had to live near their places of employment. The concentration is reinforced through chain-migration. Immigrants select their destinations using the social networks of their family members and friends. These ties help new immigrants to find jobs and accommodations. Moreover, once the density of an ethnic population becomes high, ethnic institutions (e.g., ethnic stores and media) fostered, and established ethnic neighborhoods reinforce the chain-migration.

On the other hand, the process of dispersion occurs as immigrants achieve socioeconomic mobility, and are acculturated. Immigrants move away from their ethnic neighborhoods to the suburbs over time in order to improve their residential amenities. As the social status of minority members rises, the probability of residential contact with non-Hispanic whites increases, while rising social status leads to a lower probability of contact with other minority groups. Therefore, non-English language speakers are more likely to concentrate in the inner city.

While the residential segregation of minorities continues in the United States (Iceland, Weinberg, and Steinmetz 2002; Logan, Stults, and Farley 2004), some research shows that residential patterns of the new immigrants are not adequately explained by the model of spatial assimilation. Zhou and Logan (1991), for example, found that the recent Chinese immigrants move directly into suburbs after they immigrate. This is because of the importance of the residential location of the family and relatives for new immigrants, and a formal real estate market organized through Chinese realtors supporting the clustering of Chinese in certain neighborhoods (Zhou and Logan 1991). Moreover, other studies (Alba et al. 1999a, 1999b; Singer 2004) also show new immigrants, mostly from Latin America and Asia, are moving

directly to the suburbs, and there is less of a barrier to live in the suburbs even for immigrants who do not speak English well. Furthermore, the proportion of immigrants living in the suburbs is now more than the proportion of those living in the inner cities (Singer 2004).

HYPOTHESES

The first two hypotheses are consistent with the model of spatial assimilation.

Hypothesis 1: Non-English language communities are more likely to be located in central cities than in suburbs.

Hypothesis 2: Non-English language communities in central cities are more likely to have a higher proportion of limited English proficient population.

Because some research has shown that the residential pattern of new immigrants does not necessarily accord with the model of spatial assimilation, and that there is a group and context specific pattern in suburbanization (Alba et al. 1999b), I pose the following two hypotheses.

Hypothesis 3: The demographic and socioeconomic characteristics of non-English language communities differ by language group.

Hypothesis 4: The demographic and socioeconomic characteristics of non-English language communities differ by the location of communities (i.e., central city and suburb).

DATA AND METHODS

Data

The data for this paper are obtained from the U.S. Census Bureau. The data are the 2000 Census of Population and Housing Summary File 1, which are from the census short form questionnaire for every person and housing unit, and the 2000 Census of Population and Housing Summary 3, which are based on population and housing information collected from the census long form questionnaire sent to a one in six sample of households and from the census short form questionnaire.

In 2000, the census long form included three questions on language use. The questions on language use were asked to those aged above 5 years old. The questions are:

1. Does this person speak a language other than English at home? (yes or no)
2. [If yes to (1)], What is this language?
3. How well does this person speak English? (very well, well, not well, or not at all).

The non-English language use item (question 1) has a few potential criticisms: respondents are not asked about frequency of non-English language use, fluency in non-English language, use of non-English language outside of home (e.g., work place), multiple non-English language use, and their non-English language use earlier in their lives.

In addition, there is an issue to pay attention to in the English fluency variable (question 3). As Stevens (1999b) pointed out, the question on ability to speak English may not have been asked to all individuals who are not fully proficient in English. Since the first language question is, does this person speak a language other than English at home?, some answered "no" since they may not use their non-English language *at home*, but use it in other contexts (e.g., at work). Thus, there is a potential underreporting of the population who speak a non-English language,

and therefore, the question on ability to speak English is not asked to some who are not fully proficient in English. However, the census data are the most appropriate for this paper, because there is no other nationally representative data that provides language use data in small geographic entities, such as the census tract.

