URBAN ECOLOGICAL DIFFERENTIATION AND PATTERNS OF SOCIAL VISITING: A CASE STUDY OF ST. JOHN'S, NEWFOUNDLAND

MARK SHRIMPTON

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By

Mark Shrimpton

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ABSTRACT

Studies of urban social differentiation have primarily adopted either a "structuralist", macro-approach or a "behaviouralist" micro-approach to the delineation of sub-areas. In the former the objective is the spatial disaggregation of the city on the basis of the characteristics of the entire population, while the behaviouralist approach attempts an identification of sub-areas on the basis of common patterns of individual behaviour, attitudes and/or perceptions. This thesis consists of a structuralist analysis of the social differentiation of the city of St. John's, Newfoundland, and an examination of the relationship between the dimensions of differentiation so derived and one aspect of social behaviour, informal social visiting. As such it is a partial test of the assumption that structurally defined spatial units are also behavioural units, and of the degree to which locale is of importance to the social visiting behaviour of the populations of different sub-areas.

Description of the social differentiation of St. John's is accomplished by an R-mode principal components analysis of thirty-nine census variables at the enumeration area scale. Despite this use of small area data the three classical dimensions of differentiation (socio-economic status, family status and segregation) emerge, with segregation based on religious differentiation. Other components extracted reflect participation in the labour

force and housing.

Data on social visiting behaviour were gathered by a questionnaire survey of a sample of residents of twelve selected enumeration areas. Analysis of the patterns of social visiting reveals geographic distance to be a strong constraint on informal social interaction, even when the effects of variations in the distributions of potential contacts and the non-independence of geographic and social distance measures are minimized. Evaluation of the effects of social (factorial) distance is concentrated on the three main components extracted. Socio-economic and religious status differentiation are found to be significant constraints on social visiting. However, in the case of both geographic and social distance, it is found that there are systematic differences between their effects on the visiting behaviour of populations according to their social (factorial) characteristics.

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A. Introduction

Studies of urban social differentiation have primarily adopted either a "structuralist", macro approach, or a "behaviouralist", micro approach to the delineation of sub-areas. In the former the objective is the spatial disaggregation of the city on the basis of characteristics of the entire population, while the behaviouralist approach attempts an identification of sub-areas on the basis of the common patterns of behaviour, attitudes and/or perceptions of individuals. Thus, in structuralist studies cities have been classified into sub-areas on the basis of a wide range of attributes, such as social class, income, occupation, ethnicity, religion and language. Since, as Timms has noted, "almost any criterion which can be used for differentiating between individuals and groups may become the basis for their physical separation" (Timms, 1971, p. 3), all such aspects of social differentiation may have a spatial component. With the realization that there are spatial consistencies in the distributions of different characteristics, research has been increasingly concerned with the identification of variables, sets of variables or constructs describing these consistencies.

In contrast, the behavioural analysis concentrates on the sub-city scale in order to delimit areas of functional unity in terms of common behavioural traits. This approach has been criticized by those who argue that locale is no longer important to most urban residents and that the concept of community, which links behaviour with locale to form a functional unit, is accordingly obsolete except in the case of certain relict areas. For instance, Webber has argued that increased rates of mobility have reduced the importance of geographic distance as a factor constraining social behaviour, and that this has made locale largely irrelevant to interaction. He has suggested that "we may not be far from the time when the vernacular (locale based) meaning of 'community' will be archaic and disappear from popular useage. It has already lost much of its traditional meaning for those on the leading edge of society" (Webber, 1968, p. 1099). Implicit in this statement is the idea that geographic distance is of different importance to different groups in society. These groups may, as Webber recognized, be residentially segregated.

A number of other writers have argued against the somewhat elitist position adopted by Webber. Bernard, for example, has stated that:

> "we have here the familiar replication of the old city-slicker, rural hayseed picture. On the one hand are the supermobile, wide-ranging upper echelons of industry, government and academia, who are at home everywhere, moving about from one part of the world to another in the ordinary course of their lives. And, on the other hand, are the non-mobile people in settlements set aside for children and their caretakers and for 'those adults who have not gained access to modern society' (Webber, 1968, p. 1099). It is for these 'unimportant' people that community remains important" (Bernard, 1973, p. 188).

Furthermore, Palm (1973, p. 341) has suggested that there is an increasing awareness of the importance of communities as the basic units of the urban political structure, and Harvey has argued that in the "post-city age" there has not been a decline in place-based reciprocal relationships but, rather, that new forms have evolved. In particular "'neighbourly behaviour' has been redefined ... it has become particularly significant as a mode of behaviour which is resurrected by communities under threat" (Harvey, 1973, p. 282). Such threats may include highway clearance, polluting land-uses, ghetto expansion, urban renewal and the activities of real estate speculators. However, "neighbourly behaviour" is not solely engendered by specific threats to an area, but may also result from the changing aspirations of its population.

Thus, the significance of behaviourally defined sub-areas within any city will vary over both time and

space in response to changes in the particular problems of different areas and the aspirations and other characteristics of their populations. This latter cause of inter-area differences suggests that the behaviouralist and the structuralist approaches to urban social differentiation are not independent. Indeed, it is often implied that areas delimited by structuralist analyses, and especially in social area and factor ecological studies, are in some ways communities (see, for instance, Murdie, 1969, p. 168 and Rees, 1970, p. 379). Conversely there have been attempts such as the Burgess model, to describe the city in terms of an aggregation of communities previously defined at the micro-scale. However, few studies have formally combined the two approaches.

This thesis consists of a structuralist analysis of the social differentiation of St. John's, Newfoundland, which summarizes the variability of social areas for a behavioural study of social visiting patterns. As such it is a partial test of the assumption that structurally defined spatial units are also behavioural units, and of the degree to which locale is of importance to the populations of different sub-areas. While a wide range of behavioural characteristics could possibly have been studied,

social visiting was chosen as being of particular relevance to the establishment of locale-based normative behaviour, as has been demonstrated with respect to voting patterns (Tingsten, 1937; Putnam, 1966 and Foldare, 1968) and educational attitudes (Robson, 1969). Such contact appears to be "not only the most influential form of interaction, but also ... an essential aspect of the human socialization process" (Timms, 1971, p. 35).

In the rest of this chapter there is, firstly, a description of the development and basic characteristics of the technique of structural analysis used in this thesis, factor ecological analysis. Secondly, there is a review of a number of studies which have considered the behavioural characteristics of urban sub-areas.

B. The Development of Multivariate Structural Analyses

1. Classical Urban Ecology

The human ecological approach to the study of the city was developed by the members of the "Chicago School" and was the first serious attempt to formalize information about cities. In The City: Suggestions for the Investigation of Human Behaviour of the Urban Community R.E. Park suggested that "there are forces within the limits of the human community - within the

limits of any natural area of human habitation - which tend to bring about an orderly and typical grouping of its population" (Park, 1952, p. 14). The urban community was defined, somewhat vaguely, as a "spatial pattern and a moral order" (Park, 1926, p. 3), the former supposedly providing index values of the latter. The focus of urban ecological research, however, was the study of social relationships, and the concept of community they provided. "It is because social relations are so frequently and so inevitable correlated with spatial relations; because physical distances are, or seem to be, the index of social distances, that statistics have any significance at all" (Park, 1926, p. 3). Hence the importance of a spatial unit, the "natural area", as the basic unit of ecological research as practised by the followers of the "Chicago School".

There has always been considerable confusion over the use of the term "natural area". For some researchers the natural area was "a spatial unit limited by natural boundaries enclosing a homogeneous population with a characteristic moral order"; others emphasized "its biotic and community aspects as a spatial unit inhabited by a population united on the basis of symbiotic relationships" (Hatt, 1961, p. 104). These areas were seen as being either a framework for the operation of, or the products of, the basic ecological forces of

competition, invasion and succession, and dominance. Rees (1972) has drawn a parallel between this conflict over the nature of the natural area and that over the geographical concept of the natural region. Just as many geographers came to view the natural region as a concrete object, many urban ecologists "deified" the natural area, regarding it as a real entity.

This lack of clarity as to the characteristics of the natural area is reflected in the criteria used in the delimitation of the seventy five "community areas" used in the study of Chicago. These criteria were originally drawn up on the basis of several considerations, including settlement history, local identification, trade area boundaries, membership of institutions and natural and man-made physical boundaries. Such areas proved useful for the description of the processes of residential differentiation in the city (Burgess, 1924) and for the study of certain types of individuals and social groups by relating behaviour to environmental setting (Anderson, 1923; Thrasher, 1927; Shaw et al, 1929; Cressey, 1932). However, it is generally agreed today that community areas are now little more than a useful summary device for reporting census and local statistics.

Thus classical urban ecology postulated the existence of natural areas which reflect the spatial patterns of a variety of social groups (e.g. ethnic, income and deviant groups). Later work attempted to identify those dimensions of social differentiation which are of general significance to the areal differentiation of the entire urban population. In this development emphasis was placed not on the ecological interactions of pre-ordained social groups but rather on the underlying dimensions of the ecological differentiation of the entire city. The most concerted and influential attempt to provide such a theoretical framework for the description of social differentiation was the social area typology developed by Shevky, Williams and Bell.

2. Social Area Analysis

In an attempt to reduce to manageable proportions the mass of data provided by the 1940 and 1950 U.S. Censuses Shevky, Williams and Bell sought to classify Census Tracts into social areas. These areas are "not bounded by the geographical frame of reference as is the natural area" (Shevky and Bell, 1955, p. 233) in that they are arbitrary subdivisions

of a three dimensional space defined by social indices.[1] However, their relevance to the description and analysis of urban residential differentiation is seen in the stated purposes of the classification:

(i) to provide a classificatory system which is scale flexible, in that it can use census tracts, cities, regions or countries as its unit of analysis;

(ii) to delineate socially homogeneous sub-areas within the city;

(iii) to allow comparative studies between different cities at one point in time;

(iv) to allow comparative studies of a city at two or more points in time;

(v) to provide a framework for the execution of other types of research, particularly through provision of a sampling framework "for studying the attitudes and

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[1] The social area concept, as originally formulated, thus appears to have no specifically geographic dimension, although Shevky is not clear on this point (see Hawley and Duncan, 1957), and subsequent useage by Rees and others refers to it as a geographic unit. It is to make clear this differentiation that the term "sociographic area" is used in this thesis to describe the basic units of the structuralist analysis, contiguous urban sub-areas delimited on the basis of the socio-economic characteristics of their populations.

behaviours of individuals living in various types of neighbourhoods in the city" (Shevky and Bell, 1955, p. 234).

