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by
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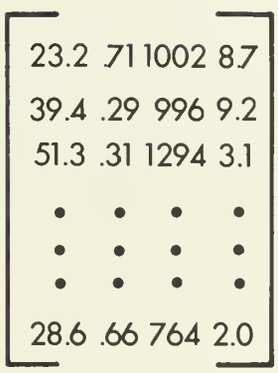

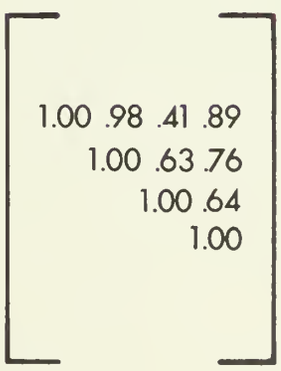

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SOCIAL AREAS AND SPATIAL CHANGE IN THE BLACK COMMUNITY OF CHICAGO: 1950-1960*

Charles Christian

ABSTRACT

Factor analysis, social change analysis and factor congruence analysis were applied to the black community of Chicago for 1950 and 1960 to derive indices of social structure and spatial changes over time for the black population. Derived basic dimensions of the social structure for the black population of Chicago are found to be similar to previous studies of applied factor analysis for entire metropolitan areas, however spatial patterns of social structure for blacks are quite dissimilar to those presented in previous similar studies of metropolitan areas. In essence, findings from this paper show that for both 1950 and 1960, economic status in the black community is concentric while family structure is sectorial in reference to the entire city. Social change analysis uncovered aspects of change dimensions occurring spatially within the black community: population, income, family, unskilled employment, housing, and in-migration dimensions explained the greatest proportion of variance. A factor congruence analysis suggests no great changes in the social structure for the two time periods. As a result of these analyses, several processes are revealed which may explain social and spatial structure: (1) urban renewal and public housing influencing economic and family structure; (2) city-wide discrimination affecting housing choice, employment and mobility within the entire city; (3) variations in the invasion-succession process reacting to housing availability for blacks; and (4) the migration of diverse social and economic attributes responding to housing availability in the core areas, as well as the entire metropolitan area

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INTRODUCTION

Population growth in urban areas is accompanied by changes in social and spatial form. The analytical approach used most often by geographers to delimit the urban structure has been a factor analytic model (King, 1969), which is an extension of the social area model formulated by Shevky and Bell (1955). This model is based upon three independent dimensions (economic status, family status, and ethnic status) that characterize and differentiate the urban structure (Shevky and Bell, 1955; Bell, 1959). A review of the literature reveals that factor analytic models have rarely been applied to the black community to ascertain its internal structure within the central city (Frazier, 1932; Taeuber and Taeuber, 1965; and Frueh and Lewis, 1971).

Recently, black urban communities have increased significantly in population -- both in absolute number and as a percentage of the total population within the central city. Increasing numbers of black and decreasing numbers of whites in central cities have had profound effects on the social, economic and spatial structure of urban areas, and more specifically, on the black community. Recognizing the fact that discrimination, prejudice, low income, and other constraints on black residential choice still exist within the urban environment, the question remains, "what is the internal social and spatial structure of the black community?" Furthermore, "how has the internal structure of the black community changed over time?"

PURPOSE

Specifically, three questions are to be investigated in this study: (1) are the dimensions and the spatial patterns of the internal structure of "black Chicago" similar to those derived in previous factorial ecology studies of entire metropolitan areas? (2) are the temporal dimensions and resultant spatial patterns of the black community similar to those derived in previous social change studies? and (3) what possible implications for uncovering broader structural and spatial processes can be obtained from this study of the black community of Chicago?

STUDY AREA

Population Trends

The rapid increase in in-migration of the non-white population to Chicago, noted between 1940 and 1950 continued during the 1950 to 1960 decade. Ninety-seven percent of the non-white resident population in Chicago for both 1950 and 1960 were black residents (Chicago Urban League, 1965), thus the non-white population is referred to as black throughout this paper. The black population of Chicago increased 80.5 percent between 1940 and 1950, to reach a total of more than 509,000. In the period 1950 to 1955, the black population increased an estimated 24.3 percent to a total population of 633,000 (Romanow, 1959). In the ten year period, 1950 to 1960, the black population in Chicago increased by more than 64 percent from an absolute population of 509,000 to over 812,000 (U.S. Census of Population, 1950 and 1960). A number of metropolitan Chicago suburbs are also experiencing a high rate of increase in black population. The black population in the metropolitan suburbs increased almost 100 percent during 1950 through 1960 from an absolute population of 44,958 to 82,345 respectively (Illinois Commission on Human Relations, 1962).

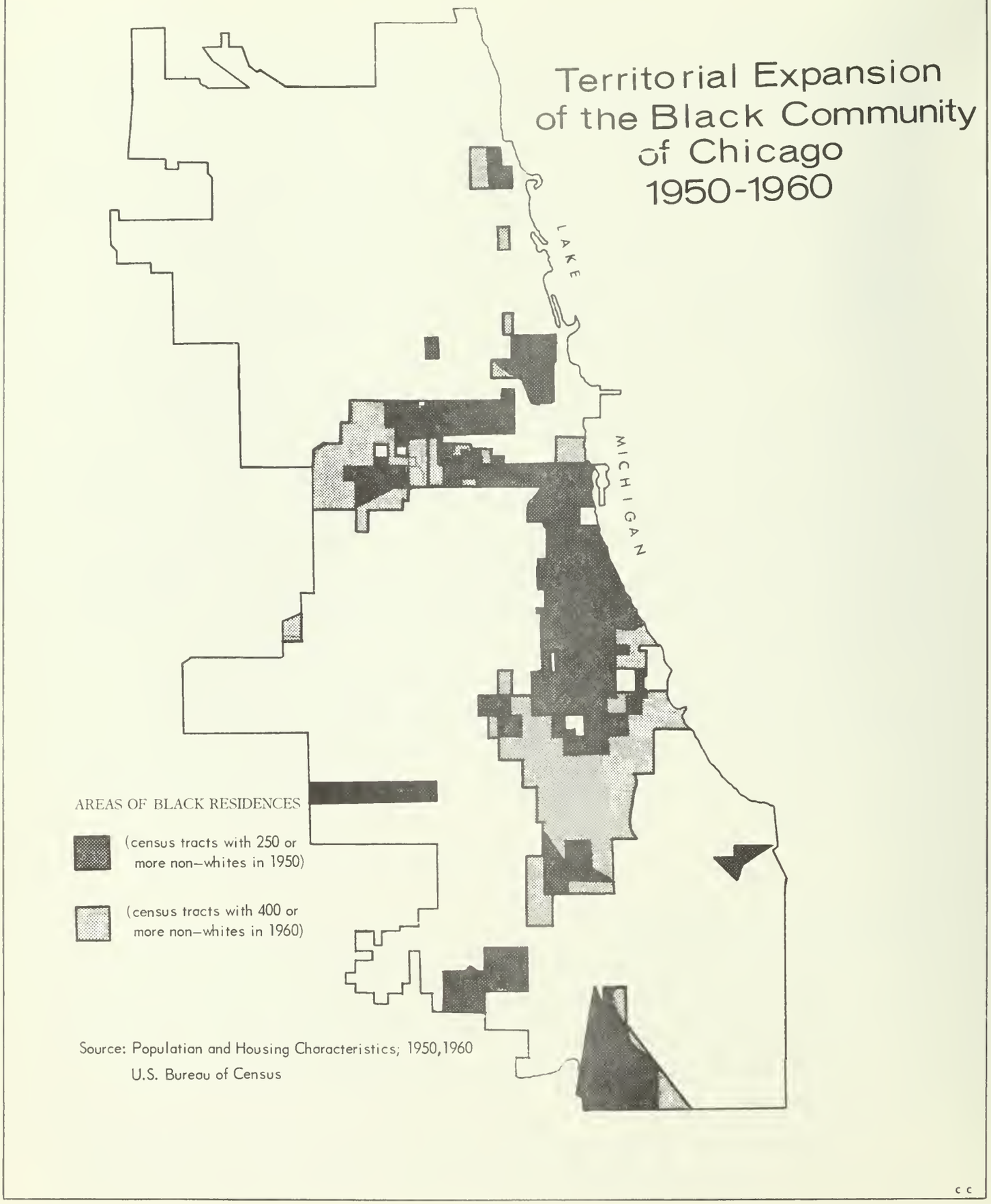
The central city of Chicago is not atypical in having experienced a substantial increase in non-white population and a decrease in its white population. Census data confirms that other large central cities such as New York, Detroit and Baltimore are experiencing similar population changes.

Delimitation of Study Area

The study area within the city of Chicago is composed of those census tracts containing 250 or more non-whites in 1950 and 400 or more non-whites in 1960 according to the U.S. Census of Population statistics. Map 1 indicates territorial expansion of the black community between 1950 and 1960.

Data utilized in the analyses consist of 21 socio-economic variables for the black community of Chicago taken from 1950 and 1960 Census

MAP 1


Territorial Expansion
of the Black Community
of Chicago
1950-1960
LAKE
MICHIGAN
AREAS OF BLACK RESIDENCES
(census tracts with 250 or more non-whites in 1950)
(census tracts with 400 or more non-whites in 1960)
Source: Population and Housing Characteristics; 1950,1960
U.S. Bureau of Census

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of Population. With minor exceptions, the variables are identical for both census periods.[1] These variables were selected to provide a general and efficient profile of the socio-economic characteristics of the study area (Table 1). Observations include 173 census tracts for 1950 and 229 census tracts for 1960. Census tracts were excluded from the study area and subsequently from the analysis if they did not contain both demographic and housing characteristics for 1950 and for 1960.

METHODOLOGY

Four basic analyses were performed: factor analysis for the black community in 1950; factor analysis for the black community in 1960; a factor congruence analysis for 1950 and 1960 factor structures; and an analysis of social area change between 1950 and 1960 as measured by the percent change in each of the 21 variables for 125 census tracts. Only the 125 census tracts that were comparable in both 1950 and 1960 were used in the social area change analysis.

SOCIAL STRUCTURE OF THE BLACK COMMUNITY, 1950

Principal components factor analysis applied to census tracts within the black community of Chicago for 1950 yielded five basic factors with eigenvalues greater than 1.00, which account for approximately 67 percent of the total variance (Table 1). Factor loadings greater than +.5 or less than -.5 are considered in the definition and description of the factors.

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[1]In the 1950 analysis variables 18 and 19 are based on persons 1 year old and older moving inside the county and across county boundaries while variables 18 and 19 for the 1960 analysis are based on persons 5 years and older moving inside the SMSA and across SMSA boundaries.

TABLE 1 -- ROTATED FACTOR MATRIX, 1950

VARIABLES	Commu-nalities	FACTORS I	II	III	IV	V
2. Median income	.847	0.837				
20. Percent of the dwellings sound	.770	0.824				
1. Percent families with incomes under $2,000	.835	-0.817				
5. Median school years	.734	0.725				
3. Percent dwellings with 1.01 or more/room	.723	-0.735				
4. Percent dwellings owner occupied	.642	0.711				
11. Percent labor force employed as prof.-mgrs.	.775	0.656				
17. Percent families with incomes over $7,000	.494	0.632				
15. Percent of the labor force unemployed	.395	-0.501				
21. Percent of blacks in tracts	.771		-0.808			
8. Total black population	.659		-0.723			
18. Moved to different house from inside county	.603		0.705			
19. Moved to different house from outside county	.591		0.658			
6. Population per household	.823			-0.874		
9. Percent population under 18 years of age	.835			-0.767		
13. Percent labor force employed as laborers	.570			-0.604		
12. Percent labor force employed as craftsmen and operatives	.579				0.726	
10. Percent population over 65 years of age	.762				-0.717	
7. Percent households with married heads	.610				0.554	
16. Percent females in the labor force	.772					0.823
14. Percent labor force employed as private household workers	.433					0.572
Cumulative Proportion of Total Variance		0.268	0.417	0.542	0.615	0.677
Eigenvalues		5.63	3.13	2.62	1.54	1.30

FACTOR I -- Economic Status
II -- Mobility-Segregation Structure
III -- Family Structure
IV -- Craftsmen-Operatives Status
V -- Female Employment Status

Factor I -- Economic Status

The first factor derived is "economic status", accounting for 26 percent of the total variance, and is characterized by high positive loadings with median income, percentage owner occupied dwellings, median education, percentage of professional and managerial employees in the labor force, percentage of the sound housing and percentage of the population with incomes over $7,000. High negative loadings on this factor include percentage of families with incomes under $2,000, percentage dwellings with 1.01 or more persons per room, and percentage of the labor force unemployed.

