

URBAN NEIGHBORHOODS AND INDIVIDUAL BEHAVIOR

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It is a matter of everyday observation that metropolitan areas are subdivided into different sections, each exhibiting certain distinctive features. There are manufacturing, warehouse, theater, financial, department store, used car lot, residential, and many other districts in most modern American cities. The residential areas themselves are further differentiated with respect to many additional characteristics. Some are inhabited predominantly by Negroes, Chinese, Japanese, Puerto Ricans, Italians, Germans, Poles, Swedes, Mexicans, or some other racial or nationality group. Some districts are set apart from others because Jews, Catholics, or the members of a particular Protestant denomination live there in relatively large numbers.

Some districts are characterized by old, dilapidated dwellings, or by large apartment houses, or by access to such desirable places as lake fronts, beaches, or river views, and still others by prominence of concrete, steel, asphalt, or general neglect. All urban areas have sections where the "rich people" live; others where the "poor people" live; and most urban subcommunities contain residents representing the many gradations in amount of wealth or income between these two extremes. Some neighborhood communities are marked by the presence of older persons, renters instead of home owners, more women than men, or certain occupations such as proprietors, professionals, managers, and officials. Others contain unskilled or semiskilled workers, or many unrelated individuals, or many persons living together in family units.

Recognizing this diversity in the social characters of urban subcommunities, Louis Wirth (1938) described the city as "a mosaic of social worlds" and emphasized that the different sections of the city can be thought of as separate worlds, with the transition between them often

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*From Muzaffer and Carolyn Sherif (eds),
Problems of Youth, Chicago: Aldine, 1965*

very abrupt, reflecting their different populations, subcultures, ways of life, and social organizations.

The casual observer usually is aware of these neighborhood community differences; yet he may consider them more as a crazy quilt than as a neat, orderly, and systematic pattern. On a superficial level, he is often correct, since the various neighborhoods are of miscellaneous sizes and shapes. But various economists, geographers, sociologists, and other social scientists studying the city have located and traced various kinds of orderly patterns underlying the apparently unsystematic nature, growth, and change of neighborhoods. The study of human ecology, for example, has resulted in many generalizations concerning the spatial distribution of different kinds of people and of various functions and activities. Such works as those of Hawley (1950) and Quinn (1950) attest that the body of knowledge created with ecological concepts and techniques of analysis has been productive and fruitful. Generalizations concerning the orderly patterns of city growth and spatial structure include the concentric zone theory of Burgess (1929), Hoyt's sector theory (1939), and Harris and Ullman's multiple nuclei theory (1945). These generalizations are to be found in most recent textbooks in introductory sociology and urban sociology published in this country.

Recently, new methods for the systematic analysis of population differences between urban subcommunities have been proposed; and sufficient work has been done with the methods by enough different research workers that a sizable body of information is beginning to emerge. One of these methods, first presented by Shevky and Williams (1949) and later modified by Shevky and Bell (1955), will be discussed in some detail in this chapter along with some of the work of other persons within the Shevky framework. Occasional reference will be made to a similar method constructed by Tryon (1955). In general, these methods can be referred to as *social area analysis*, although the particular techniques by which neighborhoods are combined into social areas differ somewhat in each case.

The purposes of this chapter are to review the method of social area analysis and some of the research that has resulted from its use, and to evaluate the method in the light of recent work. In particular, the utility of the social area method for the design and analysis of urban subarea field studies will be explored: Specifically, does social area analysis of census tract statistics for a metropolitan area provide a useful frame in which to design and execute detailed investigations of the behavior of individuals and groups in different subcommunities? If so, what is the function of social area analysis for such studies?

Since a logical place to begin is with the basic data that the method utilizes, a discussion of the nature of census tract statistics precedes a description of the social area typology.

CENSUS TRACT STATISTICS

The basic unit of analysis used in the construction of social areas is the census tract.¹ Census tracts are relatively small geographical areas into which certain cities and often their adjacent areas have been subdivided. They are larger than blocks and usually contain between 3,000 and 6,000 persons. In 1950, a metropolitan area the size of Chicago was divided into approximately 1,000 of these small units; the San Francisco-Oakland area about 244; San Jose, California, as few as 59; and smaller areas into even fewer tracts. Data collected in connection with the regular decennial census of the United States are published in a form that allows study of population and housing characteristics of these tracts or subareas.

The census tract program is a relatively recent development. New York City and seven other cities having populations over 500,000 were divided into census tracts in 1910, and census data were tabulated by tracts within these cities for the first time. The purpose was to obtain detailed population data for sufficiently small areas within the city so that neighborhood communities could be studied. In 1920, tract data were again tabulated for the same eight cities, and in 1930 this number was increased to 18. By 1940 tract data were available for 60 urban places. By 1950 as many as 69 urban places in the United States and its territories had been divided into census tracts. By 1960, the program had expanded to include published reports for 180 tracted areas, three of which were in Puerto Rico (see U.S. Bureau of Census, 1958, 1960). Comparative studies of urban neighborhoods with a scope and adequacy never before possible can now be made.

Some of the information contained in the census tract bulletins represented a complete count of all the persons in the census tracts. Additional information was presented which was obtained from a 20 per cent sample of persons in the tracts. The information given for each census tract for 1950 is listed below:

Total population	Type of structure
Race	Condition and plumbing facilities
Sex	Year structure was built
Nativity	Number of all occupied dwelling units
Married couples	Number of persons in dwelling unit
Families or unrelated individuals	Number of households
Number of dwelling units	Population per household
Owner- or renter-occupied dwelling units	Population in households.

¹ Other units of analysis can be and, to some extent, have been used, such as the county, the state, countries as a whole, etc. The chief use of the social area typology to date, however, has been in connection with the census tract; thus, for simplicity this discussion will deal only with research related to the use of census tracts.

Institutional population
 Years of school completed
 Residence in 1949
 Income in 1949
 Age
 Marital status
 Employment status
 Major occupational group

Women in the labor force
 Persons per room
 Type of heating fuel
 Refrigeration equipment
 Television
 Contract monthly rent
 Value of one-dwelling-unit structures
 Spanish surnames (for certain areas only)

The above list, of course, greatly underestimates the total number of useful measures contained in the tract bulletins, since many combinations and permutations are possible. For example, an investigator can use data on age and sex to compute a fertility ratio for a tract by taking the number of women from age 15 to age 44, dividing that sum into the number of children under age 5, and then multiplying by 1,000. Thus, the fertility ratios of tract populations can be compared. Many other such permutations of the above variables giving important information about a tract population can be made.

If one wishes to get a coherent and easily understandable picture of the character of a tract population, however, it is cumbersome and inefficient to deal separately with as many different variables (and their permutations) as are contained in the census bulletins. For example, if one tried to compare and contrast the 244 tracts in the San Francisco Bay area with respect to thirty or more variables simultaneously, each handled individually, the task would be exceedingly tedious and would result in complex patterns difficult to comprehend. Thus, some ordering or clustering of the variables should be made as a prior step in constructing a composite of a tract's social characteristics.