Shevky and Williams claimed that their typology was based on a number of broad postulates as to the nature of social change (see Figure 1.1). They suggested that any given social system could be described in terms of three basic constructs derived from these postulates. These constructs were labelled social rank (or economic status), urbanization (family status) and segregation (ethnic status).[1] This theoretical structure was operationalized by the use of three indices made up of census variables, and census tracts were classified into social areas on the basis of their index scores. The original schema saw the two main constructs, economic and family status, each sub-divided into three categories so that each tract could be allocated to one of nine social areas on the basis of its index values. A revised methodology divided both of the main constructs into four categories, and the ethnic status index was then used to further sub-divide the sixteen social areas so generated into those with lower and higher than average proportions of minority groups.

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[1] The first terms given are those of Shevky while those in parentheses are those adopted by Bell. To prevent confusion I have chosen to use Bell's terminology in this thesis.

Figure 1.1

Steps in the Formulation of the Social Area Analysis Constructs and Indices

Postulates concerning industrial society (aspects of increasing scale) (1)	Statistics of trends (2)	Changes in the structure of a given social system (3)	Constructs (4)	Sample statistics (related to the constructs) (5)	Derived measures (from col. 5) (6)	
Change in the range and intensity of relations →	Changing distribution of skills: lessening importance of manual productive operations – growing importance of clerical, supervisory management operations →	Changes in the arrangement of occupations based on function →	Social rank (economic status) →	Years of schooling Employment status Class of worker Major occupation group Value of home Rent by dwelling unit Persons per room Plumbing and repair Heating and re-frigeration →	Occupation Schooling Rent	Index I
Differentiation of function →	Changing structure of productive activity: lessening importance of primary production – growing importance of relations centered in cities – lessening importance of the household as economic unit →	Changes in the ways of living – movement of women into urban occupations – spread of alternative family patterns →	Urbanization (family status) →	Age and sex Owner or tenant House structure Persons in household →	Fertility Women at work Single-family dwelling units	Index II
Complexity of organization →	Changing composition of population: increasing movement – alterations in age, sex distribution, increasing diversity →	Redistribution in space – changes in the proportion of supporting and dependent population – isolation and segregation of groups →	Segregation (ethnic status) →	Race and nativity Country of birth Citizenship →	Racial and national groups in relative isolation	Index III

Source: Shevky and Bell (1955) p. 4

Shevky and Williams' explanation of the theoretical rationale of the social area typology has been criticized as "an ex post facto rationalization of their choice of indices" (Hawley and Duncan, 1957, p. 339), while the method of dimensioning the selected census variables has been criticized for empirical reasons (see, for instance, Robson, 1969, pp. 52-53). Despite these criticisms, the use of techniques of multivariate analysis to test the formal validity of the indices has suggested that the typology is generally applicable in well developed countries and that these indices usually account for much of the observed sociographic variation (Bell, 1955; Van Arsdol, et al, 1958; McElrath, 1962; Herbert, 1967; Timms, 1971).

3. Factor Analytic Testing of Social Area Analysis and the Development of Factor Ecological Studies

The term "factor ecology" was coined by Sweetser (1965 B) to describe those studies which apply the techniques of factor analysis to urban ecological study. As early as 1941 Hagood had suggested that factor analysis offered a suitable method for "synthesizing data on characteristics with respect to which regions are to be homogeneous" (Hagood, et al, 1941), one of the central problems of urban ecological study. However, it was not used in such a context until the late 1950's,

when it provided a suitable methodology for testing the validity of the indices used in social area analysis.

Factor analytical techniques recognize the fact that in a collection of variables each one is not of the same importance or weight as a diagnostic measure of the total variation, and that some of the variables overlap to show the same basic patterns of variation. In such a situation factor analysis suggests which are the redundant variables, and isolates the basic patterns which lie within the data. The factors derived are approximations of these basic patterns.

In the context of urban ecological study, then, the purpose of factor analysis is the reduction of a matrix of n census areas by m variables to one of n areas by r factors, where the number of significant factors, r, is less than m. In testing the validity of social area analysis m would be the "derived measures", which should load onto the r factors or indices in the manner predicted by the typology. Such testing of an a priori hypothesis regarding the factorial composition of a specific data set is known as a "direct" factor analysis.

Bell (1955) used Thurstone's centroid method in testing the validity of the social area typology. Using census data on Los Angeles and San Francisco

Bell found that the seven pre-selected variables could be factored into the hypothesized three dimensions, and that these could be rotated to approximate simple structure (albeit with strong inter-factor correlations). Van Arsdol et al (1958) studied ten U.S. cities with populations of between two and five hundred thousand. In six of them the factor structures were in accordance with the social area construct indices, and the authors came to the conclusion that "the Shevky system has high generality for the cities included in the study" (Van Arsdol et al, 1958, p. 284). Timms, in a review of a number of such tests of the typology, including some undertaken outside North America, concluded that "the social area model outlined by Shevky and Bell is valid... in the case of the most modern cities" (Timms, 1971, p. 176).

Empirical testing partly confirmed Shevky's notions and partly showed a need for modifications. In particular it suggested that it would be beneficial to include a wider range of variables descriptive of the socio-economic characteristics of census area populations, and to utilize indirect factor solutions to isolate basic patterns of variation in the data. This represented an attempt to avoid the weaknesses inherent in the selection of variables on the basis of a classification scheme

of questionable theoretical validity. Studies utilizing such indirect factor analyses of expanded variable lists have concentrated on two main objectives: the identification and description of the basic dimensions of social differentiation and the description of the spatial patterns of such variation.

4. Factorial Dimensions of Urban Social Differentiation

In factor ecological studies of North American, European and Australasian cities[1] three dimensions in the spatial variation of social, economic and demographic characteristics have commonly emerged. As might be expected, these approximate the three "structural reflections of change" of social area analysis.[2] A factor identified by socio-economic variables (closely related to the economic status construct of social area analysis) is almost universal, having high correlations with indicants relating to occupation, income, and educational attainment. The links between such measures are usually strong, and this factor normally accounts for a major proportion of the variation in the inter-variable correlation matrix. It is not uncommon for

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[1] For a discussion of the differences encountered in the study of Third World cities see Abu-Lughod (1969).

[2] However, Palm and Caruso (1972) have shown that the expectation that this will be the case may often lead to erroneous labelling, and that factors in different studies which are given the same label may exhibit strong differences in their structures.

additional variables to load on this dimension in the case of particular cities. Palm and Caruso (1972) have suggested that the occurrence of such additional variables is dependent upon the available housing stock, characteristic modes of transportation, housing tenure and ethnic structure.

The second dimension normally extracted is largely related to differences in the demographic characteristics of areas. It is commonly entitled "stage in the life cycle" or "urbanization". Variables used to identify it are typically demographic, relating to age structure, fertility and marital status, and it clearly approximates the family status dimension of Shevky's typology. However, it displays greater inter-city variation than the socio-economic factor. Palm and Caroso conclude from a consideration of ten U.S. cities that "it appears to be a product of several different structural processes, and thus has a variety of attributes" (Palm and Caruso, 1972, p. 132). Timms (1971, p. 59) has suggested that it may be a demographic factor which generalizes the influence of a number of sub-factors relating to specific age groups and which only emerge with the addition of a wider range of demographic and related variables.

The third dimension (or set of dimensions) occurring with regularity relates to ethnic status, although in this context Shevky's "segregation" label is often more apt, for its role in differentiating the urban population depends on the degree of segregation in terms of both ethnicity and religion. Thus, while no such factor emerges in Scandinavian studies, Rees (1970) identifies "Immigrant and Catholic", "Jewish and Russian", "Irish and Swedes", "Other non-white and Italian" and "Race and resources" factors in Chicago. Similarly Sweetser (1965A) reports three distinct ethnic groups in Boston: "non-white ethnic", "Italian ethnic" and "Irish middle class."

Factor ecological studies have also identified a number of dimensions specific to individual cities. Many of these, such as the "traditional commercial communities" of Berry and Rees' study of Calcutta (1969), occur in cities of the Third World, and appear to be culture-specific and likely to disappear with increasing westernization. Other factors occurring with some regularity relate to residential mobility (Pedersen, 1967; Janson, 1968), recent population growth (Sweetser, 1965B; Pedersen, 1967), and housing. The last of these sometimes reflects housing type and tenure variations within the private sector (Bourne and Barber, 1971),

while in British and New Zealand studies it often identifies areas of public housing (Robson, 1969; Norman, 1969 and Johnston, 1973). The emergence of such dimensions is clearly even more dependent on the original variable selection than is the case for the more universal factors.

5. Spatial Patterns of Urban Social Differentiation

Both social area analyses and factor ecological studies have been used to evaluate the three classical models of urban growth and structure, namely the concentric ring model of urban growth of Burgess (1961), the sectoral model of residential rental areas of Hoyt (1939) and the multiple nuclei model of Harris and Ullman (1945). Despite the differences in their objectives, these models have traditionally been considered as competing interpretations. Clearly their differences can only be reconciled by considering them as models of different aspects of residential location. It is now generally thought that they are "independent, additive contributors to the socio-economic structuring of city neighborhoods" (Berry, 1965, p. 115) and that they relate to the three dimensions of sociographic differentiation posited by the social area typology and frequently confirmed by urban ecological studies.