The unit of analysis for the research is the census tract. Census tracts are statistical subdivisions of a county or statistically equivalent entity delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program, and designed to be relatively homogeneous with regard to population characteristics, economic status, and living conditions. The 2000 census is the first to have census tracts for the entire United States. Each census tract has between 1,000 and 8,000 people with an optimum size of 4,000 people (U.S. Census Bureau 2001).

In this paper, I focus on the Chicago Primary Metropolitan Statistical Area (PMSA), which includes Cook, DeKalb, DuPage, Grundy, Kane, Kendall, Lake, McHenry, and Will counties. The federal Office of Management and Budget (OMB) defines metropolitan areas, and these areas share a high degree of economic and social integration. There are 1,863 census tracts in the Chicago PMSA (from here on Chicago), with 962 in the central cities and 901 in the suburbs.

Chicago has been the immigrant gateway since the 19th century. Chicago received many immigrants from Europe in the late 1800s and early 1900s. By 1920, Polish, Irish, Italian, and German were the major ethnic groups from Europe (Howenstine 1996). The arrivals of immigrants had slowed down by the 1970s as in other parts of the United States. However, over the last three decades Chicago has experienced the high growth of immigration especially from Latin America and Asia (Singer 2004). In 2000, about a half of foreign-born living in Chicago

are from Mexico, followed by Poland (11 percent), Philippines (4 percent), and China (3 percent) (The Brookings Institution Center on Urban and Metropolitan Policy 2003).

Methods

Using the spatial analysis software, *GeoDa* (Anselin 2003), I employ exploratory spatial data analysis (ESDA), a spatial extension of exploratory data analysis (EDA) (Tukey 1977), to examine spatial patterns of non-English language neighborhoods (as represented by census tracts). ESDA is "a collection of techniques to describe and visualize spatial distributions, identify atypical locations or spatial outliers, discover patterns of spatial association, clusters or hot spots, and suggest spatial regimes or other forms of spatial heterogeneity" (Messner et al. 1999: 425). Because of the lack of prior research on non-English language communities, ESDA is suitable for this research.

In order to answer the first research question, do non-English language speakers live close enough to form spatially bounded communities?, I assess the *clustering* of non-English language neighborhoods globally and the *clusters* of non-English language neighborhoods locally, using measures of spatial autocorrelation (i.e., global Moran's I and local indicators of spatial association (LISA)) (Anselin, Syabri, and Kho Forthcoming). Spatial autocorrelation refers to value similarities of a variable matched with location similarities (Cliff and Ord 1981). Global Moran's I is a summary indicator of spatial autocorrelation, and it compares the value of the variable at any one census tract with the value at all other census tracts. Spatial autocorrelation assess whether the observed value of a variable at one census tract is independent of values of the variable at neighboring tracts. Global Moran's I is:

$$I = \frac{\sum_i \sum_j w_{ij} z_i z_j}{\sum_i z_i^2},$$

where z_i and z_j are the deviation from the sample mean, and w_{ij} is an element of a row-standardized spatial weight matrix (i.e., elements of a row sum to one). Subscript *i* refers to a particular census tract and subscript *j* refers to that census tract's neighbors. In this paper, I define "neighbor" as any tract that shares a common boundary, which is the first-order contiguity weight. Inference is based on the permutation approach.[1]

Global Moran's I statistic varies from -1 to 1, where 1 suggests perfect positive spatial autocorrelation (where high values or low values are spatially clustering), -1 suggests perfect negative spatial autocorrelation (where a checkerboard pattern dominates), and 0 suggests perfect spatial randomness.

While global Moran's I suggests the presence or lack of spatial autocorrelation at the level of geographic area as a whole, local indicators of spatial association (LISA) is a location specific statistic and identifies where exactly the clusters of non-English language neighborhoods are (Anselin 1995). Furthermore, LISA can be visualized as a map. LISA is:

$$I_i = z_i \sum_j w_{ij} z_j .$$

[1] A permutation approach involves generating a reference distribution of values of Moran's I with the spatially random simulated data sets using 999 permutations. The pseudo significance level (0.001) is computed as "the ratio of the number of statistics for the randomly generated data sets that are equal to or exceed the observed statistic + 1, over the number of permutations used + 1" (Anselin 2003:91).