ORDERING OF CENSUS VARIABLES

Apart from the variables reflecting sheer size of the census tract, there appear to be three sets of general characteristics in the census tract bulletins: *socioeconomic*, *family*, and *ethnic* characteristics. There are, no doubt, other ways in which the census variables can be ordered. For example, there are variables which refer to housing and other variables which refer to population. But for the purposes of systematically analyzing the social features of urban neighborhood communities, the division of the variables into those which are socioeconomic or socioeconomic-related, those which indicate the presence or lack of families, and those which reflect the presence or absence of certain racial and nationality groups seemed most revealing to those of us engaged in the early work using the social area typology. Looking back over the census variables given above, one can easily group most of them into one of these three categories. This has been done below:

<i>Socioeconomic Characteristics</i>	<i>Family Characteristics</i>	<i>Ethnic Characteristics</i>
Condition and plumbing facilities	Sex	Race
Persons per room	Married couples	Nativity
Years of school completed	Families or unrelated individuals	Spanish surnames
Income in 1949	Owner- or renter-occupied dwelling units	
Employment status	Type of structure	
Major occupational group	Age	
Type of heating fuel	Marital status	
Refrigeration equipment	Women in the labor force	
Contract monthly rent	Lack of institutional population	
Value of one-dwelling-unit structures		

The census variables were first grouped this way in the development of social area analysis by Shevky and Williams (1949). The author verified the classification by using 1940 census data for the Los Angeles area and the San Francisco Bay area (Bell, 1955a). Tryon (1955), working independently, analyzed all the census variables for the San Francisco Bay area as of 1940 and reached practically the same classification. In addition, Walter C. Kaufman (1961) has found that this grouping of variables is, in general, valid for the San Francisco Bay and Chicago areas as of 1950 as well.

Some of the work of Van Arsdol, Camilleri, and Schmid (1957, 1958a) is important in this connection. They performed a factor analysis of selected variables from the 1950 census tract data for ten American cities—Akron, Ohio; Atlanta, Georgia; Birmingham, Alabama; Kansas City, Missouri; Louisville, Kentucky; Minneapolis, Minnesota; Portland, Oregon; Providence, Rhode Island; Rochester, New York; and Seattle, Washington. They concluded that this grouping of census variables is an adequate measure of socioeconomic, family, and ethnic characteristics in eight of these cities.

In general, the ordering of the census variables into three basic types has been strongly confirmed by much of the research designed to test it. But Van Arsdol, Camilleri, and Schmid's deviant cases, along with the recent research results of Anderson and Bean (1961), suggest that additional attention should be paid to the possibility of some alternative—perhaps more complicated—clustering of the basic census variables.

For example, Anderson and Bean conclude from a factorial analysis of 1950 census tract statistics for Toledo (Ohio) that two factors, rather than one, constitute a more adequate representation of the second set of variables listed above. They divide the variables into *housing characteristics* (which they are willing to call *urbanization* after Shevky's original label for this index) and *family characteristics*, which is consistent with the suggested re-interpretation of this same index, *familism*,

made by the present writer (Shevky and Bell, 1955, p. 68). More will be said of this later.

INDEXES OF SOCIOECONOMIC STATUS, FAMILISM, AND ETHNICITY

All the census variables can be reduced to three more basic factors, although more different factors may prove necessary in the long run. Using these three basic factors, it is possible to construct a picture of the smaller social worlds into which an urban area is subdivided in terms of the socioeconomic, family, and ethnic characteristics of the tract populations. It is neither necessary nor efficient to include all the possible measures of the three factors in indexes for them. A few indicators of a factor are sufficient.

Of course, some census variables are better measures of their particular factor than others. Thus, certain census variables were selected, and their average value used as an index of the socioeconomic characteristics of a census tract. The index was named the *index of socioeconomic status*. Other variables were selected to be averaged as an indicator of the family characteristics of a tract population, and this was named the *index of familism*. Finally, the average of still other variables was made an indicator of the racial and nationality characteristics of a tract population and was named the *index of ethnicity*. The variables selected to measure the three factors were as follows:

<i>Index of Socioeconomic Status</i>	<i>Index of Familism</i>	<i>Index of Ethnicity</i>
Rent	Fertility ratio	Race
Education	Women not in	Nativity
Occupation	the labor force	Spanish surnames
	Single-family detached	(when available)
	dwelling	

The specific procedures for the computation of the indexes are given in the appendix to this chapter. There have been some changes in composition, and there may be more, as indicated above. For example, for technical reasons the measure of rent was dropped in computing the socioeconomic index after 1940. It suffices to say here that each census tract can be given three scores—for the indexes of socioeconomic status, familism, and ethnicity. These scores have been standardized to range from zero to 100 according to the extremes on each measure in the Los Angeles area as of 1940. Therefore, it is possible for tracts in other urban areas (or in Los Angeles in other years) to receive scores less than zero or somewhat greater than 100. Ideally, of course, the scores should be standardized to the range of all the census tracts in the entire United States—or even throughout the world, when small area statistics become

available for the metropolitan areas in other countries—or to some extreme lower and upper limits which cannot in fact be quickly transcended by the data for any particular time and place.

In tracts with high scores on the index of socioeconomic status there are many persons with white-collar occupations, such as professionals, proprietors, managers, officials, salesmen, clerks; many persons have a higher education; and rents are high. In tracts with low scores, there are many persons with blue-collar occupations, such as craftsmen, foremen, operatives, and laborers; many persons have no more than a grade school education; and rents are low.

This index was originally labeled *social rank* by Shevky, and is so designated by some other researchers using the social area typology. Although I have been using the term *economic status*, for reasons which do not seem too important in hindsight, perhaps a good compromise would be *socioeconomic status* or *level*. No significant alteration in the conceptual interpretation was intended in any event. On the other hand, Anderson and Bean (1961, p. 123) argue that to call this dimension *social rank* (or *economic status* either, apparently) is inappropriate. They suggest that the underlying factor measured by the index be "classed a measure of the *prestige value* of the neighborhood." Only additional data, along with conceptual and theoretical analysis, can lead to an adequate resolution of their difference of opinion.

It is possible for tracts to vary in family characteristics regardless of their scores on the index of socioeconomic status. Tracts having high scores on the index of familism contain populations which have high fertility ratios (that is, many children under age 5 in relation to the number of women between the ages of 15 and 44); many women not in the labor force, but at home in the roles of housewives and mothers; and many single-family detached dwellings. Tracts with low fertility ratios, many women in the labor force, and many multiple dwellings achieve low scores on the index of familism.