Economic status changes from low to high as distance increases from the center city (Fig. 1a). Low economic status is almost totally contained within a three mile radius of the CBD while highest economic status of blacks within the city occurs beyond the six mile radius of the CBD. Nucleated high economic status settlements are found at greater distance beyond more concentrated black residential areas.

Factor II -- Mobility-Segregation Structure

The second factor extracted is designated "mobility-segregation" and accounts for approximately 15 percent of the total variation. This factor is characterized by high positive loadings for change in residence from inside and outside the county, and high negative loadings for percent of blacks in tracts and total black population.

Census tracts with high positive factor scores on this factor are characterized by a low number and low proportion of blacks and high proportions of black in-migrants from both inside and outside the county. These tracts are relatively new frontiers of an expanding black community and tend to be on the fringes of the black community (Fig. 1b). Conversely, high negative scores identify census tracts of high black population density and low percentage black in-migration from either inside or outside the county.

The fact that the mobility and density variables loaded together to make up this factor suggests an invasion-succession process. This concept is further solidified by the pattern of "mobility-segregation" (Fig. 1b) as high density and low in-migration is found at the center

FIGURE 1a

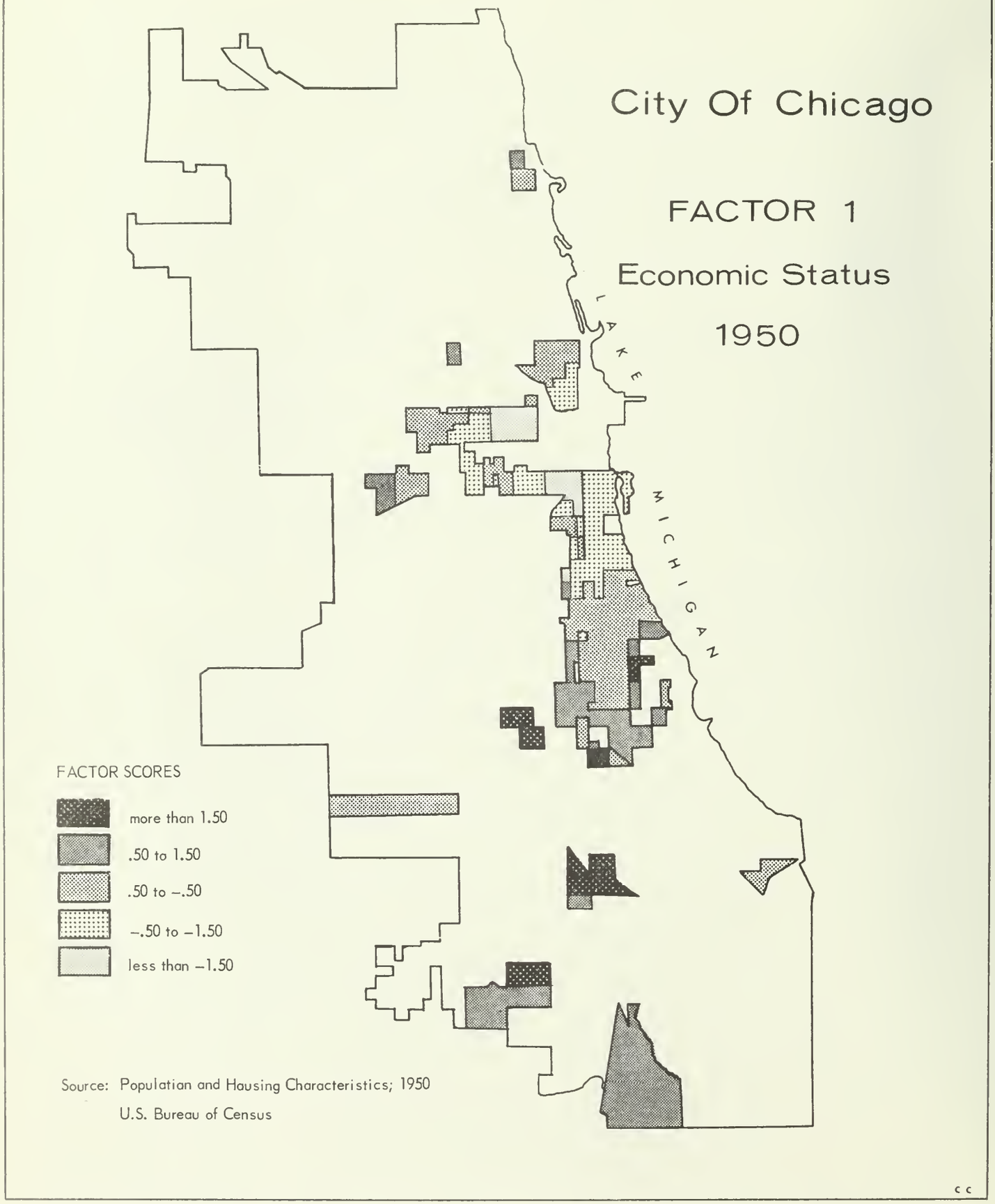
City Of Chicago
FACTOR 1
Economic Status
1950
LAKE
MICHIGAN
FACTOR SCORES
more than 1.50
.50 to 1.50
.50 to –.50
–.50 to –1.50
less than –1.50
Source: Population and Housing Characteristics; 1950
U.S. Bureau of Census

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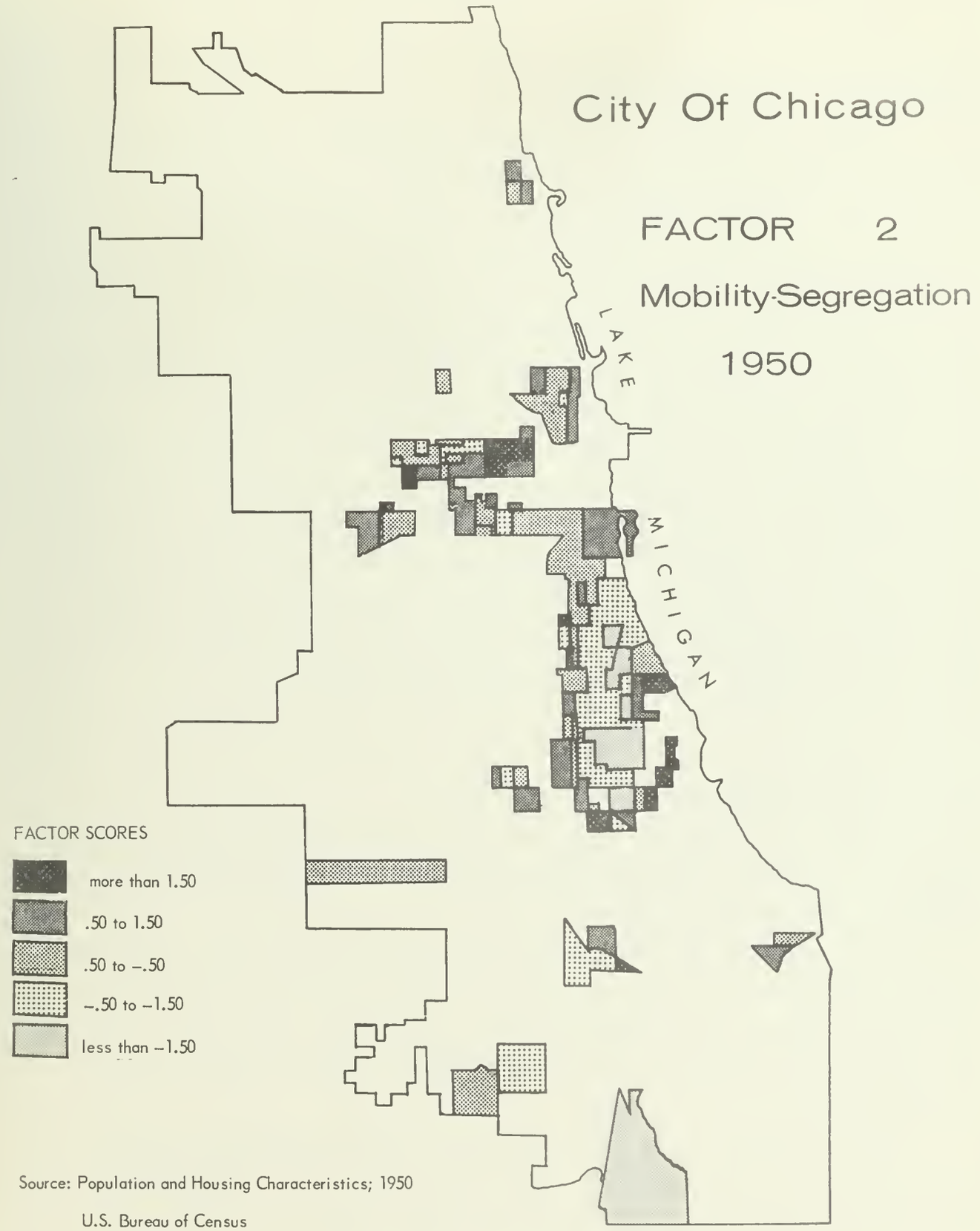
FIGURE 1b



Source: Population and Housing Characteristics; 1950
U.S. Bureau of Census

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of the southern and western populated areas and lower densities and higher in-migration increasing with distance from these centers.

Factor III -- Family Structure

Family structure, the third factor extracted by the principal components analysis accounts for slightly more than 12 percent of the total variation. Family structure within the black community for 1950 is characterized by high factor loadings with population per household, percent population under 18 years of age, and percent of the labor force employed as laborers (Table 1). High positive scores indicate few people per household, few children under 18 years of age living in the household, and a small proportion of the labor force employed as laborers.

A sector pattern of family structure appears to be quite distinct in the southern and western portions of the black community (Fig. 1c). A somewhat similar sectorial pattern is found in the small cluster settlements in the northern black residential areas. In the southern and northern portions of the black community, family structure is found sectorially distributed in a north-south manner with family size generally increasing with distance from the lake front.