Studies of the zonal and sectoral variation in the dimensions of social area analysis have normally shown economic status to vary by sector, and family status to vary by zone, although the latter may also be sectoral. Anderson and Egeland (1961) found economic status sectoral and family status concentric in three out of the four U.S. cities examined. In the fourth, family status was both sectoral and zonal, with the former predominant. A factor ecological study of eleven Canadian cities by Schwirian and Matre (1974) found economic status to be significantly sectoral in six cities, and both sectoral and zonal in one, while family status was solely zonal in five and sectoral and zonal in four. Other such examinations of the dimensions of both social area analyses and factor ecologies have confirmed these tendencies. It has been suggested that variations which occur result from differences in urban morphology and city size (Rees, 1970), levels of industrialization (Murdie, 1971) and topography.

Just as the social area constructs may be combined to form social areas, so may the dimension derived from factorial ecologies, which may then be mapped as areally distinct sociographic areas. The grouping of tracts has normally been accomplished using a social

space format similar to that used in social area analysis sensu stricto. Rees (1970) has achieved the same ends by using a grouping algorithm. This classifies tracts through a distance minimization function, rather than through the use of arbitrarily placed divisions which may bisect natural groupings of similar tracts.

C. The Behavioural Characteristics of Sociographic Areas

As has been seen, the concept of community formed the focus of the work of the "Chicago School". Furthermore, there is implicit within urban geographical studies using social area or factor analyses, the idea that the areas so derived are also, in some ways, functionally defined areas or "communities". There are many definitional problems associated with the concept of community, but it is clearly "characterized by similar socio-economic characteristics, common patterns of movement and association, and commonly perceived boundaries" (Murdie, 1969, p. 169). By way of the rationale and logic of their formulation the areas delimited by social area and factor ecological studies have "similar socio-economic characteristics."[1] It is often further implied that urban sociographic differentiation reflects behavioural differentiation, in that the residents of sociographic areas have both common patterns

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[1] For, as Rees (1972) has shown, they are simple classificatory schemata.

of movement and association and common perceptions. Beshers, in a study of the relevance of census area data to urban sociology, listed four main corollaries to the hypothesis that "the pattern of social characteristics of residential areas which persists over time... functions as a behavioural determinant"[1] (Beshers, 1957, p. 21). These may be reformulated and expanded to provide five corollaries of this hypothesis, and then the degree to which each is supported by past research can be considered. These corollaries are

(i) That statistically defined geographic differentiation is psychologically real; residential areas are referred to and thought of as real units by urban residents.

(ii) That urban residents organize some aspects of their behaviour as a consequence of their perceptions of these areas.

(iii) That the spatial aspect of urban social differentiation is a constraint on social interaction.

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[1] The term "determinant" should not, of course, be taken to imply a direct causality. For a discussion of this point see Bernard (1973) p. 98.

(iv) That the social aspect of urban social differentiation is a constraint on social interaction. (This reflects the fact that not only will interaction decrease with increased geographic distance, but with increased social distance. In this context social distance may be considered to be measured on any or all of the economic status, family status and ethnic status/segregation dimensions of social area and factor ecological analyses).

(v) That the populations of areas differing in terms of their positions in social space exhibit different behavioural characteristics.

Corollary (i) has since been supported by a number of studies. Boal (1971), in a study of two Belfast census districts of contrasting socio-economic rank, and Ross (1962) in a study of the Beacon Hill area of Boston, found consistency in both the naming and delimiting of areas. Between sixty seven and seventy three percent of those interviewed in the different cities identified the area within which they lived by the same names, while the percentage agreement on boundaries averaged eighty three and forty three percent for the Belfast areas and seventy-three percent in Boston. The lowest figure recorded for any one boundary was thirty eight percent, the highest ninety eight percent.

There would appear to be two independent causes of variations in the naming of areas. First, those persons living on the fringe of an area were shown to be more likely to use a different name. Second, people conceiving of themselves as upper and middle-class tended to choose one name while people of the lower classes preferred another, reflecting the societal status ascriptions of the different names. There was no spatial component in this second element. The failure of a number of studies to identify local communities in terms of respondents' naming and bounding of an area in which they live[1] may reflect these two elements, real differences between the populations of areas or methodological weaknesses. Among the last of these Ross includes the use of the ambiguous term "neighbourhood", and the incorporation of questions on the naming and delimiting of areas in a questionnaire which seeks information on an area which it has previously defined.

With regard to the Belfast and Boston studies, variations in agreement as to the boundaries appeared

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[1] e.g. McKenzie, 1923; Reimer, 1951; Block, 1952; Foley, 1952; Smith et al; 1954; Lee, 1964.

to reflect the degree to which there were obvious physical and socio-economic contrasts between the areas. Thus Boal states of one of his areas that "the perceptual data suggests that Taughmonagh is a self-conscious low status island in a sea of high-status housing" (Boal, 1971, p. 245).

Myers' (1950) research on the part played by residential areas in the social mobility of Italians in New Haven is relevant to both corollaries (i) and (ii). Both he and Ross found that residents perceived the relative social status (in terms of class and ethnicity) of different areas of their cities. Some of the New Haven Italian population also used this information to "improve" their social positions.[1] Indeed it is clear that many people attach great importance to having a good address. Zorbaugh describes this social register aspect of urban residential differentiation:

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[1] In terms of Villéneuve's conceptualization of urban ethnic acculturation this may be considered the substitution of socio-economic status rewards for ethnic identity awards through residential change (Villeneuve, 1973, p. 847).

> "'unless you have a sound social position do not live north of North Avenue or west of North State Street, and be careful in your choice of blocks. If you must live at a hotel live at ... A disapproved neighbourhood or hotel goes to prove that you are undesirable... the exigencies of the social game demand that 'society' lives in certain neighborhoods'" (p. 57-62, quoted in Timms, 1971, p. 39).

Conversely Myers found that upwardly mobile New Haven Italians who moved were often rejected by the other residents of the area they had left, even when they wished to maintain links.

That geographic distance is a physical limitation on social interaction is shown by a number of studies of social visiting and of the pre-marital residential locations of spouses. Stutz (1973), in a study of the residents of four areas of San Diego, found distinct distance decay curves for contacts with neighbours and friends, but contact with relatives did not appear to be affected by geographic distance.[1] Timms' analysis of the friendship choices of women in an Australian suburb found that "the effects of distance on friendship interaction are marked, even though no houses are separated by more than half a mile" (Timms, 1971, p. 11).

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[1] Whilst there are certain methodological weaknesses inherent in Stutz's analysis (see Chapter four, below) these do not undermine the fact that he found that there were distinct curves for different contact groups.

Other researchers have confirmed this result at the city, suburb, block and even apartment building scale (Festinger et al, 1950; Caplow and Forman, 1950; Mogey, 1956; Whyte, 1960; Herbert and Rodgers, 1967; Western, 1973). Similarly a number of researchers have shown that there is a clear tendency for betrothal of people living in cloase proximity, despite the fact that the number of potential spouses increases with distance (Bossard, 1932; Katz and Hill, 1958; Ramsøy, 1966; Küchemann et al, 1974 A and B).

Cox (1969) has suggested that such social contact distance decays occur because:

(i) the probability of contact is affected by the "localization of many social activities, which in turn derives from a desire to minimize energy expenditure";

(ii) "quite independently of distance minimiation goals, an individual is likely ... for purely geometrical reasons ... to interact with a greater proportion of the population in his immediate neighbourhood than with those further away" (p. 150), and

(iii) the relative locations of the participants in an established relationship influences the likely rewards or costs associated with that relationship, and hence the likelihood of its being maintained.

That geographic propinquity is not, in itself, sufficient to generate interaction, is demonstrated by Boal's studies of Belfast (1969 and 1971). In the study of Taughmonagh and Upper Malone, two adjacent areas of contrasting socio-economic status, he found high social interaction within them but practically no interaction between them. The residents of the two areas are from different origins both within and outside the city, attend different churches even when of the same denomination and send their children to different schools. Despite their proximity "there is practically no social visiting, in a spatial sense, across the socio-economic divide either locally or at the scale of the urban area" (Boal, 1971, p. 241). A second study of two adjacent areas, similar in socio-economic terms but with differing religious affiliation, revealed the same types of separation between activity patterns (Boal, 1969). However, given that the boundary between the two areas is the now infamous Falls Road this may be considered an extreme example.

These studies only show, of course, that there is little interaction between populations different in terms of some types of social ranking. They do not show that there is a progressive decline in interaction with

increased social distance between areas. However, studies of the interaction of individuals strongly suggest that this is the case (e.g. Boalt and Janson, 1957 and Küchemann et al, 1974 A and B).

With regard to corollary (v), a wide range of studies has shown that populations differing in their positions in social space (usually measured in terms of the Shevky constructs) exhibit different behavioural characteristics. They include studies of social visiting (Greer, 1956; Greer and Kube, 1959; Boal, 1971), friendliness (Timms, 1971), sociability (Timms, 1971), attitudes toward personal relationships (Bell and Force, 1956; Bell and Boat, 1957; Bell, 1957), participation in clubs and organizations (Bell and Force, 1956; Bell and Boat, 1957; Bell, 1957; Greer and Kube, 1959), attendance at cultural events (Greer, 1956), church attendance (Greer and Kube, 1959), mutual aid (Timms, 1971), crime (Schmid, 1960 A and B), anomie (Bell and Force, 1956; Bell and Boat, 1957; Bell, 1957), delinquency (Polk, 1967), voting (Cox, 1968), newspaper readership (Boal, 1971)[1] and attitudes toward education (Robson, 1969).