Originally, Shevky called this index *urbanization* (high urbanization being equivalent in operational terms to low familism), but his designation contains conceptual elements inadequately measured by the items comprising the index. It is also true that additional marital and family characteristics probably should be added to the index if a better indicator of the *family life characteristics* of census tract populations is desired. Scott Greer (1956, 1960, 1962a, 1962b), Greer and Kube (1959), Greer and Orleans (1962), and Kaufman and Greer (1960), among others, have compromised, while creatively elaborating the concept and stressing the underlying agreement and similarity of the two designations as referring to differential life styles or choice patterns of urban residents. They prominently use *urbanism-familism*, which seems to be a good solution to this terminological problem at the present time. The factor analysis of

Anderson and Bean, mentioned above, which located two factors within the *urbanism-familism* index, as well as some recent work of the Sherifs (1964), should stimulate additional work on this question. The latter researchers have decided that low *urbanization*, rather than high *familism*, is a better term to describe the family characteristics of a sample of low socioeconomic, largely Spanish-speaking populations, since almost a quarter of the large families lacked a male breadwinner. These facts seemed congenial to the idea that these populations were low in their acculturation to an urban way of life, a notion better conveyed by *urbanization* than by *familism*. The low socioeconomic level of these tracts may modify the nature of the family life in them and explain the absence of male breadwinners, while the concentration of Spanish-speaking persons may explain the low level of acculturation. Nonetheless, one can agree that more experimentation with this and alternative indexes needs to be done.

One additional problem has arisen with the designation *index of family status*, which I have suggested before for the urbanism-familism dimension. Fortunately, it is merely a terminological and not a conceptual problem. The use of *status* in the label led some readers to believe that the referent was the economic status, the social rank, or the prestige of the families in the census tracts. Such is not the case. Thus, *familism* or *urbanism-familism* may be superior as labels on the simple grounds that they more clearly convey the meaning intended.

Tracts which contain many Negroes, persons of other non-white races, persons with Spanish surnames, and foreign-born whites from certain countries receive high scores; and tracts which contain mostly native-born whites receive low scores on the index of ethnicity. This index, of course, is negatively related to the index of socioeconomic status, since Negroes and many other American minority groups are most often located in urban neighborhoods of low socioeconomic status. However, it is possible to find some neighborhood communities in which generally subordinate minority groups have high socioeconomic status and to find others inhabited by native-born whites of low socioeconomic status. Moreover, socioeconomic status is not the same thing as race and nationality; that is, the social significance of these two types of variables is different even though they have often been confused. Consequently, in spite of the empirical relationship between the indexes of socioeconomic status and ethnicity, they should be kept conceptually distinct in any sociological analysis, including one of urban communities.

CONSTRUCTION OF THE SOCIAL AREA TYPOLOGY

Since the three indexes are to be utilized as *distinct* properties of urban subcommunities, they cannot be simply added together. Some

method must be devised to use them simultaneously in the analysis. To do this, types or a typology must be constructed. The use of the concept of type here follows Lazarsfeld (1937) who said:

One is safe in saying that the concept of type is always used in referring to special compounds of attributes. In speaking of the Middle-western type of American, one may have in mind certain physical features, certain attitudes and habits, certain affiliations and talents attributed to the inhabitants of this region. In speaking of types of books or of types of governments, a special combination of attributes is thrown into relief.

The special "compound of attributes" used in social area analysis is that composed of economic, family, and ethnic characteristics. Instead of a "Middle-western type of American," "types of books," or "types of governments," the types are composed of urban neighborhoods. As shown in Figure 10, a social attribute space is constructed which is bounded by the indexes of socioeconomic status and familism. Census tract populations near to each other in the social area diagram would necessarily have similar configurations of scores on the two indexes. Such tracts are grouped together by the divisions which are made in the indexes, segmenting each into four parts.

The social space has been segmented by divisions passing through socioeconomic status scores of 25, 50, and 75, and through familism scores also of 25, 50, and 75. Thus, potentially, sixteen groupings of census tract populations are made, and these represent different social types of tract populations. These *types* are also called social areas.

Social areas so far, then, are composed of a tract or tracts with particular patterns of scores on the indexes of socioeconomic status and familism. They are called *social* in that the properties of neighborhood communities dealt with are social properties. The term *area* is employed because a geometric space frame is utilized. By similar reasoning the diagram shown in Figures 10 and 11 can be referred to as a "social space diagram."

A number and letter designation are given to each of the types as shown in Figure 10. Social area 1D, for example, contains tract populations with low socioeconomic status and low familism. Tract populations in social area 1A would have the same socioeconomic status as those contained in 1D, but the familism of tracts in 1A would be high instead of low. Likewise, social area 4D varies systematically from 1D, but in this case the familism (or conversely urbanism) of the two groups of census tracts is the same, while the socioeconomic status differs, social area 4D containing tract populations low on familism (or high on urbanism) but high on socioeconomic status. Thus, each type of social area delimits census tracts which have a particular configuration of scores with respect to

FAMILISM	High	1A	2A	3A	4A
		1B	2B	3B	4B
		1C	2C	3C	4C
	Low	1D	2D	3D	4D
		Low	High		
SOCIOECONOMIC STATUS					

FIGURE 10. Social Area Key Based on Socioeconomic Status and Familism

economic and family characteristics (see Figure 10 for positions and designations of other social areas).

The third factor, ethnicity, adds to the typology so far constructed by distinguishing those census tracts which contain relatively many members of American racial and nationality minority groups. Tract populations having high indexes of ethnicity are given an "S" along with their social area designations as given in Figure 10. Tracts which have low indexes of ethnicity remain with only the designation as shown in Figure 10. Thus, there are thirty-two possible social areas or types of urban subcommunities: 1A, 1B . . . 4D and 1AS, 1BS . . . 4DS.²

Shevky called this index *segregation*, considering those tract populations which contained relatively more than average percentages of subordinate ethnic groups as segregated; and those which contained less than average as not segregated. This label created some confusion with another meaning of segregation used by Shevky as well as others (*e.g.*, Bell, 1954; Bell and Willis, 1957), namely the degree of residential segregation of a particular *group* summing across neighborhoods. Therefore, some of us began using the label *ethnic status* to refer to the racial and nationality composition of particular neighborhoods. This label, however, led to further lack of clarity, since *high* ethnic status designated tract populations with higher than average percentages of *subordinate* ethnic

² Tryon's method of constructing social areas differs somewhat from the Shevky method which is discussed here. However, the results are much the same; for instance, the social areas of the San Francisco Bay area as of 1940 and as established by the Tryon method are for all practical purposes the same as those achieved by the Shevky method ($Eta = .82$).

groups, groups generally having low rather than high status in the larger society. Thus, using *ethnic status* in this way flies in the face of common parlance by reversing general meaning. Again, this is simply a terminological problem, which several writers have solved by using the term *ethnicity* to refer to the ethnic composition of a census tract population, *high ethnicity* referring to a tract with relatively many members of subordinate ethnic groups.

SOME ILLUSTRATIONS OF THE USE OF SOCIAL AREA ANALYSIS

Since this chapter cannot discuss completely all the work using social area analysis, a selection of research executed in this framework will illustrate some of the uses and the nature of the findings. The census tracts of the San Francisco Bay area are plotted in the social space diagram in Figure 11 according to their scores on the three indexes for 1950. Included are 244 tracts with a total population of 1,509,678. The social position of each tract population can be seen in relation to all other tracts in the Bay area.

Notice on Figure 11 that there is little relationship between the indexes of familism and socioeconomic status, the correlation being $-.13$ between them. The correlation between the indexes of socioeconomic status and ethnicity is $-.50$, reflecting the fact that Negroes, Orientals, other non-whites, Mexican-Americans, and members of certain other foreign-born groups are most likely to live in neighborhoods characterized by low socioeconomic status. These groups are also increasingly likely to live in areas having little family life, as the socioeconomic levels of their neighborhoods increase.