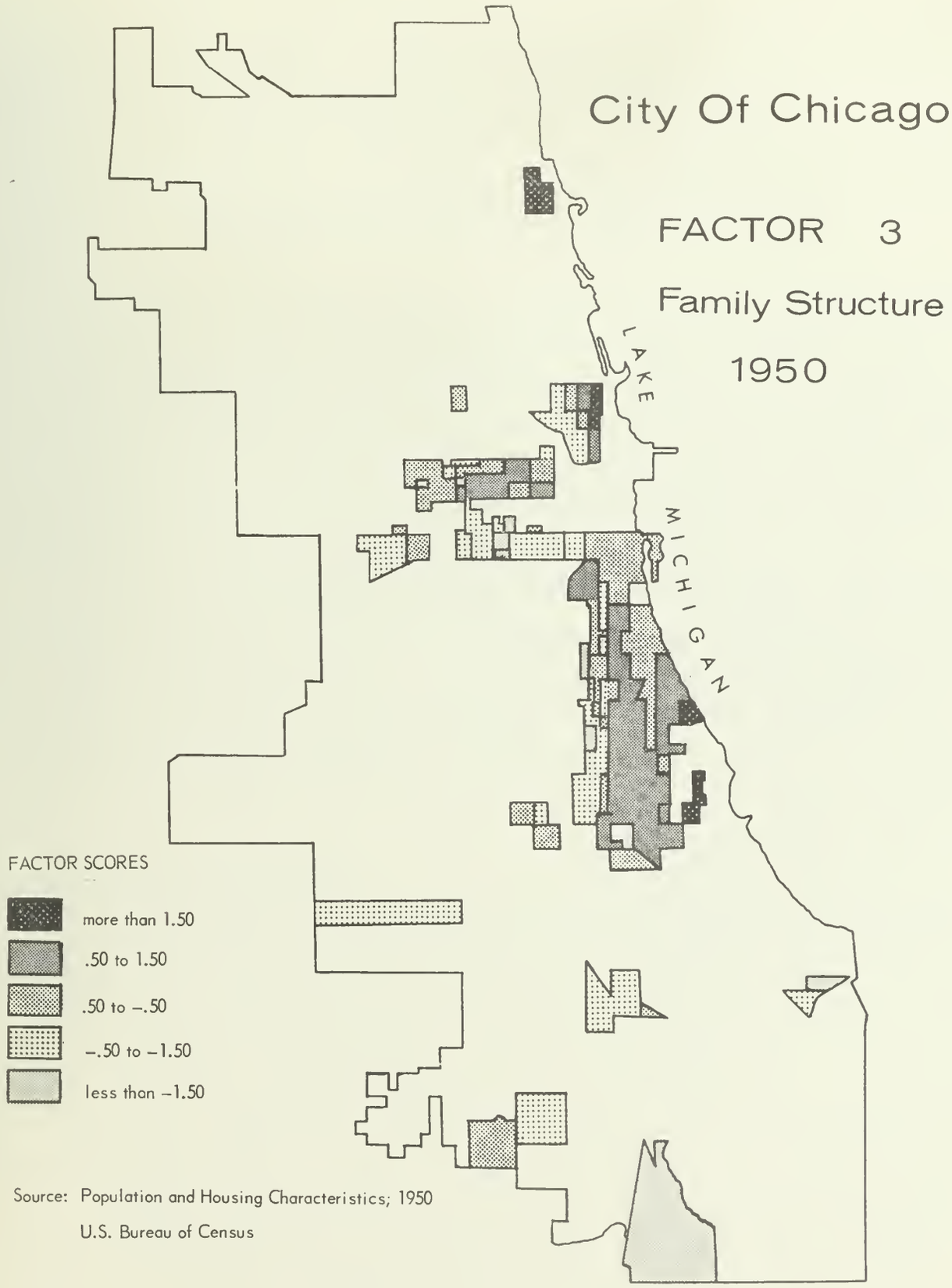
Factor IV -- Craftsmen-Operative Structure

Factor IV is characterized by high loadings of percentage of the labor force employed as craftsmen and operatives plus percentage of the population over 65 years of age.

Positive scores on this factor identify census tracts which have a small proportion of the population over 65 years of age and a high proportion of the population employed as craftsmen and operatives. Negative factor scores distinguish census tracts which have the opposite characteristics.

There appears to be no clear spatial pattern to this factor as both high and low factor scores tend to be distributed throughout southern and western communities, and therefore factor scores were not mapped.

FIGURE 1c



Source: Population and Housing Characteristics; 1950
U.S. Bureau of Census

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Factor V -- Female Employment Structure

This factor is principally related to percentage of females in the labor force and accounts for 6 percent of the total variation. Since no clear identifiable spatial pattern emerged, this factor was not mapped. However, it was found that lower proportions of females participating in the labor force are found in the northern and upper western black settlements than the lower western and southern portions of the black community.

Summary

A review of the factors and resulting spatial patterns for 1950 indicates that: (1) the factors extracted for the black community are similar to those derived by previous studies of applied factor models to entire metropolitan areas. Factors of economic status and family structure are found to be quite similar in factor structure to those found in previous studies (Berry and Horton, 1970; Roseman, Christian, and Bullamore, 1972; Frueh and Lewis, 1971); (2) the Mobility-Segregation factor was extracted as the second most important factor of social structure in the black community. This factor suggests that the black community is continuously expanding as a result of migration from both inside and outside the county; (3) factor IV and V (Craftsmen and Operatives and Female Employment Structures) are similar to factors derived by Murdie in his analysis of Toronto (Murdie, 1960).

The spatial patterns derived from mapping the factor scores reveal some dissimilarities with previously documented patterns of factors within metropolitan areas. Economic status within the black community is clearly concentric with respect to the center of the city. This concentric trend has been noted in previous studies of the black community of Chicago (Frazier, 1930). Previous factor analytic studies of metropolitan areas have documented economic status as displaying sectorial patterns (Hoyt, 1939: Shevky and Bell, 1950); Anderson (1962) suggests that the sectorial growth pattern in the black communities is an indication of maturity, whereas prematurity is characterized by a more concentric pattern. There is no doubt that the sectorial growth patterns are the result of constraints which inhibit black residential choice,

thereby solidifying the notion that the invasion-succession process is in effect within the black community. Family structure has sectorial tendencies within the western and southern portions of the black community. Hence, it contrasts to the typical concentric pattern for family structure dimension derived in analyses of entire cities.

SOCIAL STRUCTURE OF THE BLACK COMMUNITY, 1960

The total population of Chicago decreased almost 2 percent between 1950 and 1960, while the black population of Chicago increased approximately 65 percent during the same period (Kitagawa and Taeuber, 1963). Although out-migration of both whites and blacks to the suburbs occurred, a larger percentage of the black population continued to settle in the city, suggesting that the city's growth patterns and structure may have been seriously altered by these population changes.

The principal components analysis of 1960 census data again derived five basic factors to differentiate and describe the social structure of the black community (Table 2). These five factors account for approximately 69 percent of the total variance, a percentage similar to the 67 percent explained variation in 1950 (Table 1).

Factor I -- Economic Status

Economic status for the black community of Chicago for 1960 has high positive loadings of median income, percent of households with married heads, percent of families with incomes over $7,000, owner occupied dwellings, median education, and dwellings sound. High negative loadings were percent of families with incomes under $2,000 and percent of the labor force unemployed. This factor accounts for 30.5 percent of the total variation.

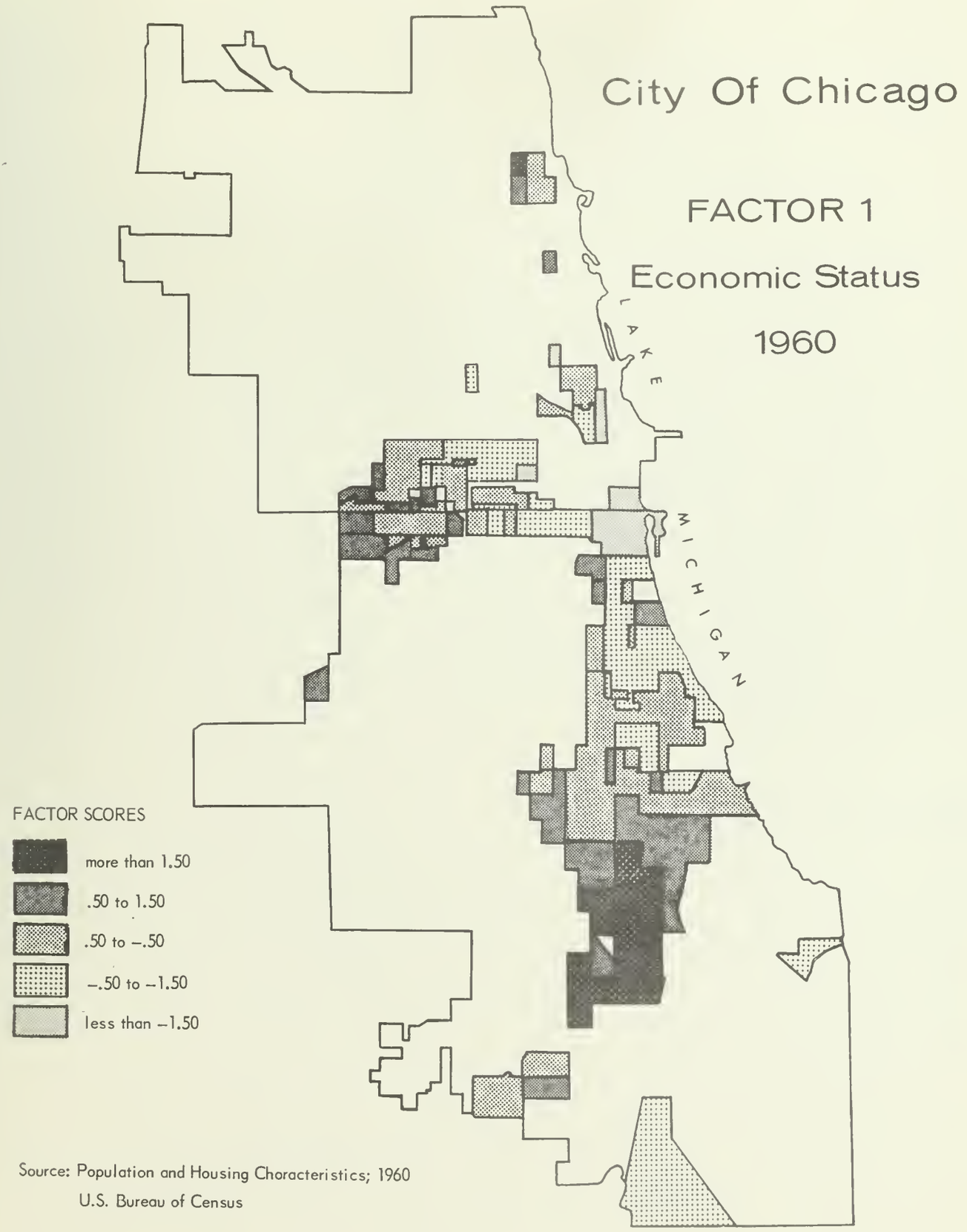
Economic status pattern for 1960 is almost identical to the 1950 economic status pattern (both increasing with distance from the CBD), however, each level of economic status has undergone some areal expansion (Fig. 2a).

TABLE 2 -- ROTATED FACTOR MATRIX, 1960

VARIABLES	Commu-nalities	FACTORS I	II	III	IV	V
2. Median income	.902	0.927				
7. Percent of households with married heads	.869	0.855				
17. Percent of families with incomes over $7000	.810	0.837				
4. Percent of dwellings owner occupied	.629	0.786				
1. Percent of families with incomes under $2000	.613	-0.727				
5. Median school years	.802	0.707				
15. Percent of the labor force unemployed	.352	-0.569				
20. Percent of dwellings sound	.679	0.557				
18. Moved to different house from inside SMSA	.479					
9. Percent of population under 18 years of age	.892		0.923			
6. Population per household	.860		0.882			
3. Percent of dwellings with 1.01 or more persons per room	.880		0.780			
10. Percent of population over 65 years of age	.812		-0.607		-0.598	
16. Percent of females in the labor force	.675		-0.585			
13. Percent of labor force employed as laborers	.484					
21. Percent of blacks in tracts	.750			-0.831		
8. Total black population				-0.631		
14. Percent of labor force employed as private household workers				-0.574		
11. Percent of labor force employed as professionals and managers	.444					
19. Moved to different house from outside SMSA	.697				0.782	
12. Percent of labor force employed as craftsmen and operatives	.639					0.704
Cumulative Proportion of Total Variance		0.305	0.479	0.567	0.634	0.691
Eigenvalues		6.41	3.64	1.86	1.40	1.21

FACTOR I -- Economic Status
II -- Family Structure
III -- Segregation
IV -- Mobility
V -- Craftsmen-Operative Status

FIGURE 2a



Source: Population and Housing Characteristics; 1960
U.S. Bureau of Census

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Factor II -- Family Structure

In 1960, the second most important factor is that of family structure, explaining 17 percent of the total variance, and is comprised of the percentage of population under 18 years of age, population per household, percentage dwellings with 1.01 or more persons per room, and percentage of the labor force employed as laborers.