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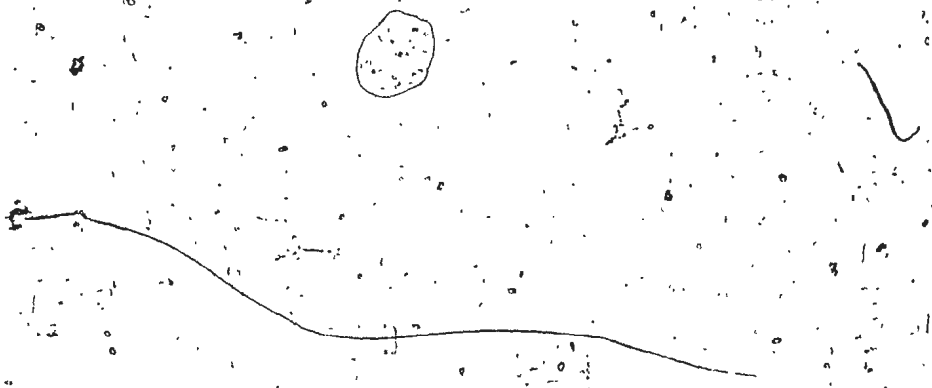
[1] However Palm (1973), in a study of periodical readership, does not find a "community of outlook".

The original hypothesis of Beshers was that the pattern of social characteristics of residential areas which persists over time functions as a behavioural determinant. The past research reviewed here largely confirms the five corollaries and hence the hypothesis itself. They seem to support Bell's statement that:

> "the social character of local areas within a city, as defined by economic, family and ethnic characteristics, is an important predictor of individual attitudes and behaviours, subcultural patterns and social organization. It is crucial in determining the extent to which a local area in the city can be considered a community in the sense of having flows of communication, interaction, community identification and social integration among its residents" (Bell, 1959, p. 80).

However, most of these studies have looked at a single, or a few contrasting areas. An exception is Robson's study of educational attitudes (1969), which used seven areas each of which was similar in terms of the dimensions of a factor analysis. This study shows the populations of these areas to have different attitudes, but, as is the case with the other research cited, there is no systematic study of the relationship between measures of sociographic differentiation and variations in attitudes, perceptions or behaviour. In this thesis an attempt is made to analyze the effects of sociographic differentiation on informal social

visiting. This is an aspect of behaviour which, as has been seen, is of particular relevance to the study of urban sub-areal differentiation.



II. RESEARCH OBJECTIVES AND DATA COLLECTION

A. Research Objectives

Methodologically, this thesis consists of a factor ecological analysis of St. John's, Newfoundland, and an analysis of social visiting behaviour in the city. In the factor ecological study of St. John's it is hypothesized that:

(1) a factor ecological analysis of St. John's census data will reveal a number of major dimensions of urban differentiation, and that three of these will reflect the commonly occurring dimensions of socio-economic status, family status and segregation. In the last case prior knowledge of St. John's leads to the expectation that segregation will be according to religious affiliation.

The second part of the thesis is a systematic study of the effects of both the spatial and social aspects of urban social differentiation on informal visiting behaviour. An attempt is made to understand how certain, areally defined populations behave, and in particular how their social behaviour is likely to be affected by spatial and social isolation from other populations. Finally, this thesis provides a partial test of the assumption that the units defined by urban ecological analysis are also behavioural units. These objectives are achieved by investigating a further three hypotheses; that

(2) social visiting between areas declines with increased geographic distance,

(3) social visiting between areas declines with increased social distance (as measured in terms of the dimensions emerging from the factor ecological analysis), and

(4) there are systematic differences in the social visiting behaviour of the populations of areas according to their social characteristics (as measured in terms of the dimensions emerging from the factor ecological analysis).

B. Data and Methodology

Data on the informal social visiting patterns of St. John's were gathered by a questionnaire survey of twelve of the one hundred and thirty-three enumeration areas of the city, while the factor ecological analysis utilized enumeration area scale data on thirty-nine census variables.

1. The Questionnaire Survey

a. Sampling Design. The sample areas for the questionnaire survey were selected by a modified stratified random sampling method. Given the nature of the research it was clearly desirable to select areas which were widely differentiated in their positions in geographic and social (factor) space. Time constraints precluded the possibility of establishing the positions of the areas in factor space prior to questionnairing. However, past studies of urban social differentiation, including those using factor ecological methods, indicate that concentric ring and sectoral dimensions are normally present (see above, p.18)

Personal knowledge of St. John's further supported the expectation that some concentric ring and sectoral patterns would emerge.

Therefore it was considered that a choice of enumeration areas on the basis of a concentric ring and sectoral division would maximize both the geographic and social differentiation of areas. Hence the city was divided into four sectors, each containing thirty enumeration areas, thirteen other institutional land use areas having been excluded from the outset. This division of the city was achieved by moving a radial line, centred at the southeastern edge of the C.B.D., anti-clockwise from due east until thirty enumeration area centres had been crossed. These areas were included in the first, northern, sector. The line was then swung around further until another thirty centres had been crossed, and so on. The decision to commence this process with the line extending due east permitted division of the city, which is of generally semi-circular form, into four contiguous sectors. Within each sector the ten enumeration areas nearest to the centre point were included in the inner zone, the next ten in the middle zone and the balance in the outer zone.

From each of the twelve divisions thus created a single enumeration area was selected at random. However, the selected area was rejected and another substituted if:

ENUMERATION AREAS, ST. JOHN'S, 1971

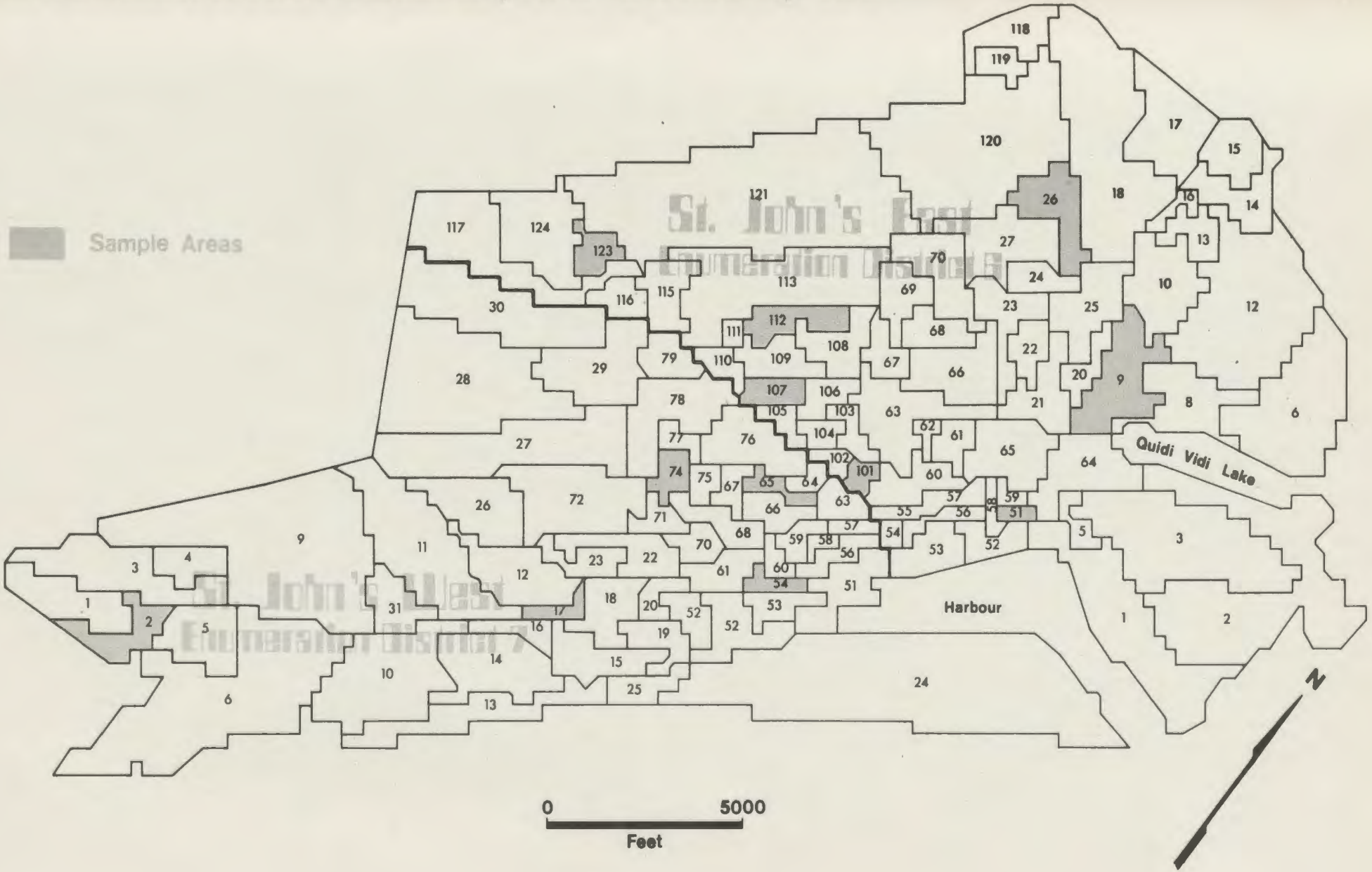


Figure 2.1

(a) it was adjacent to an enumeration area chosen for a previous zone (the intention again being to reduce the likelihood of selecting areas similar with respect to geographic, and hence, likely, social, space), or

(b) it was judged that there had been major changes in the area between the date of the census (April 1, 1971) and the survey period (Summer and Fall of 1972). In the two cases where this occurred the changes consisted of large amounts of new residential construction in suburban enumeration areas.

From each of the twelve enumeration areas thus selected fifty people were chosen at random from the 1971 Official List of Electors. The use of this list, compiled between February and April 1971, had the effect of increasing the likelihood that those questioned were resident in the area at the time of the census, and thus further minimized the effect of the time lag between the census and questionnairing. However, it also excluded those who were ineligible for inclusion on the list (persons under nineteen years of age, of other than Canadian or British citizenship, recently moved to the province and the insane) and those not registered due to error.