LISA identifies significant spatial clusters of non-English language neighborhoods by taking into account unusually high or low values in a census tract as well as the values of neighboring tracts. Inference is also based on the permutation approach.

I provide descriptive statistics on socioeconomic and demographic characteristics of non-English language communities to answer the second research question: what are non-English language communities like? Characteristics include percentage of limited English proficient (LEP) population (i.e., non-English language speakers who speak English less than "very well"), the mean percentage of foreign-born, the mean of linguistic diversity – index A, the mean percentage of English only speakers, the mean percent of all non-English language speakers, the mean percentage of population living in poverty, the median household income, and the mean percentage of owning a home. Kominski's study (1989) indicated that the ability in English of respondents who answered speaking English "very well" is similar to that of the English speaking population. Thus I selected "very well" as the separating category for LEP.

Measures

Linguistic Diversity at Census Tract

Language diversity depends on the absolute number of non-English language groups present in a given area, i.e., richness, and the relative population size of each of the groups present in a given area, i.e., evenness or equitability (Pielou 1975). In this paper, I use a measure of linguistic diversity, index *A*.

Greenberg (1956) first introduced index *A*. The index value is the probability that two members of the population who are randomly selected would speak a different language (Greenberg 1956; White 1986). Index *A* is calculated as:

$$A = 1 - \sum_{k=1}^{K} (p_k)^2 \ ,$$

where p_k is a proportion of persons who speak *kth* language at home. It varies from 0 (one language spoken) to $1 - \frac{1}{K}$ (all *k* language groups are equally present). The index *A* takes into account both richness and evenness, and considers an area dominated by few languages to be less diverse than one in which several different languages have the same proportion. The advantage of index *A* is a quantitative description of the degree of language diversity existing in a given area and permits for comparisons between areas. However, because the maximum value of index *A* is a function of the number of languages included in the enumeration, the more spoken languages included in the enumeration, the larger the maximum value index *A* becomes.[2] While standardized index A' is sometimes preferred over unstandardized index *A* (Lieberson 1969), I only present the results of the unstandardized index *A*.

It is important to note a few criticisms of index *A*. Although, the operational meaning given to a value of index *A* is that all members will interact with one another with equal frequency, members will tend to interact with the same language speakers more frequently than with those whose language is different due to spatial and social segregation (Lieberson 1981: 99-

[2] For example, in this paper, there are 25 language groups, and therefore, the maximum value of index *A* is, $1 - \frac{1}{25}$, 0.960. On the other hand, the standardized index *A* denoted as A' varies from 0 to 1. The standardized index A' is calculated as $A' = \frac{A}{1 - (1/K)}$. Although there is no standard indicating when the adjustment is necessary, Lieberson (1969) provided a general recommendation. When comparisons are made between two or more populations that differ in the number of languages spoken, the unstandardized measure of index *A* is appropriate (Lieberson 1969). In addition, unstandardized index *A* and standardized index A' would correlate perfectly since the value of unstandardized index *A* divided by the constant, $1 - \frac{1}{K}$, is the value of standardized index A'. Moreover, the preliminary analysis using data on Chicago showed that results did not differ between standardized and unstandardized.

100). Index *A* is weighted towards the evenness of the language use rather than providing a measure of language richness (Magurran 1988).

Non-English language communities

Non-English language communities refer to a spatial concentration of non-English language speakers. In this paper, I use the proportion of non-English language speakers as a measure of concentration.

RESULTS

Table 1 shows the number of English and non-English language speakers ranked by size in Chicago in 2000. Approximately one fourth of the population aged above 5 speaks a non-English language at home, and the largest non-English language group is Spanish. 57 percent of non-English language speakers are Spanish speakers. While diverse language groups are present in Chicago, I examine the five largest non-English language groups, Spanish, Polish, Tagalog, Chinese, and Italian in this paper.