Similar patterns of relationships have been noted for Los Angeles (Bell, 1955a) and Chicago (Kaufman, 1961). Whether the relations between the factors will vary markedly for other cities, or whether the stability of these patterns represents a generalization about the social structure of American cities at least for a particular time is a matter for future research. The Van Arsdol, Camilleri, and Schmid (1958a) research on the ten cities, which was mentioned earlier, suggests that this pattern of intercorrelations may be fairly general. But variation was reported for some of the cities, which may indicate the existence of differential patterns of social area distributions in cities of different regions, ages, economic bases, etc.

Orderly patterns have been found in the relationship between the sex ratio and the social areas in both Los Angeles and San Francisco. The sex ratio varies inversely with familism at low levels of socioeconomic status, and directly with familism at high levels of socioeconomic status; it varies inversely with socioeconomic status at all levels of familism. Thus, relatively more women than men are located in higher socioeco-

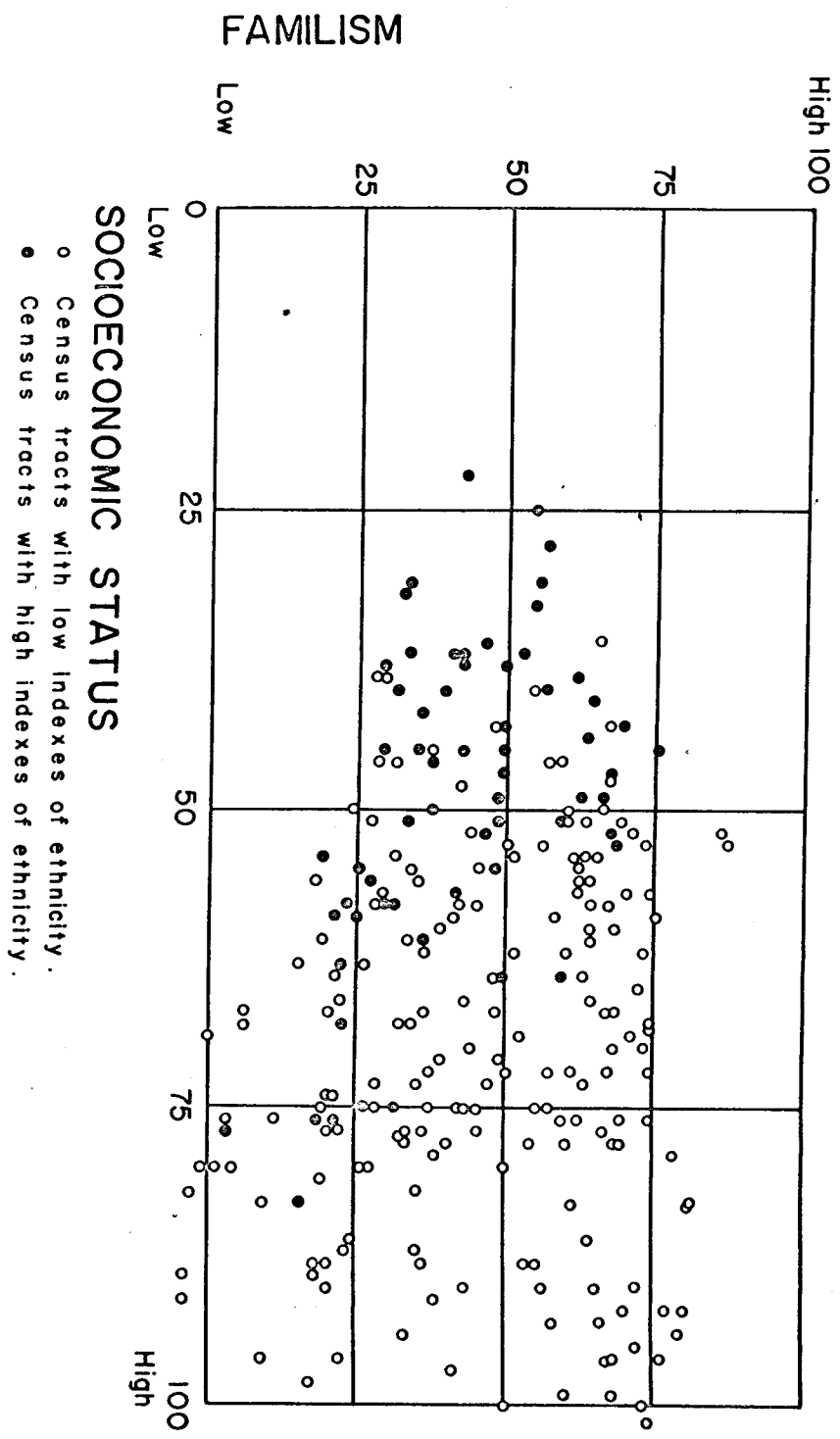


FIGURE 11. Distribution of the Census Tracts in the Social Areas of the San Francisco Bay Region, 1950

conomic status neighborhoods, with the greatest concentration of women in relation to men occurring in areas of expensive apartment houses, and the greatest concentration of men in relation to women occurring in the cheap rooming-house areas (Shevky and Williams, 1949; Bell, 1953; Shevky and Bell, 1955).

The age distributions of the persons in social areas also show systematic differences. In Los Angeles and San Francisco, the percentage of older persons increases with the socioeconomic status and decreases with the familism of a tract. The percentage of persons under fifteen years of age decreases with socioeconomic status and increases with familism. For example, social area 4D contains the largest percentage of older and the smallest percentage of younger persons. Although the pattern is less clear, the social area distribution of the middle-aged group tends to follow that of the older group.

STUDIES OF THE NATURE AND PATTERN OF SUBCOMMUNITIES

Once the census tracts of a metropolitan area have been given scores according to their socioeconomic, family, and ethnic characteristics, it becomes possible to execute systematically a variety of investigations into the nature of different urban subcommunities within the social area framework. For example, an examination of neighborhood place names used by the residents of a city allows a study of the relationship between subjective evaluations of urban neighborhoods and the social characteristics of the neighborhoods as determined by an analysis of census variables. Some named places in San Francisco are given below with their scores on the three indexes for 1950 (Shevky and Bell, 1955, pp. 61-63).

<i>Identifying Place Name</i>	<i>Index of Socioeconomic Status</i>	<i>Index of Familism</i>	<i>Index of Ethnicity</i>	<i>Social Area</i>
Nob Hill (A-12)	91	- 4	9	4D
Chinatown (A-15)	46	37	92	2CS
Sea Cliff (E-1)	93	58	10	4B
Potrero (L-1)	38	52	29	2BS
Diamond Heights (N-13)	52	71	11	3B

Studies could be designed to determine subjective evaluations of the social images of these named places. These evaluations could then be analyzed with respect to both the social characteristics of the named places and the social characteristics of the persons doing the evaluating.