The exclusion of those ineligible for the electoral list was not considered a major problem. The social visiting patterns of children and adolescents have been studied and appear to be very different from those of adults, most notably in terms of mode of transport used

(Mann, 1965). To include them in the present study would add further, unwarranted, complexity. Persons of other than Canadian or British citizenship, and those not resident in Newfoundland in the previous six months, represent an insignificant proportion of the population.[1] Similarly, under-enumeration of the electoral list is likely to have been small, and there is no reason to believe that those not enumerated differ significantly from the rest of the population.

A further problem was the exclusion from the sample of people moving into or out of the area during the eighteen month lag between the compilation of the electoral list and the survey period. The 1971 census reveals that 16.3 percent of the population had been occupying their dwellings for less than one year and 31.9 percent had been there for less than three years. However, these figures do not simply represent the frequency of movement to new residences in that they also reflect the rate of new household formation and immigration into the city. While such groups may be of substantial size (there was a 37.4 percent increase in the number of households between 1966 and 1971) they will not necessarily continue to change residence frequently.

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[1] The total in-migration to Newfoundland during 1970-71 was 9094 (Government of Newfoundland, 1970) and many of these are likely to have gone to major project sites outside St. John's.

However, the sample may still underrepresent the number of residentially highly mobile individuals. There is no doubt that the residentially mobile differ from the rest of the population; in general they have more education, greater income and higher status jobs (see, for instance, Jansen, 1969). However, the effects of any bias within the sample caused by these factors, already small because such people represent only a small proportion of the total population, are likely further minimized by two factors. Firstly, the spatial basis of the sample selection helps ensure a true representation of the population, and secondly, the characteristics of the highly mobile are also those of people who are considered to be more likely to respond to questionnaires (Moser and Kalton, 1971, p. 263).

b. The Questionnaire and Its Implementation. Each of the fifty persons selected for each sample area received by mail a questionnaire[1] covering letter and return paid envelope. Of structured form, the questionnaire sought to discover certain information about the respondent (his or her address, length of residency at that address and, if less than ten years, previous addresses) and the four most

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[1] See Appendix One

frequently met social contacts (their addresses, length of residency there, nature of the relationship, frequency and place of contacts, and mode of transport used). In the preparation of the questionnaire extreme care was taken with vocabulary, syntax and structure, so as to minimize vagueness and maximize uniformity and volume of response.

In this regard special efforts were made to give an unambiguous definition of a "social contact". Hence it was stated that

> "we only want to know about those people you meet socially; we are not interested in people you work with unless you also meet them outside work hours. Include any relatives that you meet socially (but not, of course, those with whom you live)." (See Appendix One)

Each person receiving the questionnaire was given the option of returning the questionnaire by mail or having it collected by "the Survey interviewer." This strategy thus provided for a follow-up on the original mailing, and these personal visits gave valuable insights into the social structure of the sampled areas.

Such a personal follow-up had the additional advantage of allowing the identification of ambiguity within the questionnaire[1] or differences in interpretation between

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[1]The only problem encountered was in question five, where the most common response to the question on the place of contact was neither 'your home' nor 'his/her home' but both. Most respondents checked both answers or otherwise indicated reciprocal visiting.

the enumeration areas. However, there is also some evidence in the literature that responses in questionaires filled out by, or in the presence of, the interviewer are somewhat less considered and hence less accurate (See Moser and Kalton, 1971, p. 258).

Of the six hundred questionnaires mailed out, one hundred and eleven (18.5 percent) were returned as "not known at this address", "moved" or "deceased". Approximately seventy-five responses were received by mail. Attempts were made (to a maximum of three) to call on all other recipients; a further visit was made only if requested by the respondent. In many cases the questionnaire had been completed but not posted; in other cases the interviewer helped fill it in, or, if this was not convenient, requested that this be done promptly. People visited were, with few exceptions, both co-operative and hospitable. However it was frequently difficult to contact the potential respondent.

In total, one hundred and sixty four questionnaires were collected, a return of 27.3 percent, which were evenly distributed according to sample areas and number of contacts (Table 2.1). With respect to the request for information about four social contacts, partially completed questionnaires and the exclusion of friends living outside St. John's reduced the total number of contacts for which data was collected to 488 (an average of 2.98 per questionnaire).

TABLE 2.1

Questionnaire Returns

Enumeration Area	Number of respondents	Number of contacts
6-009	12	41
6-026	12	44
6-051	12	43
6-101	13	44
6-107	11	34
6-112	15	54
6-123	11	35
7-002	12	34
7-017	11	36
7-054	12	48
7-065	12	39
7-074	11	36
	164	488

2. The Factorial Ecology of St. John's

a. The Study Area. St. John's is the primate city and provincial capital of the Province of Newfoundland. The metropolitan area had a 1971 population of 131,810 (25.2 percent of the provincial total) while the central city, the subject of this study, contained 88,100 people. Corner Brook, the second city, had a population of 26,309. With regard to both employment and ethnicity it is one of the more homogeneous cities in Canada. It is primarily a service and administrative centre, with a relatively small proportion of the work force engaged in primary and secondary activity (see Table 2.2). The largest employers are the provincial and federal governments and educational institutions.

With respect to ethnicity the city has experienced little international immigration this century, and relatively little national immigration since confederation with Canada in 1949. As a consequence 95.4 percent of the 1971 population are of British stock, and for 98.7 percent the mother tongue is English. This contrasts strongly with the degree of ethnic and linguistic heterogeneity of many other Canadian cities of similar (Table 2.2) or larger size. However, the census term 'British' does not differentiate between Irish and English ethnic groups, the main cultural differentiating characteristic of the population, although this division is reflected in the census data on religion, with 49.4 percent of the population Roman Catholic, 21.7

TABLE 2.2

Urbanized cores of C.M.A.'s with populations less than 150,000, 1971. Selected characteristics.

	A	B	C	D	E	F	G
St. John's	15.8	94.9	1.2	98.0	0.3	41.3	4.0
Chicoutimi	31.2	94.5	3.9	97.3	2.7	44.3	4.2
Regina	16.9	46.8	21.6	82.0	7.9	39.2	3.6
Saskatoon	16.9	46.0	17.5	79.4	6.3	38.9	3.8
Saint John	23.9	79.1	13.5	90.1	7.7	39.2	3.7
St. Catherines-Niagara	41.2	57.4	8.3	78.5	5.0	38.0	3.5
Sudbury	50.6	37.9	31.9	56.4	26.6	40.0	3.7
Thunder Bay	26.5	43.5	10.2	74.1	5.6	37.8	3.6

Key:

A = % employed in primary and secondary industry
B = % in primary ethnic group
C = % in secondary ethnic
D = % in primary linguistic group
E = % in secondary linguistic group
F = % aged 19 years or less
G = average number of persons per family

Source: Census of Canada, 1971

percent Anglican and 20.1 percent United Church. The balance are mostly Salvation Army or Pentecostal.

Like the province that it dominates, St. John's has a high fertility rate and both large proportions of young people and large average family size (see Table 2.2). Since 1945, the city has experienced rapid population growth through both natural increase and in-migration, largely from rural areas of the province. During the period 1961 to 1971 the population of the city increased by 38.5 percent, compared to an average figure for Canadian cities of greater than 30,000 population (1961) of 31.1 percent and a provincial average of 14.0 percent. While this increase resulted in the construction of many new sub-divisions and apartment blocks, there has still been a consistent housing shortage with low vacancy rates.

Thus, while in many ways St. John's is typical of small North American cities it does have a number of distinctive characteristics which are likely to be revealed in the factor ecological study, and as such throw some light on the value of comparative studies of cities.

b. The Data. User Summary Tapes for the 1971 census provided data on population and a wide variety of other variables at the enumeration area scale. This data was used in establishing the distribution of population in the city, and in the principal components analysis used to derive measures of social distance.

c. The Scale of Analysis. The decision to use enumeration area[1] scale data was dictated by the size of St. John's in that it was felt that the alternative, the use of the sixteen census tracts of the city, provided insufficient observational units for meaningful analysis. However, this decision does raise questions as to the effect of spatial unit scale differences upon the results of factor ecological studies. In social area analysis, which formed the basis for the development of the factor ecological approach, Shevky and Bell appear to have assumed that the three hypothesized dimensions will emerge regardless of scale (See Timms, 1971, p. 176). There has been some discussion of this claim (Udry, 1964; Bell and Moskos, 1964), but in general the effect of scale differences upon social area analysis and factor ecological studies has been ignored. This is surprising, since there has been a significant difference between the unit size commonly used in North America studies, and that used in Britain and elsewhere. Rees (1972) notes that it is not clear whether

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[1] Defined as the "Spatial unit canvassed by one Census Representative. It is defined according to the following criteria: (1) Population - an EA may include as many as 300 households, depending on its location; (2) Number of farms - an Ea always includes fewer than 100 farms; (3) Limits - an EA being the building-block of all statistical areas, never cuts across any area recognized by the Census. Moreover boundaries are such that the Census Representative will be able to locate them without difficulty, e.g. streets, roads, railways, rivers and lakes." (Dictionary of 1971 Census Terms, Catalogue 12-540, Statistics Canada / Census Division, 1972).

differences in the factors emerging from such studies "are a product of fundamental differences between British and American housing markets and choice mechanisms, or at least partly a product of operational differences [including scale] in the various analyses" (p., 294).

Rees goes on to suggest that a careful comparative study is needed to identify real differences between Britain and North America. But it is still necessary to establish the degree of invariance to scale change for any particular city since, for a variety of reasons (such as those cited with regard to this study) it may be necessary to undertake research using data collected at a particular scale.

Romsa, Hoffman and Brozowski (1972) have attempted an empirical and quantitative test of scale effects consisting of a principal components analysis of thirty socio-economic census variables for Windsor, Ontario, by both tract (n = 43) and enumeration area (n = 340). The coefficient of congruence[1] was used to measure the consistency of results (see Table 2.3) and it was concluded that there was "a rather high degree of variance between the two data sets" (Romsa, et al, 1972, p. 91). This was most evident in the case of the fourth, fifth and sixth

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[1]This measure resembles the coefficient of correlation, ranging in value from 1.0 when factor loadings are identical, to 0.0 when there is no correspondence whatsoever (see Harman, 1967, p. 270)

components. With regard to these low order components it may be the case that a re-ordering would result in higher coefficients, or that the low degree of congruence reflects the lower significance of such components. Unfortunately it is not made clear whether each component in the one analysis was compared with all the components in the other, as recommended by Harman (1968, p. 271). Nor is there a statement of the criterion used in deciding the number of components to be extracted.