-- Table 1 about here --

Global Moran's I for the proportion of the largest five non-English language groups are 0.76, 0.74, 0.40, 0.61, and 0.58 for Spanish, Polish, Tagalog, Chinese, and Italian, respectively. These values are significant at the .001 level. The results from global Moran's I suggest that there is a significant clustering of non-English language neighborhoods for all five-language groups at the metropolitan area level in Chicago.

Figure 1 shows the clusters of non-English language neighborhoods (i.e., non-English language communities) in Chicago for five language groups. Most of the Spanish and Polish language communities are located in central cities, which is consistent with hypothesis 1 – Non-English language communities are more likely to be located in central cities than in suburbs. However, the results show that not all non-English language communities are located in central cities. Particularly, some Tagalog, Chinese, and Italian language communities are located in the suburbs in addition to central cities.

-- Figure 1 about here --

It is important to note, however, all but the Italian language communities in central cities hold larger percentages of speakers of their language group than those in suburbs (Table 2). Furthermore, in the suburbs more non-English language speakers live outside of language communities compared to those who live in language communities in suburbs. Spanish language communities in the central cities consist of 34 percent of the total number of Spanish speakers in Chicago, whereas communities in suburbs consist of 7 percent. Similarly, about one third of Polish speakers live in Polish language communities in the central cities. Tagalog language communities in central cities also have more Tagalog speakers than those in suburbs, 14 percent and 9 percent respectively. On the contrary, Italian language communities in the suburbs consist of more Italian speakers (14 percent) than those in the central cities (12 percent). According to the model of spatial assimilation, non-English language speakers concentrate in the central cities, and linguistically acculturated immigrants and descents of immigrants move into the suburbs where they are integrated into the majority population. The fact that non-English language

communities of four languages, Spanish, Polish, Tagalog, and Chinese, have more speakers in the central cities suggests that the spatial patterns of non-English language speakers support the model of spatial assimilation. However, the pattern of Italian language communities as well as suburban Tagalog and Chinese language communities are not consistent with the model of spatial assimilation.

While the non-English language communities for five language groups are identified, the mean percentage of each language group in a neighborhood (i.e., census tract) within language communities differs significantly by language group, especially for Spanish. The mean percentage of Spanish speakers in a neighborhood is the highest among the five non-English language groups. On average, the percentage of Spanish speakers in a neighborhood within Spanish language communities is 67 percent in the central cities (Table 2). Following Spanish, the mean percent of Polish and Chinese speakers within language communities in the central cities are 19 percent and 16 percent, respectively. On the other hand, the mean percentage for Tagalog and Italian speakers is about 4 percent in the central cities and suburbs. Therefore, it appears that there is a language specific pattern to the spatial distribution of speakers.

-- Table 2 about here --

Table 3 shows the characteristics of non-English language communities in Chicago. It is important to note that these characteristics are the average of neighborhoods that are within the language communities. Therefore, these characteristics are not specific to any language groups.

The mean percentage of limited English proficiency (LEP) population in the non-English language communities ranges from 21 to 41 for central cities, which are higher than those

outside of non-English language communities. This finding supports the second hypothesis – Non-English language communities in central cities are more likely to have a higher percentage of limited English proficiency population. In the suburbs, the mean percentage of LEP population in Chinese language communities is 7 percent, which is lower than that outside of Chinese language communities (9 percent). This is reflected in the lower mean percent of foreign-born in Chinese language communities in the suburbs (17 percent) than other language communities in the suburbs.