The family structure pattern appears to be similar to the family structure pattern derived for 1950 -- small size families sectorially distributed with larger size families located along the inner portions of these residential areas (Fig. 2b).

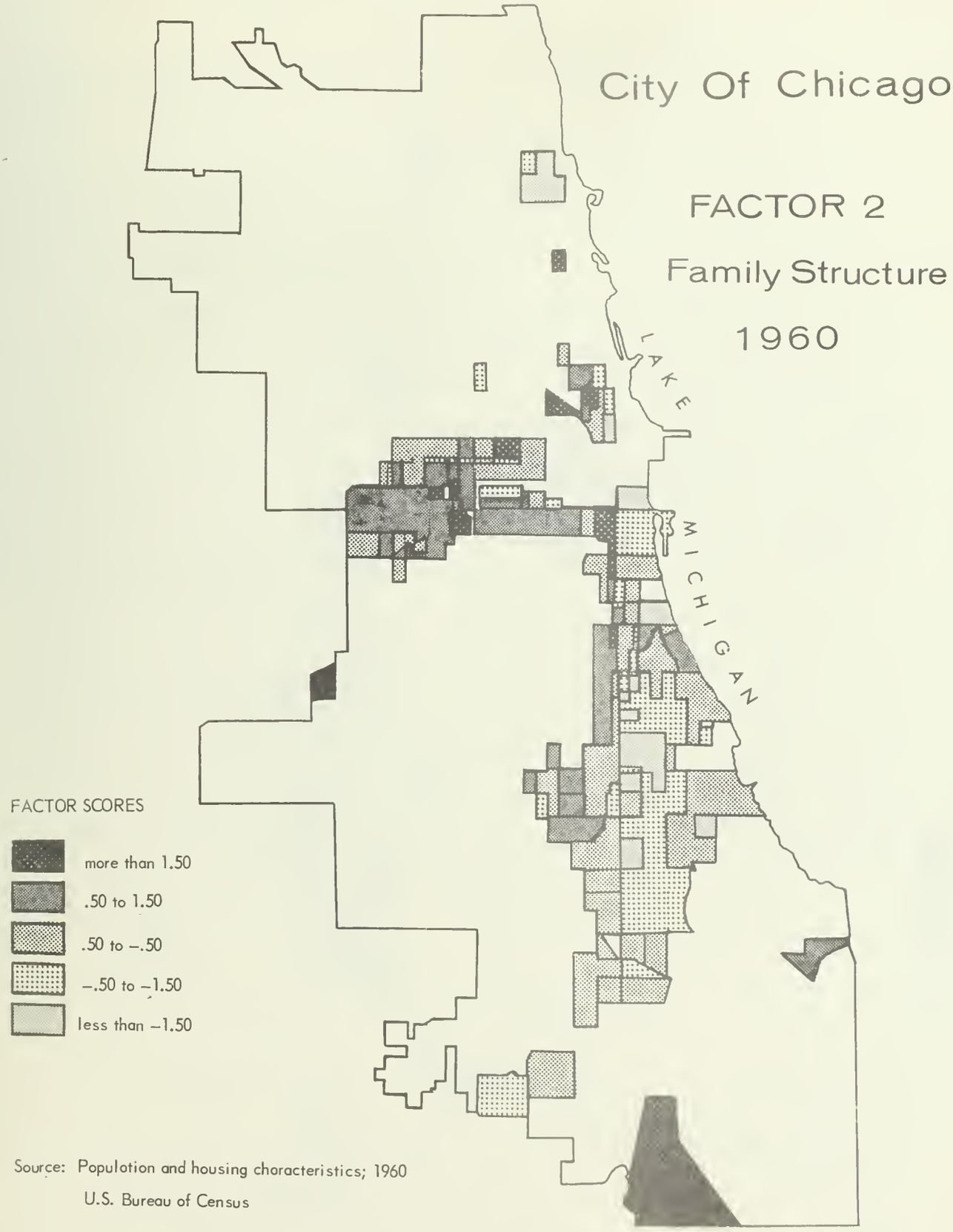
The patterns for family structure are quite different from the "family status" patterns found in previous studies of entire metropolitan areas (Sweetser, 1961; Rees, 1969; Brown and Horton, 1969; and Berry and Horton, 1970). Further research shows that urban renewal and open housing have attracted and relocated large size families to the fringes of the black community. In almost all areas of large size families (high family structure), there is some type of urban renewal, primarily public housing (Chicago Urban League, 1957). In essence, it appears that family structure patterns within the black community are, to a large extent, the results of political policy-making decisions rather than individual residential choices.

Factor III -- Segregation

The segregation factor accounts for approximately 10 percent of the total variance. This factor is identified by high loadings of percent of black population in census tracts, total black population, and percent of the labor force employed as private household workers and a positive loading of percent of the labor force employed as professional and managerial employees.

The segregation pattern, with respect to the city, is clearly sectorial; however, in the western and southern portions, as well as northern clusters of residential areas, there are high density cores of black residents (Fig. 2c). Fewer black residents and lower densities per tract are found in the northern settlement clusters whereas a high black population density is found at the extreme western portion of the

FIGURE 2b



Source: Population and housing characteristics; 1960
U.S. Bureau of Census

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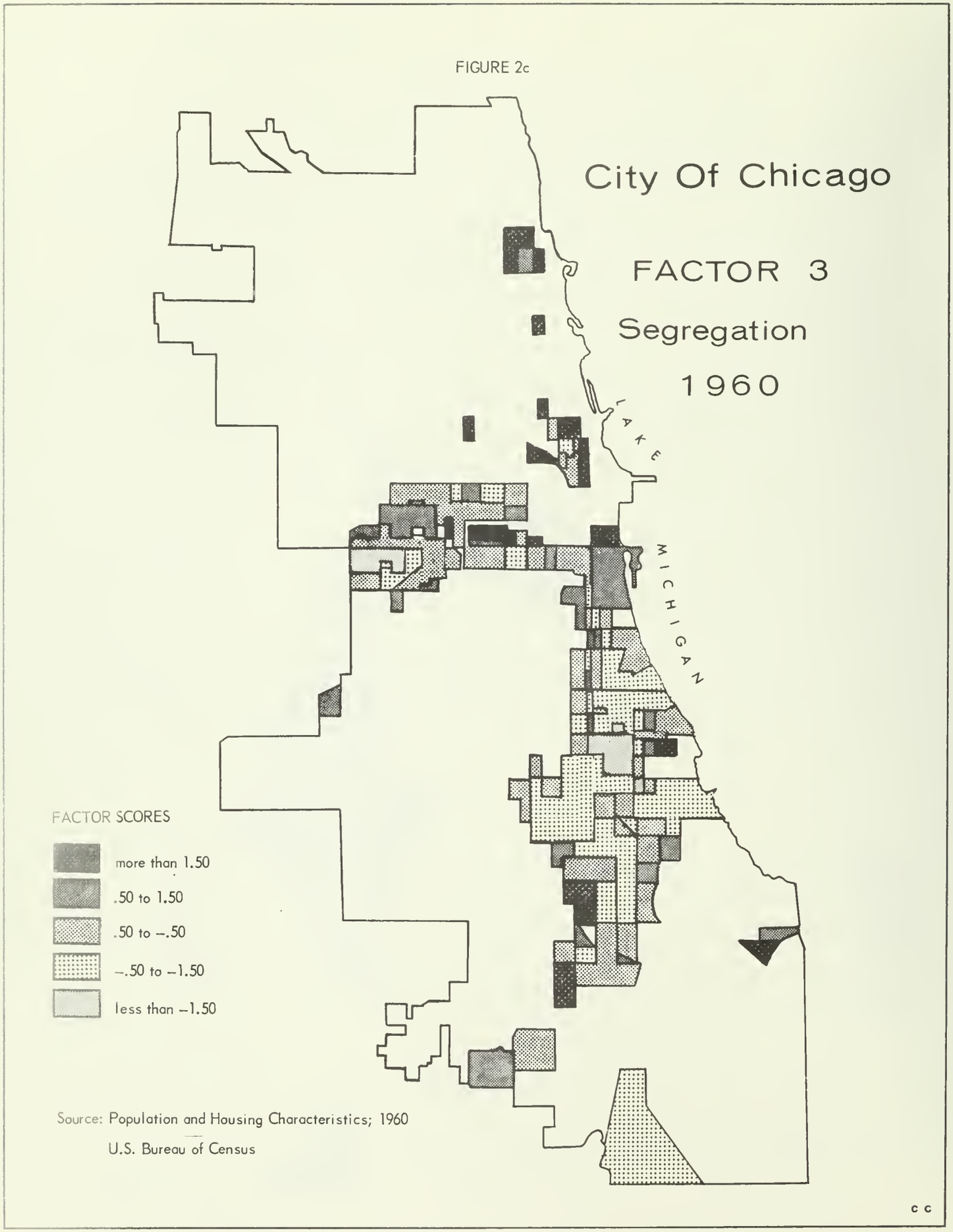
FIGURE 2c


City Of Chicago
FACTOR 3
Segregation
1960
LAKE
MICHIGAN
FACTOR SCORES
more than 1.50
.50 to 1.50
.50 to –.50
–.50 to –1.50
less than –1.50
Source: Population and Housing Characteristics; 1960
U.S. Bureau of Census
c c

black community. Generally, the higher the density, the greater the proportion of private household workers and the smaller the proportion of professional and managerial employees.

Factor IV -- Mobility

Mobility is characterized by a high positive loading of change in residence from outside the SMSA and a negative loading of percent of population over 65 years of age. This factor explains approximately 7 percent of the total variation (Table 2).

The spatial pattern for the mobility factor suggests that there are distinguishable reception areas or "migrant zones" (Freedman, 1950) (Fig. 2d). In southern, western, and scattered northern residential areas, one or more reception zones are noted (high factor scores). Most are found in the far western portion and along the lake front of the southern portion of the black community. Areas with low factor scores are most often found near the CBD and cores (centers) of the southern and western portions of the black community.

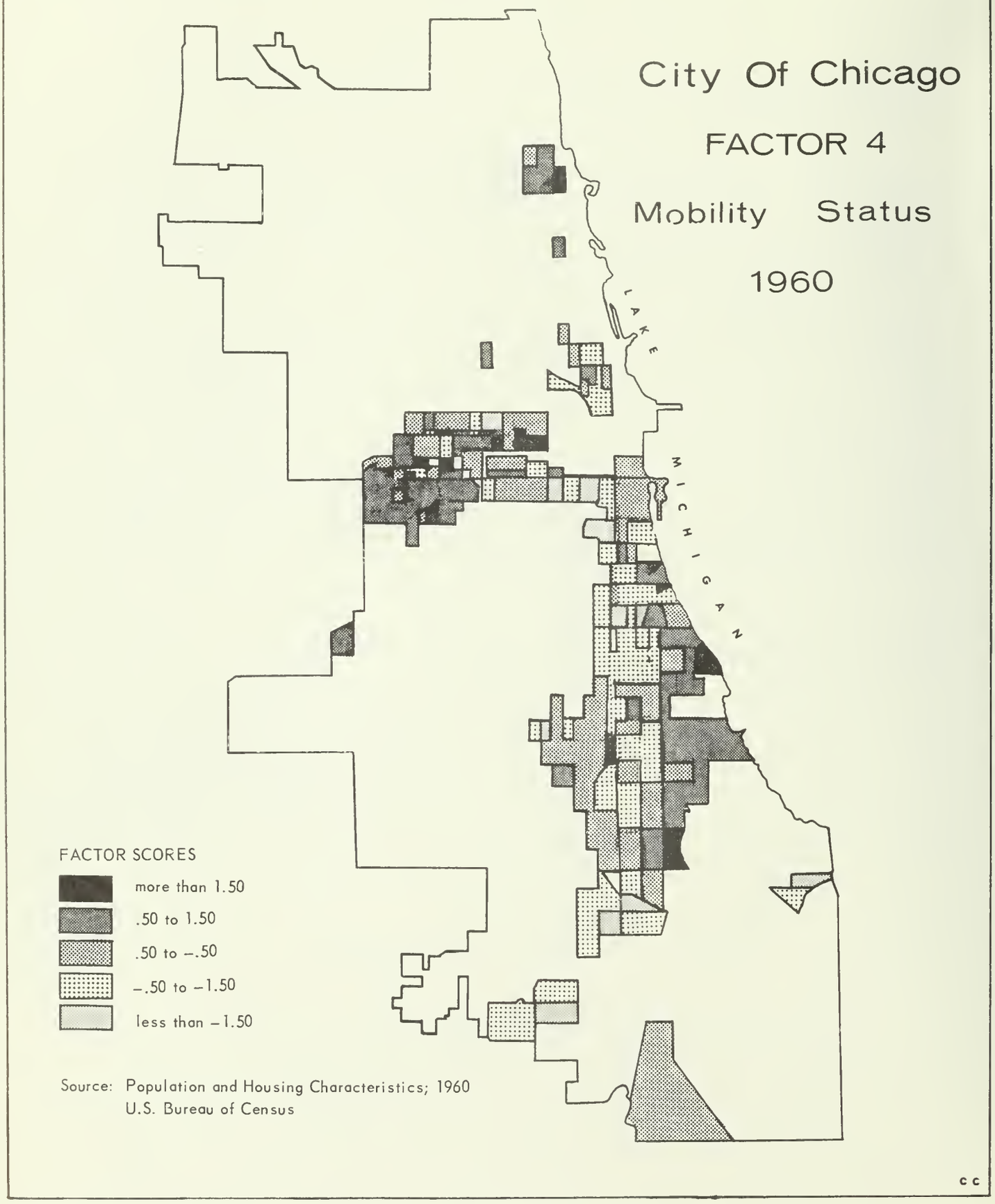
Factor V -- Craftsmen-Operative Structure