It is interesting to compare the results of the Windsor study with a similar analysis of data taken from Timms' The Urban Mosaic. Timms undertakes a factor analysis of ten socio-economic variables for the Auckland urban area, both by cities and boroughs (n = 21) and by their census subdivisions (n = 62). He notes "a marked similarity between the two sets of Auckland data" (Timms, 1971, p. 181). However, to check the degree of similarity and allow better comparison with the Windsor results coefficients of congruence have been calculated for the three factors on which data is provided (See Table 2.2). The high coefficients indicate that there is, indeed, a marked similarity.

In the light of the differences between these studies in terms of factorial techniques used, criteria and variables selected, and differences between the scale ratios (1:3 in Auckland; 1:8 in Windsor) it is not surprising that the evidence is inconclusive. However, should

TABLE 2.3

The degree of congruence between analyses undertaken using spatial units of different sizes.

Factors	Coefficients of congruence between factor loadings on all variables					
	Windsor	$n_1 = 43$ $n_2 = 340$	$v = 30$	Auckland	$n_1 = 21$ $n_2 = 62$	$v = 10$
1	.45			.99		
2	.74			.99		
3	.77			.95		
4	-.32					
5	.42					
6	.18					

n_1 = number of large areal units
n_2 = number of small areal units
v = number of variables in the analysis

Source: Romsa et al, 1972, p. 90, and Timms, 1971, p. 181. Calculations from latter by author.

it transpire that the results of an analysis undertaken at the one scale are equally valid at the other, the use of enumeration areas would seem preferable in that: "the greater detail which they reveal, and the greater likelihood of demarcating homogeneous areas which they invariably present, are to be preferred to the dubious virtue of stability over time" (Robson, 1969, p. 45) which is often claimed for the census tract. Yet even this supposed advantage of the tract is criticized by Timms when he states that the rationale for such a claim is "unclear, and it appears likely that it will be possible to defend the boundary of collectors districts [the Australian equivalent of the enumeration area] to greater effect than those of larger areas" (Timms, 1971, p. 43).

d. Rejected enumeration areas. For the purposes of the 1971 census St. John's was divided into one hundred and thirty three enumeration areas. However, thirteen of these areas consist solely of institutional land use involving temporary or permanent residence of a distinctive population group, and were, for this reason, excluded from the analysis. These areas included four hospitals, two homes for the elderly, two groups of university residences, an orphanage, a sanatorium, a mental institution, a penitentiary and a Holiday Inn. A further two areas were rejected because they included institutional residences (a large nurses' residence and a home for the elderly). One other area, in a new sub-division, was ex-

cluded because its 1971 population was only fifty five persons.

C. Research Format

The rest of this thesis consists of an analysis of the data thus gathered. The next chapter is a factor ecological analysis of St. John's, 1971, using thirty nine variables selected from the enumeration area census data. In Chapter Four an initial analysis of the effects of geographic and social distance on social visiting behaviour is made, with the factor scores generated by the factorial ecology being used as measures of social distance. Chapter Five is a further analysis of the degree to which the geographic and social differentiation of enumeration areas acts as a constraint on social visiting, with the effects of non-independence of geographic and social distance being minimized. There is, further, an analysis of the ways in which these constraints vary between populations defined by their factor scores. In the final chapter the research findings are synthesized and discussed in the context of the research objectives.

III. A FACTOR ECOLOGICAL STUDY: ST. JOHN'S, 1971

This chapter consists of a factor ecological study of St. John's, using a variety of variables selected from the 1971 census enumeration area data. As such it attempts to describe the nature of socio-economic differentiation in the city, and to classify its sub-areas on the basis of a limited number of dimensions. Measurements on these dimensions for different areas are used in later chapters as the basis for the analysis of urban social visiting. A brief description of factor analytical techniques, their place in urban ecological study, and of the factors commonly emerging, has already been provided (see Chapter One). In this chapter, however, it is necessary to present a more detailed outline of the basic elements of factor analytic techniques to aid explanation of certain decisions made with regard to the analysis.

A. Factor Analysis

Factor analysis consists of a range of techniques and is not a single universally accepted procedure. As such, the number of possible analyses that could be undertaken with any given data set is virtually infinite, while the selection of data also presents a number of problems in itself. Hence no attempt will be made to describe the various techniques and their associated problems and limitations in great depth. There is a considerable body of work available for those interested in these problems and the search for optimal factor solutions (See, for instance,

Lawley and Maxwell, 1962, and Harman, 1967).

Indeed, one of the major problems of urban ecological research is the tendency for researchers to adopt idiosyncratic preferences with regard to factorial procedures, as a response to either personal feelings as to the optimal type of analysis or to such pragmatic considerations as the availability of package programs. Thus, in this thesis one of the main priorities has been the utilization of procedures which permit some measure of interstudy comparability. In particular, it was decided to model much of the analysis used here on the procedures adopted by the main researcher currently engaged in factor ecological study in Canada, W.K. Davies.

This attempt to achieve some degree of comparability resulted in three initial decisions:

(i) to use a principal components solution;

(ii) not to transform the data, and

(iii) to use an R-mode analysis.

Principal components analysis has been widely used in factor ecological research, and whilst it is in some ways inferior to a common factor model, Davies and Barrow (1973, p. 331) have enumerated a number of practical and theoretical advantages. The decisions made with regard to the transformation of data and mode of analysis are best explained in the context of a brief description of the basic elements of principal components analysis. These are:

(i) Formation of an initial matrix of data on thirty-nine

variables for the 117 enumeration areas.

(ii) Computation of standard scores on each variable for each area. At this stage some researchers transform the data so as to make them more nearly approximate normal linear distributions. However, no attempt was made to transform the St. John's data for Davies has argued that transformation may complicate the interpretation of factors, that the transformations suitable for one study may prove inappropriate for another, and, at a more pragmatic level, that "factor ecologists have not given a particularly convincing demonstration of the effectiveness of transformation on the results of any analysis" (Davies and Barrow, 1973, p. 329). The main consequence of the decision to use raw data is that correlation coefficients generated will tend to underrepresent the true degree of association between pairs of variables.

(iii) From the standard score matrix a 39 by 39 Pearson Product Moment intercorrelation matrix is calculated, containing correlation coefficients between each pair of variables. Hence this is an R-mode analysis since a Q-mode solution would require the construction of a 117 by 117 inter-area correlation matrix.

(iv) The object of the analysis is the resolution of this 39 by 39 intercorrelation matrix into a number of components or factors (following Rummell, 1967), these terms are used as synonyms in this thesis) upon which the variables load to give a 39 by r factor loading matrix

where r is the number of factors extracted. The elements of this matrix are equivalent to correlations between the components and the original variables, and as such range between +1.0 and -1.0. The sum of the squared factor loadings for each variable is called that variable's communality. The communality gives the proportion of the total variance of each variable explained by the component. Similarly, the sum of the squared loadings for each component is called its eigenvalue, and dividing the eigenvalue for any component by the total number of variables and multiplying by one hundred gives the percentage of the total variance in the matrix explained by that component.

Components are extracted in descending order of variance explained and are orthogonal or essentially uncorrelated with one another. An initial component explaining as much of the total variance as possible is extracted, and a residual matrix, containing the remaining variance, is formed. A second component, orthogonal to the first and accounting for as much variance as possible in the residual matrix, is then extracted. The procedure is repeated until the total variance of the original correlation matrix is accounted for, or to a cut-off point stipulated by the researcher.

(v) A problem of the mathematical procedure used to define components is that, in attempting to maximize the amount of variance extracted, a single component may

incorporate two distinct but related clusters of variance. This results in variables loading with similar, moderate, loadings on a number of components, rather than loading more strongly on a few components. To achieve the latter, which clearly aids interpretation, factors are generally transformed by rotation. A range of different types of rotation are available, the most important differentiation being between orthogonal and oblique rotations. In orthogonal solutions the components remain uncorrelated with one another while oblique solutions allow varying degrees of component intercorrelation.

(vi) The rotated component matrix may then be used to generate a 117 x r (where r is the number of components) matrix of component scores for each area. The scores for any one component are standardized, having zero mean and unit variance.

B. Problems of Variable Selection and Factor Rotation

Given this basic outline of R-mode principal components analysis there are three main areas where decisions must be made. These involve a decision as to the number and type of variables to be analyzed, the type of rotation to be used and the number of components to be rotated.

1. Variable selection

As indicated in Chapter One, data on a wide variety of demographic, household, housing, economic and family

composition characteristics were available from the census tapes. Davies and Barrow (1973) used forty six variables, chosen from each of these groups, for their study of three Prairie cities (having shown this selection to substantially describe the variation occurring in a preliminary sixty two variable list), and it was decided to use this as the basis for the St. John's analysis. However, changes in the units of analysis and St. John's distinctive ethnic structure relative to the Prairies resulted in a number of alterations.

The income category variables used by Davies and Barrow are not available at the enumeration area scale and were replaced by average income data. However, the variety of such income variables available were strongly intercorrelated and hence only one such measure was used. Certain ethnicity and religion variables were omitted as being irrelevant to an analysis of St. John's (percentages British, French, German and Lutheran) while others of specific importance in the city were introduced (percentages Anglican and United Church). Television ownership was almost universal and was not used as a variable in the analysis; but the ownership of washers was introduced as a substitute.

This difference between the variables used here and those used by Davies and Barrow seems unlikely to result in major changes in the factor structures. A number of studies have shown there to be relative invariance

between analyses of individual cities which use variable sets of similar mix, but varying in terms of specific variables and the total number of variables (Schmid and Tagaschiva, 1966; Sweetser, 1965 A and B; Janson, 1968).