Land use and topography, as might be expected, are related to social areas. Generally, in the San Francisco Bay area, neighborhoods of low socioeconomic status are located adjacent to the industrially occupied, low elevation areas of the inner Bay, while neighborhoods of high socioeconomic status are usually in areas of high elevation, farther from industrially occupied land. Neighborhoods of low familism are near

commercial areas, especially near the downtown business district, while neighborhoods of high familism are located farther from the downtown commercial area, nearer to parks, lakes, or ocean beaches. The census tracts composing a social area, however, are not necessarily contiguous and continuous.

Additional studies of the spatial aspects of social area analysis have been made by Anderson and Egeland (1961) for four American cities between 200,000 and 500,000 population in 1950: Akron and Dayton, Ohio, Indianapolis, Indiana, and Syracuse, New York; by McElrath (1962) for Rome (Italy) using 1951 census data; and by McElrath and Barkey (no date) for Chicago in 1960.³ These studies are of particular significance because they relate social areas to the well-known concentric zonal theory of Burgess and the sector theory of Hoyt.

Consistently, in every city, the familism-urbanism dimension is zonally distributed; it is also distributed sectorially in Rome and Chicago, but not in the four cities studied by Anderson and Egeland. Socioeconomic status (or social rank) is distributed differentially by zones in Chicago, Indianapolis, and Rome, but not in the three smallest U.S. cities studied. *However, in Chicago the high socioeconomic neighborhoods were located near the periphery of the metropolitan area, while in Rome they were located in the central districts.* Socioeconomic levels of neighborhood populations were clearly sectorial in all the cities except Chicago. Ethnicity was included in the analysis only in Chicago. There it was not distributed zonally, although there was a tendency for it to be distributed sectorially.

STUDIES OF PREVALENT ATTITUDES AND ACTIONS IN DIFFERENT AREAS

The social area typology has now been used in numerous studies as an analytic frame for the study of individual beliefs, attitudes, and behaviors. A review of a few of these studies will serve to further illustrate the analytic utility of the method.

Bell, Boat, and Force (1954) examined the Shevky social space diagram (see Figure 11) and selected four census tracts in San Francisco which had low scores on the index of ethnicity, but widely different scores in the indexes of socioeconomic status and familism. In these tracts, an investigation was made of the social isolation and participation of urbanites. The social space positions of the four subpopulations are shown in Figure 12 along with their census tract designations and their identifying neighborhood community names. From Figure 12 it can be noted that Mission, a low-rent rooming-house area, is characterized by low socioeconomic status and low familism. Pacific Heights, a high-rent

³ Other work outside the United States includes Gagnon's study of Quebec (1960) and McElrath's study of Accra, Ghana (no date). Also, see Brody (1962) for a study of spatial aspects of social areas in ten additional American cities.

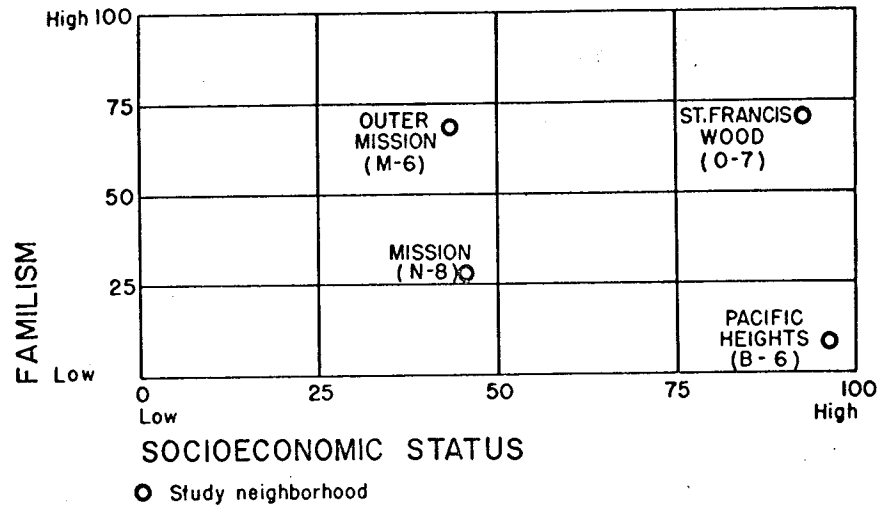


FIGURE 12. The Four San Francisco Study Tracts Located in the Social Space Diagram, 1950

apartment-house area, is high on socioeconomic status, but low on familism. Outer Mission, characterized by small single-family detached houses and residents of modest means, is low on socioeconomic status and high on familism. St. Francis Wood, an area of large single-family detached houses with residents who are fairly well off financially, is high in both economic and family characteristics.

After the selection of the study tracts, as described above, probability samples were drawn from a complete list of all the dwelling units within each tract. A total of 701 interviews was obtained with a response rate of more than 85 per cent, one randomly selected male over age 21 in each sample dwelling being interviewed.

The results of this study show different patterns of social participation in the different neighborhoods. Men living in high socioeconomic status neighborhoods (Pacific Heights and St. Francis Wood), when compared to those living in low socioeconomic status neighborhoods (Mission and Outer Mission), belong to a greater number of formal associations, attend formal association meetings more frequently, and are more likely to hold offices in formal associations (Bell and Force, 1956a). A greater percentage of their memberships are in general-interest types of associations (Bell and Force, 1956b); they interact with their co-workers away from work more frequently, have more informal contacts with friends who are not neighbors or relatives, rely more on their co-workers, are less likely to be calculating in their relationships with their neighbors (Bell

and Boat, 1957), and are much more likely to achieve low anomia scores on the Srole Scale (Bell, 1957). Jews and, to a lesser extent, Protestants, are more likely to live in the areas of high socioeconomic status than in neighborhoods of low socioeconomic status. The reverse is true of Catholics (Bell and Force, 1957).

Men who live in high familism neighborhoods (St. Francis Wood and Outer Mission), when compared with those in neighborhoods low on familism (Pacific Heights and Mission), are somewhat less socially isolated from informal group participation, have more social contacts with neighbors and kin, and are more likely to have met their close personal friends in their neighborhoods (Bell and Boat, 1957). Of the men in the two high socioeconomic status neighborhoods, those in Pacific Heights belong to fewer formal associations, attend meetings less often, are less likely to hold office, and are more likely to belong to special individual-interest types of formal associations than the men living in St. Francis Wood. Catholics are relatively more numerous in neighborhoods high in familism than they are in neighborhoods low in familism. "Independents," "agnostics," and "atheists" are most likely to live in areas low in familism.

It should be noted that the method and analysis in these studies were such that we can conclude that social participation or isolation variables are related to residency in these areas. Some work in social area analysis has used "ecological correlations," which contain pitfalls of incorrect interpretation made well known by Robinson (1950) in a now classic article. Such studies must be interpreted accordingly. The emphasis here is upon the research value of social areas as "independent variables" for studying attitudes and life styles of particular subsets of the populations.