The craftsmen and operatives structure factor accounts for approximately 6 percent of the total variance. This factor is identified on the basis of one loading -- percent of the labor force employed as craftsmen and operatives. Since no discernible pattern emerged as a result of mapping the factor scores, no map is included.

ANALYSIS OF FACTORS FOR 1950 AND 1960

The composition of economic status (Factor I in both 1950 and 1960) appears quite similar. Several variables indicating income, employment, occupation, owner-occupied dwellings, education and sound housing have moderate to high loadings on the economic status dimension for the two time periods. However, certain dissimilarities in the variable loadings for the two time periods occur. The loadings of variables 11 and 3

FIGURE 2d


City Of Chicago
FACTOR 4
Mobility Status
1960
LAKE
MICHIGAN
FACTOR SCORES
more than 1.50
.50 to 1.50
.50 to –.50
–.50 to –1.50
less than –1.50
Source: Population and Housing Characteristics; 1960
U.S. Bureau of Census
CC

(percent of the labor force employed as professional and managerial and percent of households with 1.01 or more persons per room) on Factor I decreased considerably from 1950 to 1960. In 1960, variable 7 (percent of households with married heads) loaded highly positive on Factor I, but did not appear under Factor I in 1950. These changes in the composition of economic status loadings suggest that in 1950 the professional and managerial employees and dwellings with few children per room helped to differentiate high economic status within the black community; but in 1960 these characteristics had decreased in significance in helping define high economic status for the black population. Conversely, economic status in 1960 seems more aligned with percent of households with married heads, suggesting a stronger association between this aspect of family organization and the economic well-being of black households.

A family structure factor is derived in both 1950 and 1960, the third factor extracted in 1950 (explaining 12 percent of the total variance) and the second in 1960 (explaining 17 percent of the total variance). The difference in explained variance for the two factors indicates the increasing importance of family structure as a discriminating characteristic of the social and spatial structure of the black community. In 1950, family structure had moderate or strong associations with only three variables (9, 6, and 13: percent of the population under 18 years of age; population per household; and percent of the labor force employed as laborers); while in 1960, it was related to variables 9 and 6, above, plus variables 3, 10, and 16 (percent dwellings with 1.01 or more persons per room, percent of the population 65 years of age and over, and percent females in the labor force).

One surprising result of this comparison is that, in 1950, variable 10 (percent of the population 65 years of age and over) did not load under the family structure factor as expected, but loaded weakly under Factor IV (craftsmen-operatives structure). A possible reason for this change is that the mean distribution of residents 65 years and older, was 4.04 percent of the total population with a standard deviation of less than 1.9 percent. This shows the small relative size of the elderly population and their almost even distribution throughout census tracts. While the older population is still small (4.7 percent) in 1960, the standard deviation has increased to 2.6 percent -- showing more concentration in

some census tracts than in others.

In another noteworthy change, variable 16 (percent of females in the labor force) loaded moderately negative (-.585) under the family structure factor in 1960, but loaded highly positive (0.823) under Factor V (female employment status) in 1950. Several selected correlations taken from the correlation matrices for 1950 and 1960 illustrate the change in percentage of females in the labor force with respect to other aspects of family status. In 1960, it correlates negatively with percent dwellings with 1.01 or more persons per room (-.572); population per household (-.361); and percent of the population under 18 years of age (-.560). However, in 1950, lower correlations were found with the same three variables (-.203; -.229; and -.345 respectively).

Factors II in 1950 and III in 1960 are similar in many respects -- both have high negative loadings of variables 21 and 8 (percent black population in tracts and total black population). These two variables contribute most to the identification of these factors and both are predominantly black density factors. In 1950, these density variables (21 and 8) plus the two mobility variables (18 and 19, change in residence from inside the county and from outside the county respectively) loaded together to form Factor II. In 1960, the mobility variables were absent as loadings under Factor III, but instead, variable 14 (percent of the labor force employed as private household workers) was loaded here. Because of differences in loadings the factors are identified as "mobility-segregation structure" for 1950 and "segregation" in 1960.

The changing role of migration with respect to the ecological structure of the study area can be identified by simple correlations (Table 3). The correlations indicate that in 1950 the black population expanded in territory as well as in population in association with both in-migration from outside the county and migration from within the county. More illuminating is the fact that both types of migration are channelled to areas with smaller black population densities. This suggests that there may not be sufficient housing available to accommodate this influx, or that migrating blacks tend to avoid densely populated black areas. Furthermore, whenever possible black migrants desiring better housing tend to move to tracts with predominantly white populations where better housing is available.

TABLE 3

CORRELATION OF SELECTED VARIABLES RELATING TO MOBILITY
FROM INSIDE AND OUTSIDE THE COUNTY, 1950

Variables	21	8	18	19	10	2
21.% black pop/tract	1.00					
8. Total black pop.	.575	1.00				
18.% in different house	-.534	-.298	1.00			
19.% in different area	-.514	-.289	.370	1.00		
10.% pop. over 65 yrs.	.421	.232	-.350	-.227	1.00	
2. Median income	-.338	-.024	.199	.109	-.238	1.00

Source: U.S. Bureau of Census, Population and Housing Characteristics, 1950.

The segregation structure dimension (Factor III) in 1960, without the mobility factor loadings, suggests that the black community has undergone significant territorial expansion as a result of an invasion-succession process into predominantly white tracts. This is illustrated by variable 21 (percent of black population in tracts) in 1960 which has a .457 correlation with variable 8 (total black population). On the other hand, in 1950 the correlation of these two variables was .575, indicating a more concentrated black population in 1950 than in 1960 which suggests that many tracts were more integrated in 1960 than in 1950. No other correlations exist above .350 between either variable 21 or 8 and other variables suggesting that the black population, regardless of socio-economic characteristics, was still residentially segregated throughout the city of Chicago. Furthermore, the relative independence of the migration variables from the black density variables suggests a decreasing tendency of both in-migration and intra-urban migration to be predominantly directed to expansion areas on the fringes of the black area.

Factor IV (1950) and V (1960) are labeled as craftsmen-operatives factors. In each of the factors, the highest loading is variable 12 (percent of the labor force employed as craftsmen and operatives). A significant change in this factor from 1950 to 1960 is the disappearance of variable 7 (percent of the population over 65 years of age) as an important loading. This is another indication of the possible impact of

a greatly increasing proportion of the population in the over 65 cohort.

The remaining factors, V in 1950 and IV in 1960, are quite dissimilar. In 1950 factor V (female employment status) demonstrates the relative independence of proportion of females in the labor force from other aspects of family status, as discussed earlier. Change of residence from outside the SMSA since 1955 and a negative loading of percent of the population 65 years and over characterizes factor IV (mobility structure) which is possibly an indication of a relatively younger black population migrating to the black community from outside the SMSA. Since no high positive or negative correlations exist ($> \pm .250$) between the mobility variable (19) and other variables, it appears that black in-migrants from outside the SMSA are quite diverse in economic, family, and other socio-economic characteristics.

COMPARISONS OF SPATIAL PATTERNS, 1950-1960

Spatial patterns of economic status within the black community for 1950 are similar to those of 1960. In both years economic status clearly increases with distance from the CBD of Chicago. Hence, the economic status of blacks continues to be strongly related to aspects of the overall urban structure, especially the nature of the housing market, that varies concentrically.

Several aspects of family structure patterns changed significantly between 1950 and 1960. For example, while the 1950 family structure patterns are sectorially distributed within the black community, large size families per household decrease with increasing distance from the CBD. On the other hand, by 1960 family structure patterns had changed slightly so that increasing numbers of large families were located on or near the periphery of the black community. Family structure areal patterns for 1960 appear to be related to urban renewal and public housing developments within the black community and the city.

Factor II (mobility-density) in 1950 and Factor III (segregation) in 1960 exhibit similar patterns. In both cases a core-periphery pattern with respect to the black residential area, reflecting invasion succession processes at the periphery of the black community, can be identified.

The remaining factors (craftsmen-operatives status, 1950 and 1960; mobility status, 1960; and female service employment status, 1950) lack distinct patterns. Therefore, they are not mapped.

To summarize the overall similarity between factor structures for the two time periods, a factor congruence program was performed (Table 4). Based on an equation derived by Harmon (1967, p. 270), factor congruence compares two factor structures by computing coefficients of congruence for all pairs of factors. Coefficients of congruence are similar to correlation coefficients because they express the degree of association between factor pairs (Rummel, 1970, p. 461).

TABLE 4

CONGRUENCE OF FACTOR STRUCTURES, 1950 and 1960

	1960	Econ. Status	Family Struc.	Segreg.	Mobility	Craftsm. -Oper.
1950		I	II	III	IV	V
Econ. Status	I	0.309	-0.407	0.121	0.034	-0.395
Mobility -Segreg.	II	-0.372	0.014	0.203	0.572	0.164
Family Struc.	III	-0.069	-0.758	-0.061	0.125	-0.190
Craftsm. -Oper.	IV	-0.093	0.468	0.096	0.577	0.160
Female Emplmt.	V	-0.052	0.440	-0.468	0.252	-0.054

The factor congruence analysis of the social structures of the black community for 1950 and 1960 reveals that the factor structures are dissimilar. Based on a scale where -1.00 represents perfect negative similarity, zero indicates complete dissimilarity, and +1.00 delineates perfect positive similarity, Table 4 indicates that both Economic Status (Factor I, 1950) and Mobility-Segregation (Factor II, 1950) have a very low degree of similarity respectively with Economic Status (Factor I, 1960) and Mobility (Factor IV, 1960). The factor congruence also indicates that the 1950 Family Structure dimension (Factor III) has a high

inverse relationship with Family Structure (Factor II) in 1960.

The dissimilarity between the two economic status dimensions is somewhat surprising because the previous comparisons of both the composition and spatial patterns of the two factors suggested considerable consistency. Perhaps the invasion-succession process occurring along much of the periphery of the black community, coupled with the outward displacement of each level of economic status, considerably revised the ranking of most of the census tracts on the economic status dimension. Other dissimilarities, including those involving the mobility and employment-related factors, seem consistent with comparisons discussed earlier in the paper.