-- Table 3 about here --

As for the mean of the linguistic diversity measure, index *A*, Spanish language communities in central cities are the least linguistically diverse (0.44) than the other language communities in central cities. Spanish language communities have an average of 27 percent of English only speakers and 73 percent of non-English language speakers, including Spanish speakers themselves. Given that the relatively high mean percentage of Spanish speakers in Spanish language communities in central cities (67 percent) (table 2), the majority of non-English language speakers are Spanish speakers. Therefore, the high percentage of Spanish speakers is lowering the mean of the linguistic diversity measure. On the other hand, the low mean of the linguistic diversity measure for Chinese language communities in the suburbs (0.37) is not the result of a large percentage of Chinese speakers. Instead, an average of 78 percent of English only speakers who reside in Chinese language communities lower the linguistic diversity measure. Tagalog language communities have the highest mean linguistic diversity (0.66),

because an average of 44 percent of English only speakers and 55 percent of non-English language speakers share these communities.

The socioeconomic characteristics vary by language groups. Overall, the mean percentage of population living in poverty is lower in the suburbs than in central cities regardless of whether the neighborhoods are in the non-English language communities or not. However, the mean percentage of population living in poverty for Spanish language communities in the suburbs is high (16 percent). This is reflected in the lower median household income in Spanish language communities in the suburbs compared to other language communities in the suburbs. On the other hand, while the mean percent of population living in poverty is the highest in Chinese language communities in central cities (24 percent) among the five non-English language groups, it is the lowest in Chinese language communities in the suburbs (0 percent). The median household income in Chinese language communities in the suburbs is more than twice that in central cities. These findings suggest that when Chinese language speakers live in language communities in the suburbs, they live in socio-economically advantaged areas. However, Spanish speakers are more likely to live in socio-economically disadvantaged areas regardless of whether language communities are in the suburbs or central cities. This finding for Spanish language speakers is consistent with Stevens and Garrett's (1997) research on New Jersey. In addition, while the mean percentages of owning a home are higher in the suburbs for all language communities than those in central cities, the mean percentage of home ownership for Italian language communities in central cities (72 percent) is equally high as that of in the suburbs (74 percent). In sum, the demographic and socioeconomic characteristics of non-English language communities differ by language group (hypothesis 3) based on the findings discussed above.

The findings show that demographic and socioeconomic characteristics of non-English language communities differ by the location of communities (i.e., central city and suburb) (hypothesis 4), although the difference in these characteristics between central cities and the suburbs is smaller for Spanish and Polish language communities compared to the differences for other three language groups.

DISCUSSION AND CONCLUSIONS

Using the 2000 Census data, this paper assessed the spatial distribution of non-English language speakers in Chicago. The results of exploratory spatial data analysis, specifically spatial autocorrelation analysis, systematically identified non-English language communities for the five largest non-English language groups in Chicago, Spanish, Polish, Tagalog, Chinese, and Italian. The speakers of these languages lived close enough to form spatially bounded communities in both central cities and suburbs. While some of the language communities are located in the suburbs in addition to central cities, especially for Tagalog, Chinese, and Italian language groups, all but the Italian language communities hold larger percentages of speakers of their language group in central cities than those in the suburbs. While the presence of non-English language communities in central cities is consistent with the model of spatial assimilation, the presence of non-English language communities in the suburbs is not consistent with the model. There is some support in the literature for this finding. New immigrants, mostly from Latin America and Asia, are moving directly to the suburbs, and there is a higher proportion of immigrants living in the suburbs than central cities (Alba et al. 1999a, 1999b; Singer 2004). More importantly, English proficiency was not found to be a necessary requirement for residing in the suburbs (Alba et al. 1999a). The presence of non-English

language communities in the suburbs is partly explained by social networks. The important role of social ties in migration has been emphasized in past research (Boyd 1989). For instance, these ties provide assistance for settlement. Zhou and Logan (1991) suggested kin networks help immigrants to overcome the lack of English proficiency during the course of finding affordable housing. Thus, perhaps, even in the suburbs once a non-English language community is established, the new immigrants arrive through their social networks.