These changes resulted in a revised list of thirty nine variables (see Table 3.1) which may be classified as:

(i) demographic (8 variables)
(ii) ethnic and religious (3 variables)
(iii) education and income (6 variables)
(iv) dwelling type and facilities (7 variables)
(v) household characteristics (6 variables)
(vi) employment and income (10 variables)

Whilst an attempt was made to have variable groups of similar sizes to prevent over or under representation of one group influencing the outcome of the analysis[1], both the ethnic and religious and the education and income groups have relatively less variables for reasons made clear above.

2. Rotational type selection

The most important difference among types of rotations is between orthogonal and oblique solutions. In factor ecological research the varimax orthogonal

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[1] For examples of research where this has been the case see Davies and Lewis, 1973, p. 74.

TABLE 3.1

Variables Selected, St. John's, 1971

	Variable	Short Title
1	Percentage of the population aged 0-14 years	Children
2	Percentage of the population aged 15-24 years	Young adults
3	Percentage of the population aged 25-44 years	Mature adults
4	Percentage of the population aged 45-64 years	Middle aged
5	Percentage of the population over 64 years	Old aged
6	Percentage of the population female	Female
7	Percentage of the population female aged 15-44	Fertile women
8	Percentage of the adult population, single	Single
9	Percentage of the population born outside Canada	Born outside Canada
10	Percentage of the population of Anglican Religion	Anglican
11	Percentage of the population of Roman Catholic Religion	Roman Catholic
12	Percentage of the population of United Church Religion	United Church
13	Percentage of the adult population with no formal education	No schooling
14	Percentage of the adult population with no post secondary education	No post secondary
15	Percentage of the adult population with no University qualification	No university

16	Average Family Income	Family Income
17	Percentage of households making no inter-urban move in previous 5 years	Non mobile
18	Percentage of households with only one family	1 family household
19	Percentage of households with two or more families	2 family household
20	Percentage of households with only one person	1 person household
21	Percentage of households containing lodgers	Lodgers
22	Average number of persons per household	Persons per household
23	Average number of dwellings owner occupied	Owner occupied
24	Average number of dwellings single detached	Single detached
25	Average number of dwellings built before 1946	Pre 1946 dwellings
26	Average number of dwellings with at least one car	Car
27	Average number of dwellings with freezer	Freezer
28	Average number of dwellings with washer	Washer
29	Average number of persons per room	Persons per room
30	Percentage of adult males in the labour force	Males in labour force
31	Percentage of adult males who are wage earners	Male wage earners
32	Percentage of adult males in professional or managerial occupations	Professionals (M)

33	Percentage of adult males in clerical/service occupations	White collar (M)
34	Percentage of adult males in labouring occupations	Blue collar (M)
35	Percentage of adult males unemployed	Unemployed
36	Percentage of adult females in the labour force	Females in labour force
37	Percentage of adult females in professional or managerial occupations	Professionals (F)
38	Percentage of adult females in clerical/service occupations	White collar (F)
39	Percentage of adult females in labouring occupations	Blue collar (F)

rotational criterion has been commonly used, but has recently been criticised since, on a priori grounds, individual factors may be expected to be correlated. Indeed, Davies (1971, pp. 112-117) has suggested that the use of varimax represents an uncritical "fad", reflecting automatic use of the most commonly available rotational type.

Given acceptance of this criticism, and hence a decision to use an oblique solution, a variety of rotations are available. Davies and Barrow (1973, p. 335) examined six of these, and concluded that direct oblimin rotations with low delta values and biquartimin rotations[1] produce solutions which minimize variable complexity and thereby maximize interpretability.

They finally elected to use a direct oblimin rotation with a delta value of zero, while in a study of Leicester, Davies and Lewis (1973) used a biquartimin rotation. However, in neither of these studies were there substantive differences between the outputs resulting from use of these two different rotations. This finding is confirmed in the present case (see Table 3.2), for while a direct oblimin

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[1] For a full description of the characteristics of these rotations see Harman, 1967, pp. 314-341.

TABLE 3.2

Variable complexity: The Effect of Rotational Types on the Five Component Solutions: St. John's, 1971

Rotation	Number of Variables Having Loadings 0.3 on One to Five Components Respectively				
	1	2	3	4	5
1) Varimax	14	12	8	4	1
2) Biquartimin	17	18	4	-	-
3) Direct Oblimin (delta = 0.0)	20	12	7	-	-

solution maximizes the number of loadings greater than 0.3 on a single component, biquartimin is superior when looking at two or less components.

While neither of the two oblique solutions is clearly superior it was decided to use the direct oblimin rotation, following Davies and Barrow's study of three Canadian Prairie cities. It is relevant to note that the two sets of factor loadings produced by the different rotations revealed very little substantive difference, with the lowest coefficient of congruence between similar factors in the two solutions having a value of 0.967.

3. Number of Components Extracted

There are a number of statistical procedures and guides available to aid a decision as to the exact number of components to be extracted. Many of these relate

primarily to direct factor analysis and are inappropriate to the principal components solution used here. However, a more general point relevant to all tests is Cattell's statement that any search "for an exact mathematical solution or boundary statistical position" is pointless as the former is "chimeral" and the latter "beside the point" (Cattell, 1966, p. 248), and it is his belief that making a decision on the number of factors is essentially an art. Most researchers use a simple criterion as to the best choice, or limit themselves to the number of components that they are able to easily identify. Six of the more commonly used decision criteria are outlined below as both a guide to the appropriate number to extract in the present case and an illustration of the degree of inter-test variability.

a. Components with eigenvalues greater than 1.0: This is the most commonly used criterion, but is both arbitrary and overdependent on the number of variables being analyzed (see Cattell, 1966, p. 248). In this analysis such a cut-off level would result in an eight component solution.

b. Components explaining more than one, two or five percent of variance: While less dependent on the number of variables these are still essentially arbitrary decision rules, as evidenced by the common usage of these three different values.

A number of other tests depend upon rotation of a variety of different solutions, and comparison of their output. In this case, following Davies and Lewis (1973), the pattern of first rank loadings on solutions lying between the five and two percent variance explained cut-off points were isolated and used as the basis for the following three "rules of thumb."

c. Rank distribution: Davies and Barrow (1973) suggest that the extraction of components should stop when less than five percent of the variables have their first ranked loadings on any one component. In this case, this represents an approximate cut-off point when two or less variables have such a loading on a component, and this occurs with an eight component solution (see Table 3.3).

d. Variable complexity: The ease with which any component can be interpreted is related to the degree to which variables have important loadings on few components. In general the number of variables loading on a single component increases as more components are extracted, but this is not a simple linear relationship. Hence, Davies and Barrow (1973, p. 334) suggest a search for "break point" solutions which maximize the number of variables loading on a limited number of components. In operationalizing this requirement they select a solution which "represents one point of minimum spread over two factors", although there is no reason given for favouring such a

TABLE 3.3

Rank Distribution of Factor Loadings for four to ten component solutions: St. John's, 1971

Components:		Total	1	2	3	4	5	6	7	8	9	10
Four	1st rank loadings	39	14	6	10	9						
Components	2nd rank loadings	26	8	7	8	3						
Five	1st rank loadings	39	8	8	5	11	7					
Components	2nd rank loadings	18	5	5	2	3	3					
Six	1st rank loadings	39	7	7	5	8	6	6				
Components	2nd rank loadings	25	5	3	4	5	4	4				
Seven	1st rank loadings	39	6	6	6	5	7	6	3			
Components	2nd rank loadings	21	6	4	2	3	2	3	1			
Eight	1st rank loadings	39	9	7	8	4	3	3	2	3		
Components	2nd rank loadings	21	2	1	3	0	4	2	5	4		
Nine	1st rank loadings	39	8	6	8	2	3	3	4	3		
Components	2nd rank loadings	18	2	0	3	0	4	2	2	1		
Ten	1st rank loadings	39	7	6	6	2	5	2	5	1	1	
Components	2nd rank loadings	19	3	1	3	0	4	5	1	1	0	

decision rule over one which represents a point of minimum spread over more than a single factor. In the present case the former criterion would favour a four component solution, which is not improved upon until eight components are extracted. However, if the second criterion is used a five component solution is superior to all others, with a fifty percent increase in the number of variables loading on single components relative to a four component selection (see Table 3.4).

e. Communality tipping point: As the number of components extracted increases the communalities of the variables show a corresponding increase. Davies and Barrow use this relationship to seek communality "tipping points" where an additional component results in a disproportionate increase in communalities relative to other solutions. They use the 0.7 and 0.5 communality levels as guides (while admitting them to be arbitrary), noting the number of variables exceeding these limits for each solution. When using these criteria in the present case a seven component solution stands out (Table 3.5). However, when a second (equally arbitrary) set of indicators is used (0.8 and 0.6) the five and eight component solutions appear preferable. Indeed, if the four communality levels are considered individually each suggests that a different number of factors should be extracted.

TABLE 3.4

The Complexity of Various Solutions: St. John's, 1971

Number of loadings $\geq \pm 0.3$	Number of components extracted						
	4	5	6	7	8	9	10
1	13	20	14	18	19	21	20
2	22	12	19	12	17	15	15
3	4	7	6	8	3	3	4
4	–	–	–	–	–	–	–

TABLE 3.5

Order of Entry of Specified Communality Values: St. John's

Number of variables	4	5	6	7	8	9	10
a) with communalities							
>0.8	6	8	10	12	15	21	25
>0.7	16	19	21	26	28	30	33
>0.6	22	28	30	34	36	38	39
>0.5	29	31	35	37	39	39	39
b) Added by component with communalities							
>0.8		2	2	2	3	6	4
>0.7		3	2	5	2	2	3
>0.6		6	2	4	2	2	1
>0.5		2	4	2	2	0	0

f. Scree test: Cattell's scree test attempts an identification of the major break in the ranked distribution of the eigenvalues as a guide to the selection of "non-trivial factors" (Cattell, 1966). There would appear to be two such breaks in this case (Figure 3.1), at the five and seven component levels. Where there is more than one break Cattell recommends the choice of the smaller number of factors, which would suggest a five component solution.