DIMENSIONS OF CHANGE 1950-1960

In order to measure the percentage change for each of the 21 variables in the 125 census tracts (Table 5), a principal components factor analysis was employed to derive eight change dimensions with eigenvalues greater than 1.00. These dimensions account for 67 percent of the total variance.

Dimension I -- Population Change

The first dimension, explaining 17.5 percent of the total variance, discriminates census tracts on the basis of their population change between 1950 and 1960. Tracts with high positive factor scores increased in both total black population and percent of black population. Negative scores for census tracts indicate changes which resulted in smaller increases in total black population and decreases in the percent black population. In general, high increases in absolute and relative numbers occur along the peripheries of the black community. As expected, the opposite characteristics are found in the core areas of the black community (Fig. 3a).

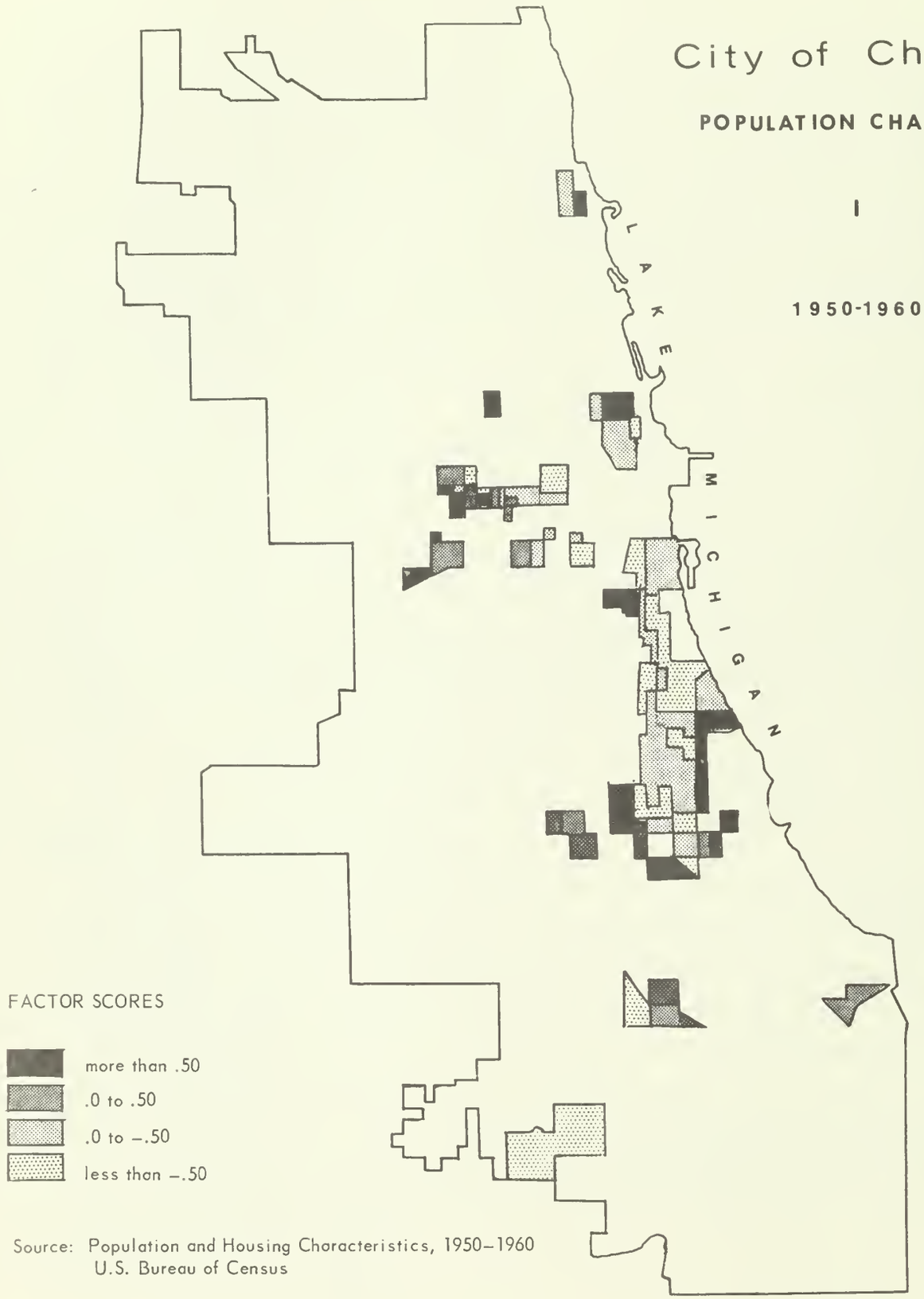
TABLE 5 -- ROTATED FACTOR MATRIX -- DIMENSIONS OF CHANGE: 1950-60*

VARIABLES	Communalities	CHANGE DIMENSIONS I	II	III	IV	V	VI	VII	VIII
8	.846	0.879							
21	.842	0.875							
3	.749	0.460		0.600					
17	.630	-0.437							
18	.613	-0.402							
1	.787		-0.854						
2	.742		0.801						
7	.696		0.568						
12	.461		0.432						
16	.688		0.411	-0.512					
9	.773			0.827					
6	.761			0.795					
10	.737			-0.718					
13	.643				0.741				
14	.642				0.720				
5	.707				-0.581	-0.423			
20	.714					-0.722			
4	.633					-0.401			
19	.724						-0.828		
11	.855							0.919	
15	.742								0.841
Cumulative proportion of total variance		.175	.308	.410	.483	.552	.612	.662	.712
Eigenvalues		3.69	2.79	2.14	1.51	1.45	1.26	1.05	1.04

DIMENSION I -- Population change
II -- Income change
III -- Family structure change
IV -- Unskilled employment change
V -- Housing change
VI -- In-migration change
VII -- Professional-managerial change
VIII -- Unemployment change

* Only factor loadings stronger than $\pm$ 0.400 are included in the table.

FIGURE 3a



Source: Population and Housing Characteristics, 1950–1960
U.S. Bureau of Census

cc

Dimension II -- Income Change

The second dimension distinguishes census tracts on the basis of income change and explains 13.3 percent of the total variance. Positive scores identify census tracts which have experienced the greatest increase in income and a corresponding decrease in the number of families with incomes less than $2,000 while negative scores connote opposite characteristics. Figure 3b indicates that clusters of high positive scores are dispersed throughout the black community with some tendency for high positive factor scores to be located near the periphery.

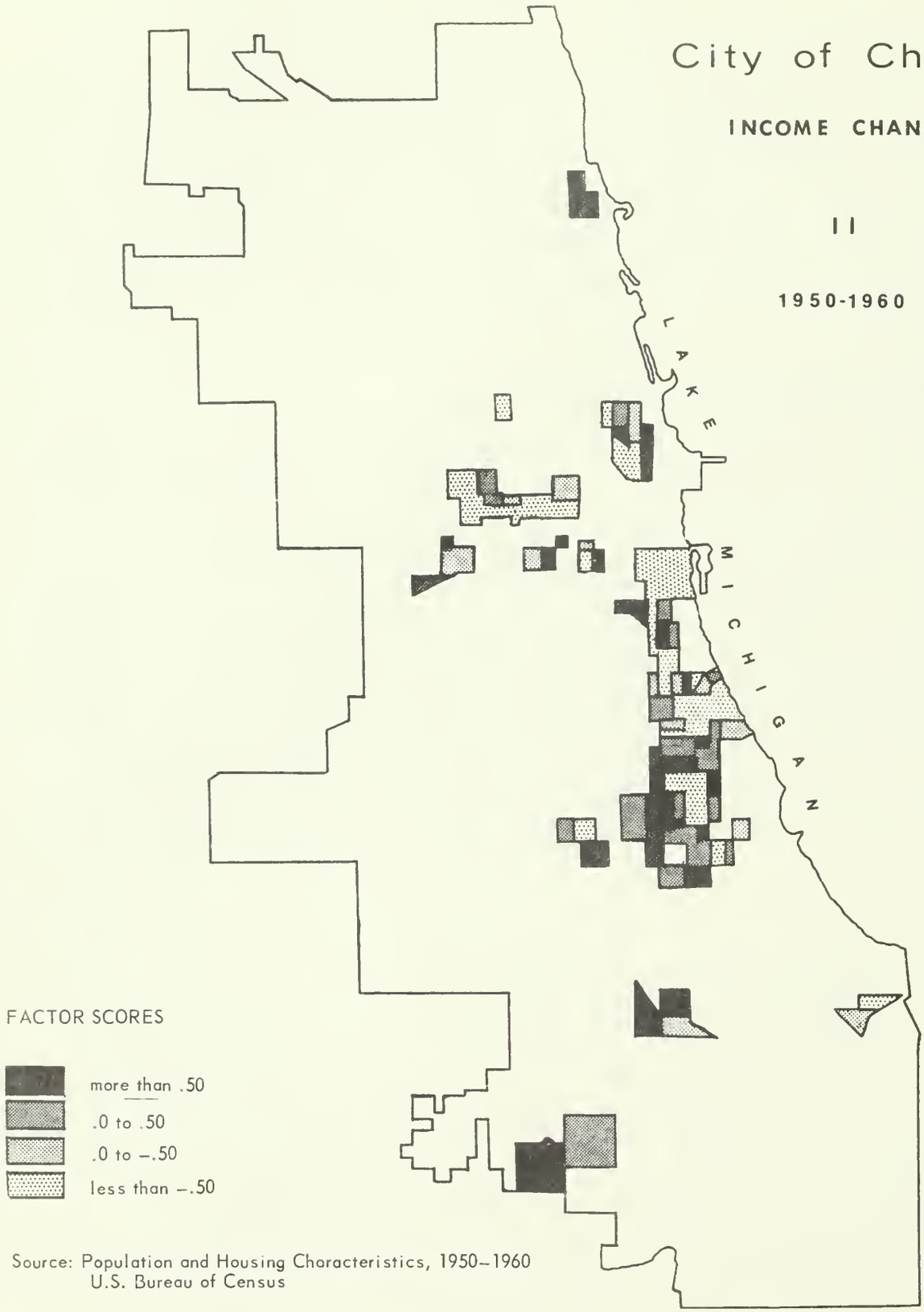
Dimension III -- Family Structure Change

The third dimension, family structure change, explaining 10.2 percent of the total variance (Table 5) has positive scores that identify census tracts with large increases in average family size and negative scores which delineate areas with small increases or decreases in average family size. No spatial patterns of scores on this factor can be readily identified within the northern and western portions of the black community (Fig. 3c). However, in the southern portion high values on this dimension are found along the lake front and also on the peripheries of the black community. As was suggested previously, this pattern is in part the result of the relocation of families related to public housing and urban renewal projects.