The results indicate that there is no one explanatory framework that explains the spatial distribution of non-English language speakers, because the characteristics of communities vary by language group. There were smaller differences between language communities in central cities and those in the suburbs for Spanish and Polish compared to the other three language groups. This might be because the places of Spanish and Polish language communities in the suburbs are relatively close to central cities (Figure 1). Spanish language communities are characterized with the highest mean percentage of limited English proficient (LEP) population, foreign-born, and non-English language speakers among the five language groups regardless of whether the location of the communities are in central cities or suburbs. The disadvantaged socioeconomic characteristics of Spanish language communities in central cities improve little for those in the suburbs.

On the other hand, the difference between Chinese language communities in central cities and suburbs regarding socioeconomic characteristics are very stark, although one must interpret with caution, because these are the characteristics of the communities as a whole. Chinese language communities in central cities have the highest mean percentage of population living in poverty, a very low median household income, and the lowest mean percentage of owning a home among the five language groups. However, the characteristics of Chinese language

communities in the suburbs are the complete opposite, as these communities are socio-economically advantaged. These results suggest that Chinese language communities in the suburbs are associated with preference than economic constraints (Alba et al. 2002; Horton 1995). Therefore, non-English language communities in the suburbs may not be transitional nor temporal as in the immigrant neighborhoods in central cities, which were explained as the place immigrants settle first and leave after they achieve economic mobility and are acculturated according to the model of spatial assimilation.

These findings have a few important implications. First, whether non-English language speakers live close to other speakers of the same language has an implication for the provision of adequate social support, such as educational programs for language-minority children. This is particularly important because the results indicated that there are higher percentages of limited proficient population in non-English language communities compared to neighborhoods outside of language communities, except for Chinese language communities in the suburbs. As Wierzbicki (2004) found, immigrants have fewer strong ties outside of households compared to the native-born, thus the access to services may be limited. In addition, the provision of services may differ by characteristics of non-English language communities, such as linguistically homogenous communities or linguistically diverse communities. For instance, the results indicated that Polish language communities and Italian language communities overlap in the Northwest part of central Chicago (Figure 1).

Second, the presence of non-English language communities may provide the context where a non-English language is used and influences the vitality of non-English language populations, especially in the suburbs if in fact the communities in suburbs are not transitional.

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Table 1. Number of Language Speakers Ranked by Size in Chicago: 2000

Language Group	Number of Speakers
Only English	5,630,883
Non-English language speakers	2,027,115
Spanish or Spanish Creole	1,155,201
Polish	182,115
Tagalog	59,445
Chinese	58,092
Italian	46,945
German	42,878
Korean	38,762
Greek	38,745
Russian	36,694
Arabic	31,767
Urdu	31,242
Other Indo European languages	30,803
French (incl. Patois, Cajun)	29,517
Serbo-Croatian	27,678
Gujarathi	27,610
Other Slavic languages	26,203
Other Asian languages	23,325
Hindi	17,307
Other Indic languages	15,693
Vietnamese	14,066
African languages	13,979
Japanese	13,112
Persian	5,398
Hebrew	5,311
Thai	5,254
Scandinavian languages	4,732
French Creole	3,895
Hungarian	3,826
Portuguese or Portuguese Creole	3,358
Yiddish	3,317
Other Pacific Island languages	3,243
Mon-Khmer, Cambodian	3,053
Other West Germanic languages	2,978
Laotian	2,785
Armenian	2,182
Other Native North American languages	821
Miao, Hmong	265
Navaho	104
Other and Unspecified languages	15,414
Total Population (5 years and over)	7,657,998