Using the social areas of Los Angeles, Scott Greer (1956; Greer and Kube, 1955, 1959) also selected four local areas in which to conduct a study of social participation in urban neighborhoods. His strategy, however was to hold both economic and ethnic characteristics constant in his study tracts and to vary family characteristics widely. For 1950, Temple City had a score of 74 on the index of familism, Eagle Rock, 64, Silver Lake, 45, and Central Hollywood, 20. Each of these subcommunities had scores of about 70 on the index of socioeconomic status and scores of 6 or less on the index of ethnicity. From his interviews with persons in these four neighborhood communities, Greer concludes that the greater the amount of family life in a neighborhood, the more "neighboring," the more persons who have friends in their neighborhood, the more likely a person is to attend a cultural event in his neighborhood, the larger the percentage of persons who belong to formal organizations drawing members from the local area, the more husbands who belong to organizations meeting in the local area, and the more persons who could name at least one local leader.

Greer also found that persons living in high familism neighborhoods, as compared with residents of neighborhoods low on familism, are more likely to think of their local area as a "little community," like a "small town," where "people are friendly and neighborly." They are less likely to mention the convenience of their location in terms of its nearness to "downtown and everything." They are less likely to speak of their neighbors as "nice people who leave you alone and mind their own business"; but they are more committed to remaining in their neighborhoods, and more apt to have their friends (other than friends who are neighbors) in other high familism tracts.

McElrath (1955) and Williamson (1953, 1954) have used social area analysis in the design and analysis of sample surveys. Using the typology, they selected samples within neighborhoods in the Los Angeles metropolitan area. They reported, respectively, that the social areas were predictive of the prestige and esteem ratings for individuals and the degree of their marital adjustment (see also Sussman, 1959). Curtis (1957) has used the method as a sampling device in his study of the employability of aging workers in Buffalo, New York.

There are many other uses to which social area analysis has been put. Studying 1,107 petitioners for change of name in Los Angeles County, Broom, Beem, and Harris (1955) find that name changers were more likely than the general population to live in areas rated high in socioeconomic status, low in familism, and low in ethnicity. This suggests that name changers may be upwardly mobile persons, who have broken away from family ties and have been, or are being, assimilated into the larger society, and are moving away from membership in and identification with some particular ethnic group.

In another study Broom and Shevky (1949) demonstrated the utility of the typological framework for the differentiation of an ethnic group. They found Jewish neighborhoods in Los Angeles in the lower ranges of familism and in the full range of socioeconomic status. Tracts lacking Russian-born persons (which indicator was used for one segment of the Jewish population) tended to fall in the high ranges of familism, with a noticeable cluster at the lowest levels of socioeconomic status. Taking the members of four Jewish fraternities on the Los Angeles campus of the University of California, they found that the two rated by campus consensus as having high prestige had members from tract locations with significantly higher socioeconomic status than members of the two lower-prestige fraternities.

Studies of the incidence of suicide and juvenile delinquency have been made by Wendling (1954) and Polk (1958). Polk (1957, 1957-58), for example, found juvenile delinquency rates highest in those areas of San Diego in which minority group members live, and lowest in areas inhabited by native whites. Smaller correlations are reported for the other two indexes, but juvenile delinquency was negatively related to socio-

economic status and familism. The highest rates of juvenile delinquency occurred in neighborhoods with high indexes of ethnicity, with low levels of income, occupation, and education, and with little family life. The only significant correlation between suicide and any of the three indexes in Polk's San Diego study is a negative correlation between familism and suicide.

In his study of the social areas of Portland in 1960, Polk empirically demonstrates the need for a typological approach in relating delinquency rates to urban neighborhoods. He notes among other things that delinquency rates increase with socioeconomic status of the neighborhood at the lowest level of familism, but decrease with socioeconomic status generally.

The typology has been used to facilitate adequate social welfare planning for local areas in the San Francisco Bay area (Bange, *et al.*, 1953). The hypothesis was that each of the social areas had certain distinctive social welfare problems related to their differences in economic, family, and ethnic characteristics. This work does a great deal in suggesting one of the many possible practical applications of the social area typology.

Robert L. Wilson (1958) has used the social area typology for a comparative study of Episcopal, Methodist, Presbyterian, and United Lutheran churches in selected cities throughout the United States. He indicates that generalizations can be made regarding the relation of churches to social areas. Curtis, Avesing, and Klosek (1957) and Sullivan (1961) have related social areas to Catholic parishes.

Tryon and his associates have related social areas to additional variables such as political preference, voting participation, psychiatric hospitalization, and the probability of an individual's attending a university. There is insufficient space to elaborate with a detailed consideration of these findings. However, Tryon's findings and interpretations on the stability of social areas deserve further comment. Tryon (1955, p. 31) argued that:

It is difficult to believe that a social area, including a number of tracts of people having the same configuration of demographic and correlated psychosocial ways, would change much in a decade, or perhaps many decades. A change would be gradual. Individual persons may be born into the area, move out or die, but it should retain its subcultural homogeneity with considerable constancy, short of socially catastrophic events. Even those areas that undergo rapid growth through construction of new homes are likely to incorporate new groups of persons homogeneous with those already there.

Tryon (1955, p. 32) also concludes from his analysis of the homogeneity of his 1940 San Francisco social areas with respect to 1950 median rent that "... little change in homogeneity of the tracts composing the

various areas has occurred in 10 years." He also reports a comparison between the 1940 vote for Roosevelt and the 1947 vote for the Democratic candidate for Congress, Havenner, a man identified with the Roosevelt-Truman program. The census tracts show practically the same rank order for Roosevelt as for Havenner, the correlation coefficient being .94.

Other evidence that social areas remain relatively constant is found in McElrath's Los Angeles study (1955). He reports that thirteen years after the collection of the data on which the social area scores were based, he achieved the anticipated results in his sample survey with respect to differences in economic, family, and ethnic characteristics in his study areas.

This is not to say that tracts never change their social area positions, but rather that most of them, short of catastrophe, can be expected to maintain consistent social patterns for relatively long periods of time. Still, the social area approach is most useful for analysis of current conditions when census data are up to date, close to census years. There is a need for techniques to keep social area analysis current in view of the high rates of change in certain parts of most American cities.

Tryon's comments are not to be construed to mean that the census tract populations need be homogeneous for the method to be valid. It is not inconsistent with the typology to find some urban neighborhoods that are typically characterized by heterogeneity in certain variables. Census tracts classified together in a social area, however, should have *about the same degree of heterogeneity* with respect to *the same set of variables*.

STUDIES OF SOCIAL ORGANIZATION IN DIFFERENT AREAS

Scott Greer and his associates (Greer, 1960, 1962a, 1962b; Kaufman and Greer, 1960; Greer and Orleans, 1962), in a 1957 study of the St. Louis metropolitan area, raise some serious doubts about the pessimistic view of the modern urban world which sees no structured force interposed between the massive power of large-scale organizations and the isolated (and therefore vulnerable) individual. (See Bollens, 1961, for a comprehensive report on the St. Louis survey.) In so doing, they both demonstrate the analytic utility of the social area typology and contribute to increasing confidence in the typology by showing its essential isomorphism with the realities of urban life. The city is not a single way of life, but many ways of life. The different ways are, for the most part, patterned and systematically variable. Greer and Orleans (1962, p. 645) wrote:

The theory of the mass society postulates an administrative state, a massified citizenry, and no mediating organizations between. We have discovered, in metropolitan St. Louis, that a widespread network of parapolitical organizations has consequences for the involvement and the competence of the citizenry with respect to local government.