Dimension IV -- Unskilled Employment Change

Service employment change is identified as the fourth dimension explaining 7.3 percent of the total variance. Census tracts with positive scores indicate highest increases in the proportion of: (1) labor force employed as laborers; and (2) private household workers in the labor force. Negative scores identify census tracts that have experienced smaller increases in the proportion of the labor force made up of these two groups. Clustered patterns of unskilled employment change are illustrated in Figure 3d. Census tracts with greatest increases in the proportion of laborers and private household workers are located in the southern portion

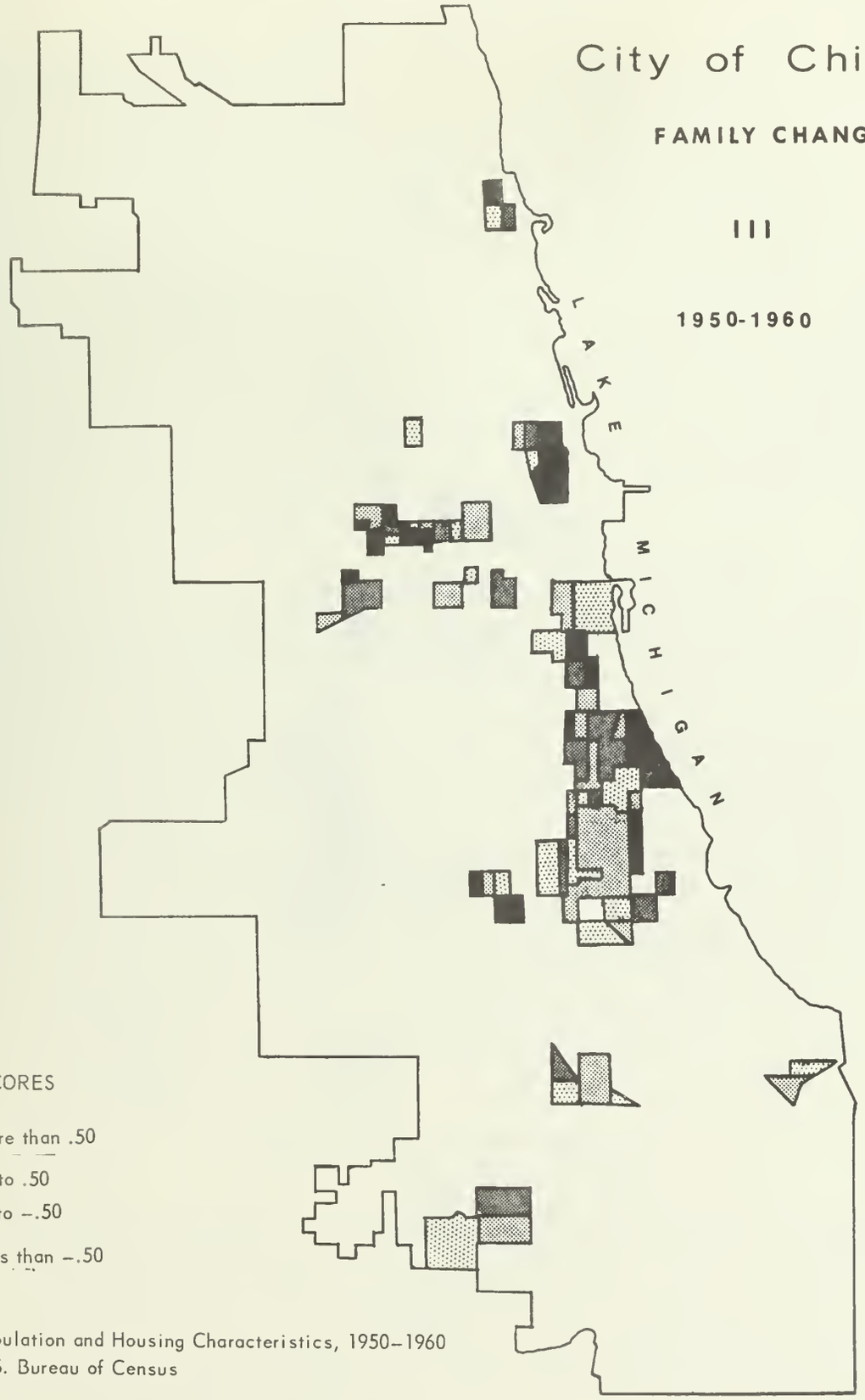
FIGURE 3b



Source: Population and Housing Characteristics, 1950–1960
U.S. Bureau of Census

cc

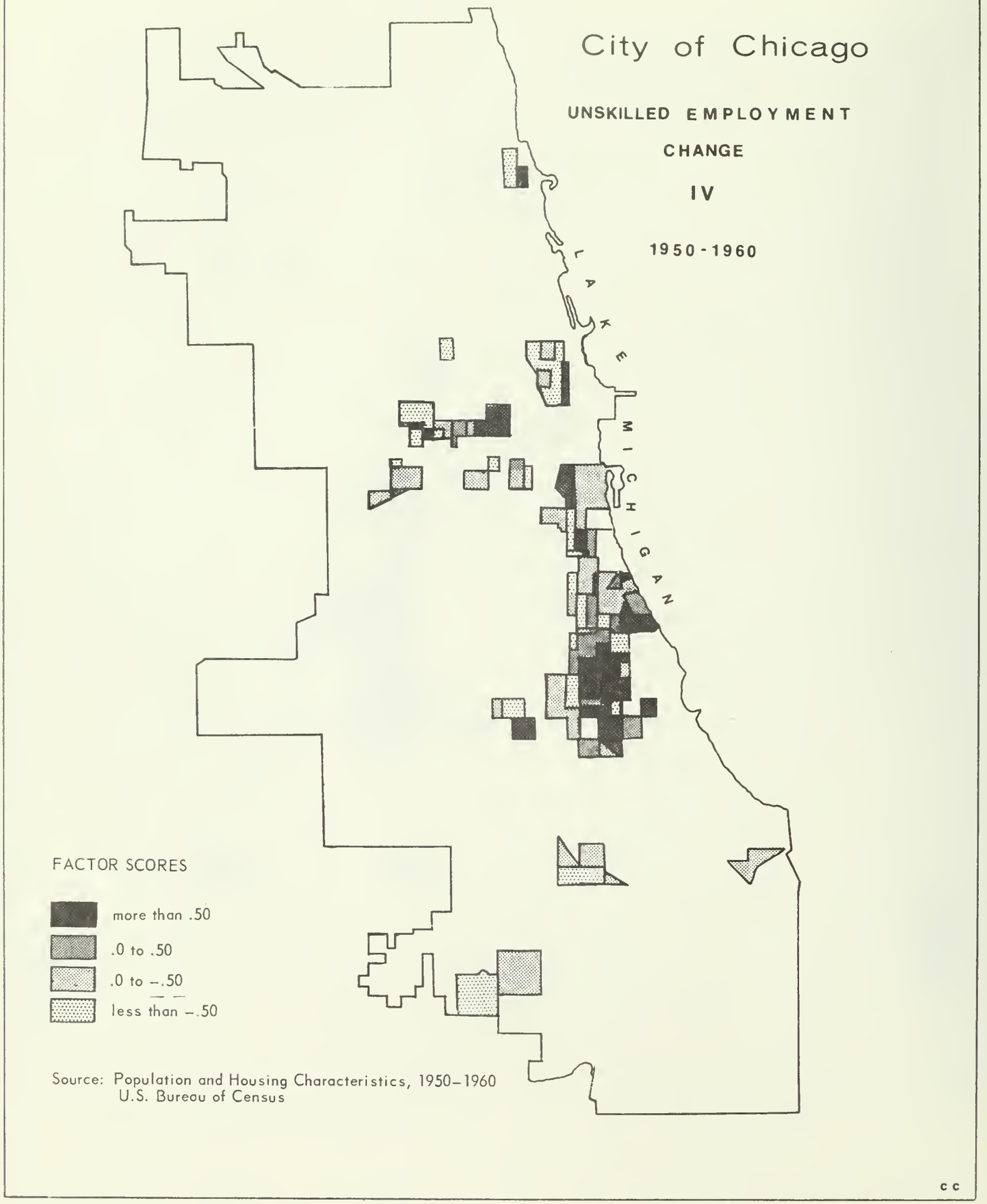
FIGURE 3c



Source: Population and Housing Characteristics, 1950–1960
U.S. Bureau of Census

cc

FIGURE 3d


City of Chicago
UNSKILLED EMPLOYMENT
CHANGE
IV
1950-1960
LAKE MICHIGAN
FACTOR SCORES
more than .50
.0 to .50
.0 to –.50
less than –.50
Source: Population and Housing Characteristics, 1950–1960
U.S. Bureau of Census

cc

of the black community. Census tracts with smaller increases in unskilled employment occur predominantly in the northern area of the black community.

Dimension V -- Housing Change

The fifth dimension is housing change which explains 6.9 percent of the total variance. Positive scores indicate stability or a decrease in the proportion of sound housing within census tracts (Table 5). Zones of high or moderate decrease in sound housing occur west of the CBD, in the extreme southwestern area, and along the periphery of the south side black community (Fig. 3e). The relatively low factor scores near the CBD and in the core of the south side black area may indicate significant urban renewal or public housing projects and/or a large proportion of housing that was unsound prior to 1950.

Dimensions VI, VII, and VIII -- In-migration Change; Professional-Managerial Change; and Unemployment Change

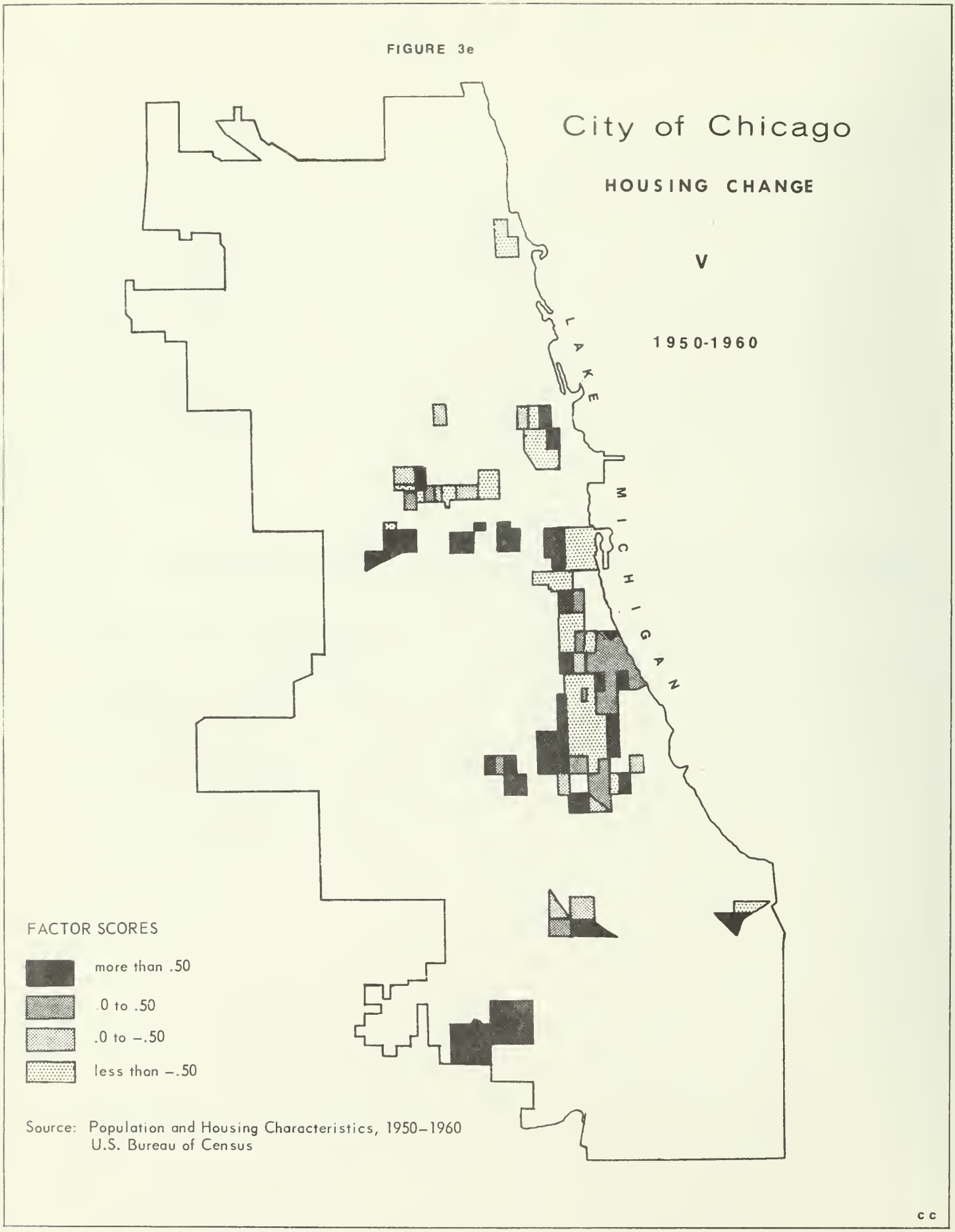
Change dimensions VI, VII, and VIII (In-migration; Professional-Managerial Employment; and Unemployment) each explaining 6 percent or less of the total variance, are each largely related to only one variable (Table 5). The in-migration change dimension is mapped (Fig. 3f), but no clear pattern is revealed, illustrating that the location of reception areas has shifted from largely peripheral locations in 1950 to scattered locations in 1960. The spatial patterns of factors VII and VIII are not clear and, therefore, are not reproduced here.