Table 2. Distribution of Non-English Language Communities in Chicago: 2000

	Central City		Suburb	
	Language Community	Non Language Community	Language Community	Non Language Community
SPANISH				
Number of Spanish speakers	395,131	332,541	82,254	345,275
Percent of Spanish speakers	34.2	28.8	7.1	29.9
Mean percent of Spanish speakers	66.5	11.6	59.8	7.9
Number of tracts	159	803	27	874
POLISH				
Number of Polish speakers	62,977	30,012	16,979	72,147
Percent of Polish speakers	34.6	16.5	9.3	39.6
Mean percent of Polish speakers	19.2	1.0	15.4	1.6
Number of tracts	74	888	22	879
TAGALOG				
Number of Tagalog speakers	8,032	15,982	5,607	29,824
Percent of Tagalog speakers	13.5	26.9	9.4	50.2
Mean percent of Tagalog speakers	3.6	0.4	4.1	0.6
Number of tracts	39	923	27	874
CHINESE				
Number of Chinese speakers	17,410	14,242	1,932	24,508
Percent of Chinese speakers	30.0	24.5	3.3	42.2
Mean percent of Chinese speakers	15.9	0.3	2.7	0.5
Number of tracts	51	911	14	887
ITALIAN				
Number of Italian speakers	5,425	9,391	6,547	25,582
Percent of Italian speakers	11.6	20.0	13.9	54.5
Mean percent of Italian speakers	4.4	0.3	4.1	0.6
Number of tracts	26	936	32	869

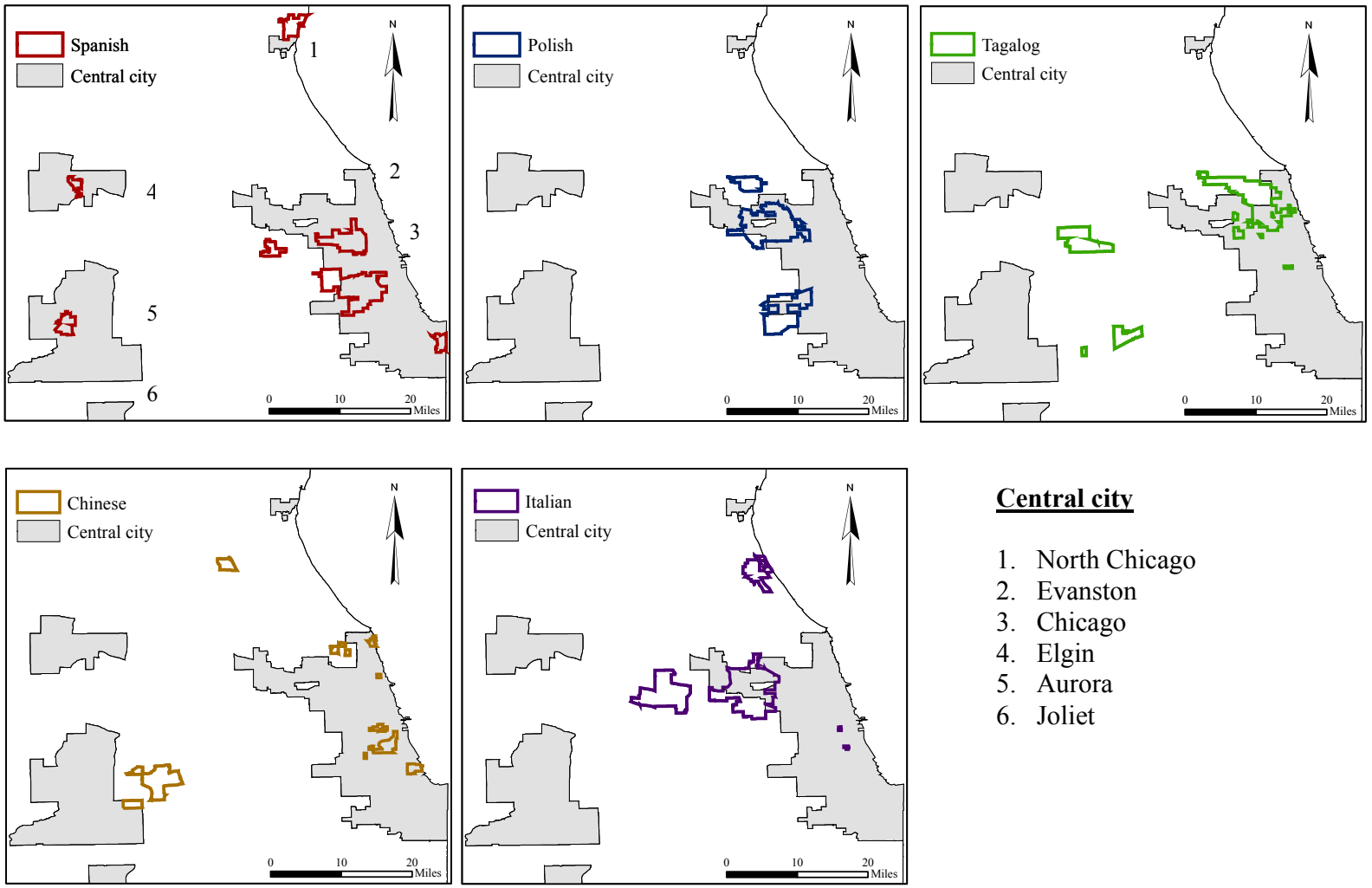
Table 3. Characteristics of Non-English Language Communities in Chicago: 2000