In the St. Louis study, the strength of the parapolitical structure, the direction of the vote in presidential and local elections, a typology of local social participators, the amount of an individual's political participation, and the degree of individual political competence vary widely from one type of social area to another. In the discussion of their findings, Greer *et al.* make important elaborations of the theoretical bases of the social area types in terms of the *differential opportunity structures* they offer.

STUDIES OF AREAS AS VARIABLES IN REFERENCE GROUPS OF RESIDENTS

There is yet another way in which social area analysis can be utilized in connection with urban subcommunity field studies. This is in the analysis of the combined or independent effect of personal and unit characteristics on variables dependent on them. Lazarsfeld and Barton (1951) have discussed the difference between personal characteristics and unit characteristics:

Personal data characterize individuals. . . . Unit data characterize some aggregation of people. . . . Of course, people can be aggregated in many different ways, some of which imply social interaction and others only categorization by the observer. A "unit" in our sense will be any aggregation—an Army company, a neighborhood, an occupational category, a political party.

In the San Francisco study two subcommunities with high socioeconomic status and two with low were selected as study areas. In general, the men living in the high socioeconomic status neighborhoods had, as expected, higher educational levels than those in the low socioeconomic status neighborhoods; the median educational level for Pacific Heights and St. Francis Wood combined being "some college or more," and for men in Mission and Outer Mission being in the "some high school or less" category. This is a *neighborhood* or, as defined above, a *unit* characteristic, and can be assigned to all the men living in a particular neighborhood community as an attribute of their residence area. However, there are men living in Pacific Heights and St. Francis Wood who can be classified on the basis of their own educational level (a *personal* characteristic) as having only a grade school education or less (10.9 per cent so report). Likewise, some men in Mission and Outer Mission (9.6 per cent) report having some college or more. This raises an interesting question: Does the educational level of the neighborhood in which a person lives affect his attitudes and behavior, even when his individual educational level is controlled? The answer seems to be "yes" in many of the cases so far tested!

Table 7, for example, shows the percentage of men who attend formal association meetings frequently according to both the average educational level of the neighborhood and the respondent's own education. Comparing the percentages *within each neighborhood*, the general tendency is for the more frequent attenders to have completed more years of

schooling. However, of particular interest here is the comparison of amount of formal association participation *between* neighborhoods for individuals with comparable personal education. In each of the individual education categories, men living in the neighborhoods with higher educational levels are more likely to be frequent attenders than the men in neighborhoods of lower educational levels. Considering that similar differences are found when personal measures of occupation and income are taken into account, it is suggested that the socioeconomic characteristics of a neighborhood population *as a unit* may be important indicators of the economic *reference group* of those living in the neighborhood; and that this reference group provides a set of expectations for the associational behavior of the residents.

TABLE 7

Percentage of Men Who Attend Formal Association Meetings Frequently by Neighborhood and Individual Educational Levels*

Individual Education	Neighborhood Education	
	Low (Mission and Outer Mission) (percentage)	High (Pacific Heights and St. Francis Wood) (percentage)
Some college or more	27.3 (33)†	46.4 (181)
Completed high school only	14.5 (83)	28.3 (92)
Some high school	17.3 (81)	30.4 (46)
Grade school or less	7.6 (144)	23.1 (39)

* Men were classified as "frequent attenders" if they attended meetings 37 or more times per year.

† The total number of cases on which the percentage is based is given in parentheses in each case.

Source: Adapted from Bell and Force (1956a, p. 31).

More recently, the Sherifs (1964), in a multi-faceted approach to the study of adolescent behavior in selected cities in the Southwest, have linked the study of behavior in small groups with the sociocultural settings in which such groups actually function. Oversimplifying, one can summarize their first report as including three major steps:

1. The selection of particular urban neighborhoods as study areas using social area analysis.
2. The assessment of the values and goals prevailing among representative adolescents in the study areas.
3. The intensive field observation of attitudes and behaviors of adolescents belonging to groups of their own choosing—that is, to "naturally-formed" groups whose members do not realize they are being studied—within the study areas.

The Sherifs' work is noteworthy in several ways—not the least of which is their determination to study *real* groups as they *actually* form and function. Of particular significance here is their methodological strategy of simultaneous, multi-level analysis in their focus on the *individual behavior-small group-neighborhood* (i.e., setting) relationship. To them, the social areas are the physical, demographic, and normative settings within which the interaction process within the small groups takes place. It is clear from their major findings regarding the perceptions, social values, and goals of adolescents in different social areas that the social areas are real, not only in the sheer perceptual sense of being part of the maps of social reality carried about in individuals' heads, but also in the sense of providing individuals with significant reference groups for gauging their own behavior as well as the behavior of others. Furthermore, the sociological reality of the social areas as differential opportunity structures (cf. Greer and Orleans, 1962) is elaborated and made concrete in the detailed case histories of the lives of particular adolescents.

SUMMARY AND CONCLUSIONS

In this chapter on the nature of social area analysis and some of its uses, it has not been possible to discuss all the studies that have used this method of analysis. Nor has it been possible to discuss the underlying theory, methodological problems, and differing evaluations of its contribution to urban studies.⁴

Some of the procedural difficulties in a comparative study of American cities have been solved simply by the tracting of cities for the 1960 census. But there remain other difficulties stemming from the nature of census data, and still others from the specific techniques employed in the method. Nonetheless, as presently constructed, the typology has proved useful as an approach to the systematic study of the smaller social worlds which a city's neighborhood communities comprise.

In sum, the various uses to which social area analysis has been put are as follows:

1. *The delineation of subareas.* Through the application of these methods to data available for American cities, it is possible to delineate systematically urban neighborhood communities having different social characteristics. Such a delineation, with the precision with which it can be accomplished, has descriptive value to the social scientist and city planner alike.

⁴The interested reader can find these topics discussed in the following: Bell (1955b), Bell and Greer (1962), Bell and Moskos (1964), Beshers (1959, 1960), Buechley (1956), Carpenter (1955), Duncan (1955a, 1955b, 1956), Farber and Osolinach (1959), Hawley and Duncan (1957), Schnore (1962), Tiebout (1958), Udry (1964) and Van Arsdol, Camilleri, and Schmid (1958b, 1961, 1962).

2. *Comparative studies at one point in time.* Comparative studies of the social areas of different cities at one point in time can be made. The social areas of Los Angeles can be compared with the social areas of New York, Chicago, Philadelphia, San Francisco, Dallas, St. Louis, Miami, or other urban areas. Social area distribution of the neighborhoods in different cities can be compared to determine patterns differentiated by the regions in which the cities are located, the sizes of the cities, their chief economic functions, their relative ages, their topographies, their ethnic compositions, and their transportation bases.