SUMMARY AND CONCLUSIONS

The black community of Chicago, made up of a dynamic and rapidly changing population, has many processes operating within and outside to create its social and spatial structure. While this study is exploratory, several structural characteristics of the black community have been identified suggesting processes which may underlie these characteristics.

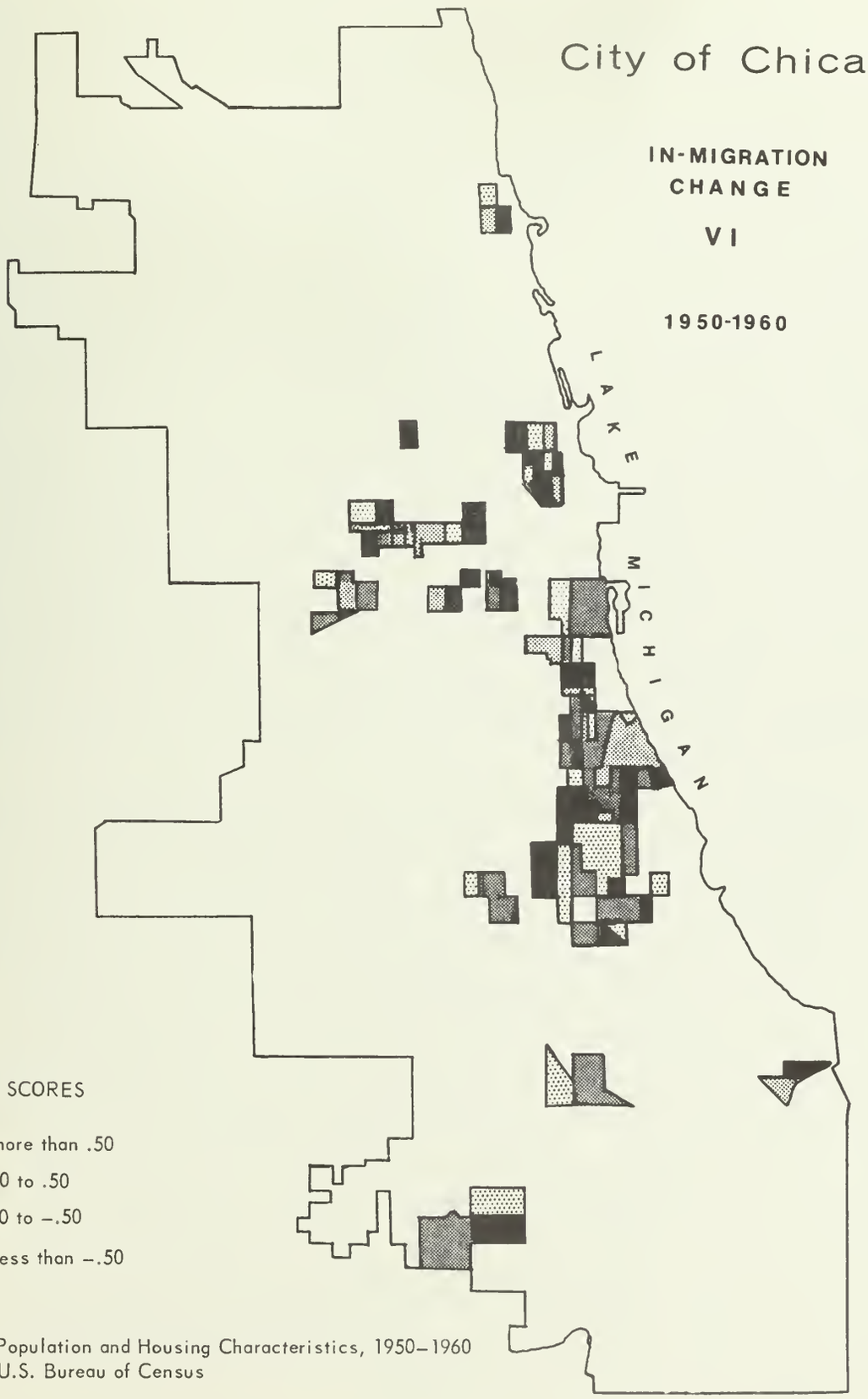
Social structure within the black community is changing but not as rapidly as might be expected. Social structure and spatial changes

FIGURE 3e


City of Chicago
HOUSING CHANGE
V
1950-1960
LAKE MICHIGAN
FACTOR SCORES
more than .50
.0 to .50
.0 to –.50
less than –.50
Source: Population and Housing Characteristics, 1950–1960
U.S. Bureau of Census

cc

FIGURE 3f



Source: Population and Housing Characteristics, 1950–1960
U.S. Bureau of Census

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result from two levels of processes: (1) local processes -- those operating within the black community (i.e., migration, stratification, etc.); (2) city-wide processes -- those operating within the total city and influencing the black population (i.e., public housing, discrimination, etc.). The net effect of city-wide processes appears to moderate or inhibit social processes within the black community.

Social structure dimensions of the black community seem to be quite similar to previous studies applying factor analysis to entire metropolitan communities. These similarities suggest that the black community, through population, income and other change characteristics, is becoming stratified socially and economically, similar to the total metropolitan community. However, many processes operating at the city-level constrain stratification within the black community.

The social structure analysis of the black community for 1960 produced few significant differences from the 1950 analysis. The principle exception concerned certain social and economic variables which did not discriminate highly within the social structure of the black community in 1950 and conversely did serve as moderate to strong discriminators of social structure ten years later. This difference suggests that some type of social stratification process is taking place in the black community.

Several aspects of the spatial patterns of social structure for the black community do not substantiate previous findings for entire metropolitan communities. The black community is growing sectorially throughout the city; however, economic status is concentric within each of the growth sectors as well as concentric in relation to the entire metropolitan area. These results concur with those of Frazier (1932). This concentric pattern for economic status is quite different from other studies that postulated sectorial economic status patterns for entire cities. Furthermore, family structures for both 1950 and 1960 display strong sectorial patterns which is contrary to previous studies of entire cities where a concentric pattern was identified. Furthermore, family structure and its spatial expressions within the black community appear to be strongly influenced by urban renewal, especially public housing developments located throughout the community.

Another process which underlies the social structure and spatial

patterns of the black community is migration. Migrants of diverse social and economic character have been channelled to specific areas within the black community, with certain reception zones receiving a relatively high proportion of these migrants. Through a complex invasion succession process operating within the community and adjacent predominantly white tracts, the black community expanded territorially during the decade following 1950.

The factor congruence test reveals similarities and dissimilarities of the social structure of the black community for the two time periods. No significant correlations are derived.

The change dimensions, comparing 1950 and 1960 data, suggest a reinforcement of existing social structures within the black community. However, that portion of the black core area found on the south side experienced more variation in social structure because many large families have been relocated to the periphery of the black community. Public housing and urban renewal contribute to the pattern change.

The patterns revealed in this research can best be understood through reference to processes operating within the black community. Migration, a major process affecting social structure, is in part inhibited by the ecological aspects of discrimination and prejudice throughout the city of Chicago. However, migration (both from within and from outside the metropolitan area) focused on the periphery in 1950; hence these areas served as reception areas for migrants. The lack of housing for migrants in the core area contributed to this push outward to tracts adjacent to the black community. The findings indicate the periphery is more diverse in economic and family structure than the core. Hence, the migration process going on within the black community does not seem to be economic selective as the usual invasion-succession model suggests. In fact migrant destinations were independent of economic and family structure attributes found in these locations. Thus, both the changing nature of the housing market and migration processes are seen to be important considerations in the explanation of the spatial patterns of social structure. Many questions relating to mobility and residential selective processes should be geared toward explanation and verification of these patterns in Chicago and other cities with more recent data.

While this discussion has focused on social structure dimensions and derived patterns for 1950 and 1960, other research is needed to develop an aggregate model of stages of black community development. The changing aggregate social and spatial form of the black community should be considered in terms of: (1) changing relationships between mobility and the social-spatial form of the community; (2) density, segregation and social-spatial stratification within a growing black community; and (3) types of aggregate changes relative to similar changes in the entire urban area.

Many questions concerning the processes mentioned and other related processes which underlie the social structure and the spatial expression of the black community are still unanswered. The paper should, therefore, stimulate further research concerning the black population and, more specifically, black migration, "migrant reception zones", and other processes that influence social and economic structure and spatial patterns.

REFERENCES

Anderson, T. and Egeland, J.A., 1961. Spatial aspects of social area analysis, American Sociological Review, vol. 26, p. 392-398.

Bell, W., 1959. Social areas: typology of urban neighborhoods. In: M. Sussman (ed.), Community Structure and Analysis. New York: Crowell. p. 61-92.

Berry, B.J.L. and Horton, F.E., 1970. Geographic Perspectives on Urban Systems. Englewood Cliffs, New Jersey: Prentice-Hall.

Brown, L.A. and Horton, F.E., 1970. Social area change: an empirical analysis, Urban Studies, vol. 7, p. 271-288.

Chicago Urban League, 1957. Chicago's Negro residential areas as related to urban renewal (map).

_____, 1965. Areas of Negro residence in Chicago (map).

Frazier, E.F., 1932. The Negro Family in Chicago. Chicago: University of Chicago Press.

Freedman, R., 1950. Recent Migration to Chicago. Chicago: University of Chicago Press.

Frueh, L.K. and Lewis, L.T., 1971. A factorial analysis of the Black community of Detroit, paper read at the annual meeting, West Lakes Division, Association of American Geographers, Iowa City, Iowa.

Harman, H.H., 1967. Modern Factor Analysis (rev. ed.). Chicago: University of Chicago Press.

Hoyt, H., 1939. The Structure and Growth of Residential Neighborhoods in American Cities. Washington: U.S. Government Printing Office.

Illinois Commission on Human Relations, 1962. Nonwhite Population in Illinois, 1950-1960. Chicago.

King, L.J., 1969. Statistical Analysis in Geography. Englewood Cliffs, New Jersey: Prentice-Hall.

Kitagawa, E.M. and Taeuber, K.E., 1963. Local Community Factbook: Chicago Metropolitan Area, 1960. Chicago: Chicago Community Inventory, University of Chicago.

Murdie, R.A., 1969. Factorial Ecology of Metropolitan Toronto, 1951-1961. Chicago: University of Chicago Department of Geography Research Paper Series No. 116.

Rees, P.H., 1968. The Factorial Ecology of Metropolitan Chicago. Chicago: Master's thesis, University of Chicago Department of Geography.

Romanow, M., 1959. Nonwhite Population Changes in Chicago's Suburbs. Chicago: Illinois Commission on Human Relations.

Roseman, C.C., Christian, C. and Bullamore, H., 1972. Factorial ecologies of urban Black communities. In: H. Rose (ed.), Perspectives in Geography, Vol. II. DeKalb, Illinois: Northern Illinois University Press. (forthcoming).

Rummel, R.J., 1970. Applied Factor Analysis. Evanston: Northwestern University Press. p. 461-471.

Shevky, E. and Bell, W., 1955. Social Area Analysis. Stanford, California: Stanford University Press.

Sweetser, F.L., 1962. Patterns of Change in the Social Ecology of Metropolitan Boston, 1950-1960. Boston: Boston, Massachusetts Department of Mental Health.

Taeuber, K.E. and Taeuber, A.F., 1965. Negroes in Cities. Chicago: Aldine.

U.S. Bureau of Census, 1952. U.S. Census of Population and Housing: 1950 Census Tracts. Washington: U.S. Government Printing Office.

_____, 1967. U.S. Census of Population and Housing: 1960 Census Tracts. Washington: U.S. Government Printing Office.

Papers Published

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