	Central City		Suburb	
	Language Community	Non Language Community	Language Community	Non Language Community
	Mean percent of limited English proficient (LEP) population			
Spanish	41.1	10.1	37.2	8.1
Polish	27.1	14.3	21.2	8.7
Tagalog	28.9	14.7	18.3	8.7
Chinese	21.1	14.9	7.4	9.0
Italian	19.5	15.1	17.6	8.7
	Mean percent of Foreign-born			
Spanish	39.0	13.3	39.4	13.1
Polish	33.6	16.2	31.0	13.5
Tagalog	38.8	16.6	33.8	13.3
Chinese	27.4	17.0	17.4	13.9
Italian	28.3	17.2	24.5	13.5
	Mean of linguistic diversity – Index *A*			
Spanish	0.44	0.30	0.47	0.30
Polish	0.60	0.30	0.61	0.30
Tagalog	0.66	0.31	0.64	0.30
Chinese	0.49	0.31	0.37	0.31
Italian	0.59	0.31	0.49	0.30
	Mean percent of English only speakers			
Spanish	27.4	78.4	35.7	81.0
Polish	48.7	71.7	57.1	80.2
Tagalog	44.6	71.0	56.7	80.4
Chinese	59.7	70.5	77.5	79.7
Italian	59.0	70.3	65.7	80.2
	Mean percent of all non-English language speakers			
Spanish	72.6	21.6	64.3	19.0
Polish	51.3	28.3	42.9	19.8
Tagalog	55.4	29.0	43.3	19.6
Chinese	40.3	29.5	22.5	20.3
Italian	41.0	29.7	34.3	19.8
	Mean percent of population living in poverty			
Spanish	21.1	21.1	15.6	5.1
Polish	7.5	22.3	5.4	5.4
Tagalog	11.2	21.5	4.5	5.4
Chinese	24.2	21.1	0.0	5.4
Italian	6.5	21.5	5.5	5.4

(Table 3 continued)

	Central City		Suburb	
	Language Community	Non Language Community	Language Community	Non Language Community
	Median household income (in dollars)			
Spanish	34,219	40,245	38,965	65,589
Polish	45,937	38,691	48,631	65,196
Tagalog	45,828	38,971	62,242	64,870
Chinese	37,804	39,330	84,455	64,481
Italian	48,595	38,989	62,870	64,862
	Mean percent of owning a home			
Spanish	41.7	44.8	56.4	78.6
Polish	66.7	42.4	73.6	78.0
Tagalog	48.5	44.1	80.2	77.8
Chinese	37.8	44.6	77.4	77.9
Italian	71.8	43.5	73.7	78.1

Figure 1. Non-English Language Communities in Chicago, 2000



Central city

1. North Chicago
2. Evanston
3. Chicago
4. Elgin
5. Aurora
6. Joliet