3. *Comparative studies at two points in time.* Despite the relative stability of many social areas, some neighborhood communities within a given urban area are undergoing change. New neighborhoods appear, they grow and develop, they become old, and sometimes they change with respect to the condition of the buildings, the type of building structures, and the kinds of residents. Other neighborhood communities may maintain the same social character for generations, like Beacon Hill in Boston (Firey, 1945). The application of the social area typology can result in a systematic description and analysis of social changes in a neighborhood.

4. *A framework for the execution of other types of research.* In addition to the above uses, the social area method can also be utilized as a framework for analyzing the attitudes and behavior of individuals. As indicated by the research cited in this chapter, neighborhood populations differ not only in demographic features, but also in values and social structure, in life styles and differential opportunities. And variations between neighborhoods have important implications for variations in individual attitudes and behavior. Even from present formulations in sociological theory, it is possible to hypothesize many relationships between neighborhood differences and the attitudes and behavior of individual residents, ranging from suicide, voting behavior, religious preference, mental disorder, personal morale, and type of crimes, to such things as frequency and nature of participation in formal organizations, amount of close contact with neighbors, local community identification, extent of kinship ties, child-rearing practices, and patterns of courtship.

As a tool for urban subarea field studies, the typology serves a number of functions:

a. The typology can be used in the selection of neighborhoods for intensive study. In the examples given, census tracts were selected for particular economic, family, and ethnic characteristics. As an aid to sampling, the typology allows the research worker to select urban subcommunities for intensive study on the basis of informed judgment concerning the social positions of the subcommunities in the larger urban area.

b. The typology provides an integrative frame for urban subcom-

munity field studies by codifying a large mass of ordered data. In the Bell and Greer studies, for example, relationships are specified between particular census tracts and all other tracts in the same city with respect to socioeconomic status, familism, and ethnicity. In addition, the analysis of social participation and isolation between neighborhoods becomes possible in terms of variations in, or specific patterns of, economic, family, and ethnic characteristics of the study neighborhoods.

c. The typology permits the investigation of the combined or independent effect of personal and unit characteristics on dependent variables. The characteristics of a neighborhood may be related to the behavior and the attitudes of individuals. In one example given, men living in high socioeconomic status neighborhoods were more frequent attenders of formal association meetings than men in low socioeconomic status neighborhoods, even though their personal socioeconomic characteristics were held constant. It was suggested that the socioeconomic character of a neighborhood population as a unit may be an important indicator of the socioeconomic group with which those living in the neighborhood identify themselves, and this may provide a set of expectations for the associational behavior of the residents. In another example, social areas were shown to constitute reference groups for adolescents in a multi-level analysis.

The relationship between neighborhood characteristics and individual behaviors and attitudes is clearly a promising subject for additional research.

APPENDIX

COMPUTATION OF THE INDEXES OF SOCIOECONOMIC STATUS, FAMILISM, AND ETHNICITY⁵

The procedures for the computation of the three indexes are given in this section. The ratios for each variable are computed directly from census tract statistics, and the standard scores for the variables from the formulas given. All the variables composing the indexes of socioeconomic status and familism have been standardized to their respective ranges in Los Angeles as of 1940. A single scale is thus established for the direct comparison of census tract scores on the respective indexes for different cities at the same time or the same city at different times. The range, lower limit, and conversion factor are given for each variable for Los Angeles, 1940. The index of ethnicity, of course, is comparable from place to place and time to time since it is a simple percentage.

A. The formula for standardization:

$$s = x(r - o)$$

⁵For manual computation, a table of standard scores is now available (see Avesing, 1960). An IBM 709 computer program is available for machine computation (see Center for Metropolitan Studies, 1963).

where

$$s = \text{standardized score for a particular variable}$$

$$o = \text{lower limit of the census tract ratio for a particular variable}$$

$$r = \text{census tract ratio for a particular variable}$$

$$x = \frac{100}{\text{range of the ratio for a particular variable}}$$

- B. For those variables (occupation, education, and women in the labor force) which have an inverse relation to the basic indexes for which they are computed, the formula is adjusted to read as follows:

$$s = 100 - [x(r - o)]$$

C. Index of Socioeconomic Status

1. Compute the following ratios:
 - a. Occupation ratio: the total number of craftsmen, operatives, and laborers per 1,000 employed persons.
 - b. Education ratio: the number of persons who have completed no more than grade school per 1,000 persons 25 years old and over.
2. Compute occupation and education standard scores using the formula given in B above and the conversion factors (x) given in F below.
3. Compute a simple average of the occupation and education standard scores. The average is the Index of Socioeconomic Status for a census tract.

D. Index of Familism

1. Compute the following ratios:
 - a. Fertility ratio: the number of children under 5 years per 1,000 females age 15 through 44.
 - b. Women in the labor force ratio: the number of females in the labor force per 1,000 females 14 years old and over.
 - c. Single-family detached dwelling units ratio: the number of single-family dwelling units per 1,000 dwelling units of all types.
2. Compute the fertility and single-family dwelling unit standard scores from the formula given in A above and the conversion factors (x) given in F below.
3. Compute the women in the labor force standard score using formula given in B above and conversion factor (x) given in F below.
4. Compute a simple average of the standard scores for fertility, women in the labor force, and single-family dwelling units. The average is the Index of Familism for a census tract.

E. Index of Ethnicity (categories for 1950 only; see Shevky and Bell, 1955)

1. Add together the number of persons designated Negro; Other Races; and foreign-born white from Poland, Czechoslovakia, Hungary, Yugoslavia, U.S.S.R., Lithuania, Finland, Rumania, Greece, Italy, Other Europe, Asia, French Canada, Mexico, and Other America.

(Note: In this enumeration, include foreign-born white from Other Europe *only* if the category contains mostly foreign-born white from southern and eastern Europe. For urban areas in Arizona, California, Colorado, New Mexico, and Texas, the number of white persons with Spanish surnames can be used instead of the number of foreign-born white from Mexico and Other America. A special tabulation may have to be requested to obtain Spanish surname data for each census tract. If "white persons with Spanish surnames" is used, the figures given for *native whites* should be adjusted by subtracting the number of *native whites with Spanish surnames* from the total number of native whites in each tract.)

2. Divide the above sum by the total population in each tract.
 3. Multiply the above quotient by 100 to obtain the Index of Ethnicity for each census tract. Separate the census tracts into two groups on the basis of their scores on the index of ethnicity. Select as the cutting point the per cent of the total population of the *urban area* represented by the *combined* racial and nationality groups listed. Those tracts with more than the average proportion of the combined racial and nationality groups are designated as being "high" in ethnicity; those tracts with less than the average proportion of the combined racial and nationality groups are designated as having "low" ethnicity.
- F. The range, the lower limit of the range, and the conversion factor (x) for each of the ratios for the Los Angeles area, 1940, are as follows:

<i>Ratio</i>	<i>Range</i>	<i>Lower Limit</i> (<i>o</i>)	<i>Conversion</i> <i>Factor</i> (<i>x</i>)
Occupation	748	0	.1336898
Education	770	130	.1298701
Fertility	602	9	.1661130
Women in the labor force	458	86	.2183406
Single-family dwelling units	994	6	.1006441

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