Clearly then, there is considerable variation both within and between the six tests outlined. If we consider the various tests and criteria as applied to the four to ten component range of solutions we find a wide spread of recommendations (Table 3.6). From this range of possible tests it was decided to use the scree test, and hence five factors were extracted. The scree test has the advantage that "it does not rest for its practical validity upon the correctness of the theory or inferences from it, but on an inductive law" (Cattell, 1966, p. 274) for which there is considerable empirical support. Furthermore, while Davies and Barrow use a number of "rules of thumb" (tests c, d and e above), their final choice "would probably have been the decision of an experienced factor analyst using Cattell's scree test" (Davies and Barrow, 1973, p. 334). A five factor solution also maximizes the number of variables loading on a single factor, thereby aiding interpretation.

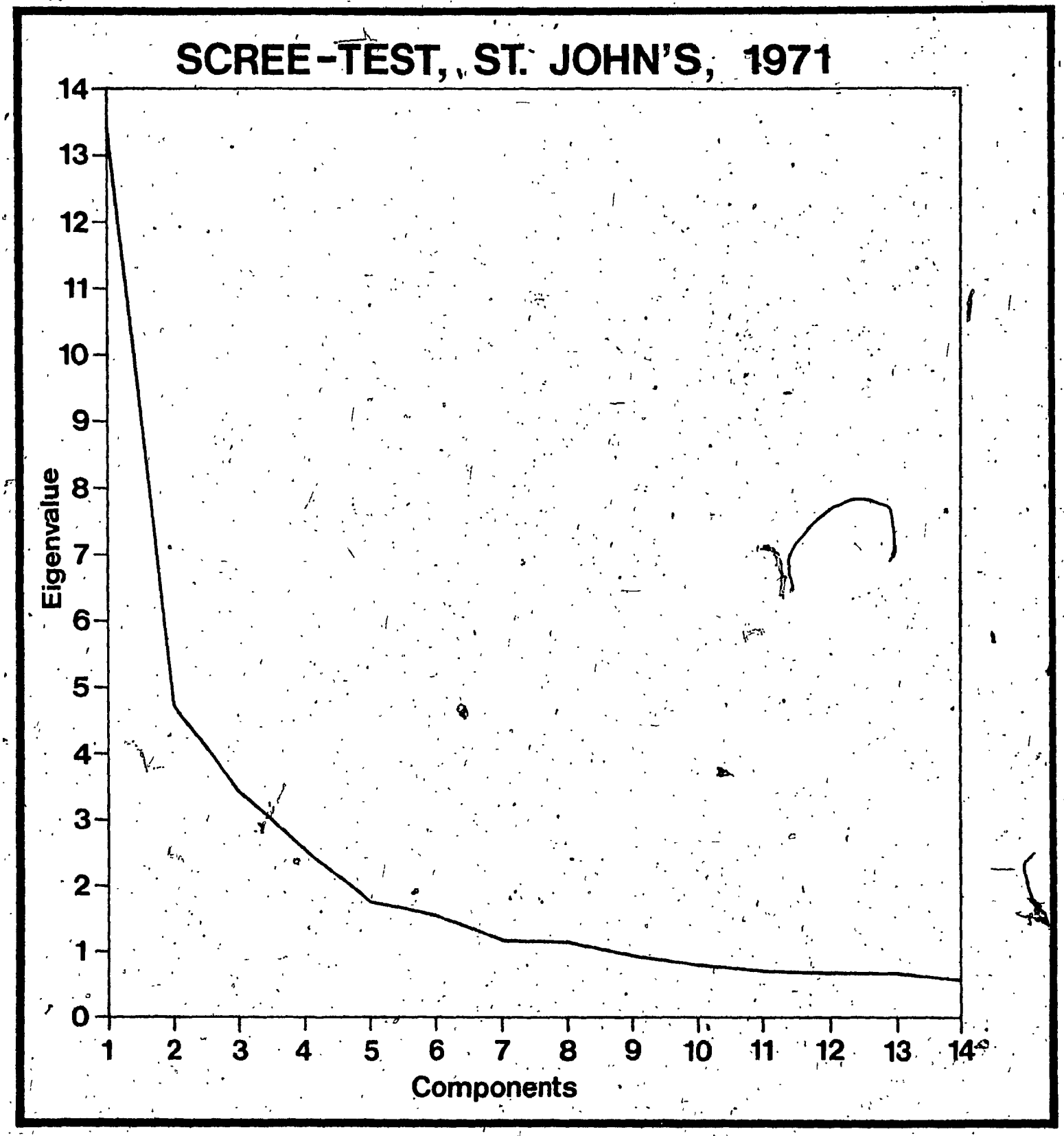
SCREE-TEST, ST. JOHN'S, 1971
Eigenvalue
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Components

Figure 3.1

TABLE 3.6

Tests as to the number of components to be extracted: St. John's, 1971

Test	Recommendation as to number of components						
	4	5	6	7	8	9	10
a. Eigenvalue 1.0					*		
b. 5% variance explained:	*						
c. Rank distribution:					*		
d. Variable complexity:							
Variables loading on 1 factor:		*					
Variables loading on 2 factors:	*						
e. Communality tipping point,							
0.8:						*	
0.7:				*			
0.6:		*					
0.5:			*				
f. Scree test		*					
Total tests advocating solution:	2	3	1	1	2	1	0

C. St. John's: Component Structure and Distributions

Five components, accounting for 66.3 percent of the total variance, were extracted and rotated using a direct oblimin solution with delta set at zero. Table 3.7 lists the important factor loadings for these components, with sign noted. It also gives a short title and the percentage of variance to which each component makes direct contribution. It should be noted that the sum of these contributions is only 59.9 percent; this is because they represent only the direct contributions the components make. The balance of the variance (6.8 percent of total variance or 10.3 percent of the variance explained by the five components) is accounted for by the joint contributions. These are the contributions to the variances by the components that result through their interactions with other

TABLE 3.7

Oblique Primary Pattern Matrix: Distribution of Loadings ±0.3

Component 1	"Religious Status" (Direct variance contribution = 12.77%)
+88	United Church
+59	Anglican
+42	Car
+42	Middle aged
+40	Freezer
+37	Fertile women
+34	Mature adults
+30	White collar (F)
-31	No post secondary
-33	Persons per room
-38	Children
-45	Pre 1946 dwellings
-47	Unemployed
-50	Single
-57	Persons per household
-91	Roman Catholic

Component 2 "Family Status". (Direct variance contribution = 13.28%)

+87	Children
+76	1 family households
+59	Persons per household
+48	Mature adults
+46	Persons per room
+40	Males in labour force
-31	Non mobile
-35	Lodgers
-38	Pre 1946 dwellings
-42	Young adults
-43	Female
-46	Single
-77	1 person households
-81	Old aged

Component 3 "Housing" (Direct variance contribution = 9.66%)

+83	Owner-occupied
+77	Single-detached
+63	Freezer
+58	Non-mobile
+40	Washer
+39	Family Income
+33	Car
-45	Fertile women

Component 4 "Socio-economic Status" (Direct variance contribution = 14.11%)

+81	Blue collar (M)
+73	No university
+63	White collar (F)
+59	2 family households
+45	Persons per room
+44	No post secondary
+43	Blue collar (F)
+40	Young adults
+38	Lodgers
+36	Unemployed
+30	Persons per household
-30	Mature adults
-54	Washer
-58	Professionals (M)
-63	Born outside Canada
-66	Family income

Component 5 "Participation in the Labour Force" (Direct variance contribution = 9.70%)

+78	Females in labour force
+76	White collar (M)
+73	Professionals (F)
+50	Females
+50	Females
+44	Males in labor force
+36	Car
+34	White collar (F)
+33	Fertile women
-34	No post secondary
-50	No schooling

components (see Harman, 1967, p. 274). The existence of joint contributions is a result of the intercorrelation of components in oblique solutions.

On the basis of the results of other factor ecological studies of North American cities, and of prior knowledge of St. John's, it was hypothesized that the analysis would reveal three major dimensions which would reflect socio-economic status, family status and segregation. It was further suggested that, in the latter case, segregation would be according to religious affiliation. While the labelling of factors is essentially subjective, it is immediately apparent that such components are indeed present in St. John's. The remaining components appear related to participation in the labour force and housing variations.

1. Socio-economic Status (Component 4)

This component accounts for the largest proportion of direct variance of any component, 14.1 percent. The variables with the highest loadings fall into the three groups associated with socio-economic status components in other studies: employment, education and income. In addition a number of variables normally associated with low socio-economic status, such as measures of residential overcrowding and lack of household facilities, load on this dimension. The foreign born variable also loads on this component, being associated with high socio-economic

status. This reflects the low degree of international in-migration to the city (only 3.8 percent of the entire population being foreign born) and the fact that many of the migrants are professionals working in higher education and government.

The component scores for the city are mapped in Figure 3.3, giving a clear representation of the spatial pattern of socio-economic differentiation. Areas which stand out as being of low socio-economic status include the residential areas of the downtown with their characteristic high density wood-framed row housing, much of it in poor structural condition. The Southside, Mundy Pond and Battery areas, whilst of lower population density, also include sub-standard housing, much of it unserviced in terms of water and sewerage. The Mundy Pond area is currently subject to urban renewal under Federal Government Neighborhood Improvement and Residential Rehabilitation Project funding.

The high socio-economic status areas of the city are divided into two main sections by the Harbour/Mundy Pond low status axis. Both sections appear to have developed by outward sectoral expansion from the high status neighbourhoods of the late nineteenth century. In the northern area the Gower Street (6-59 and 6-58) and Government House/Circular Road (6-61 and 6-65) areas were the most "fashionable" parts of the city, and whilst the former has declined with conversion of many residences to

SELECTED FEATURES, ST. JOHN'S, 1971

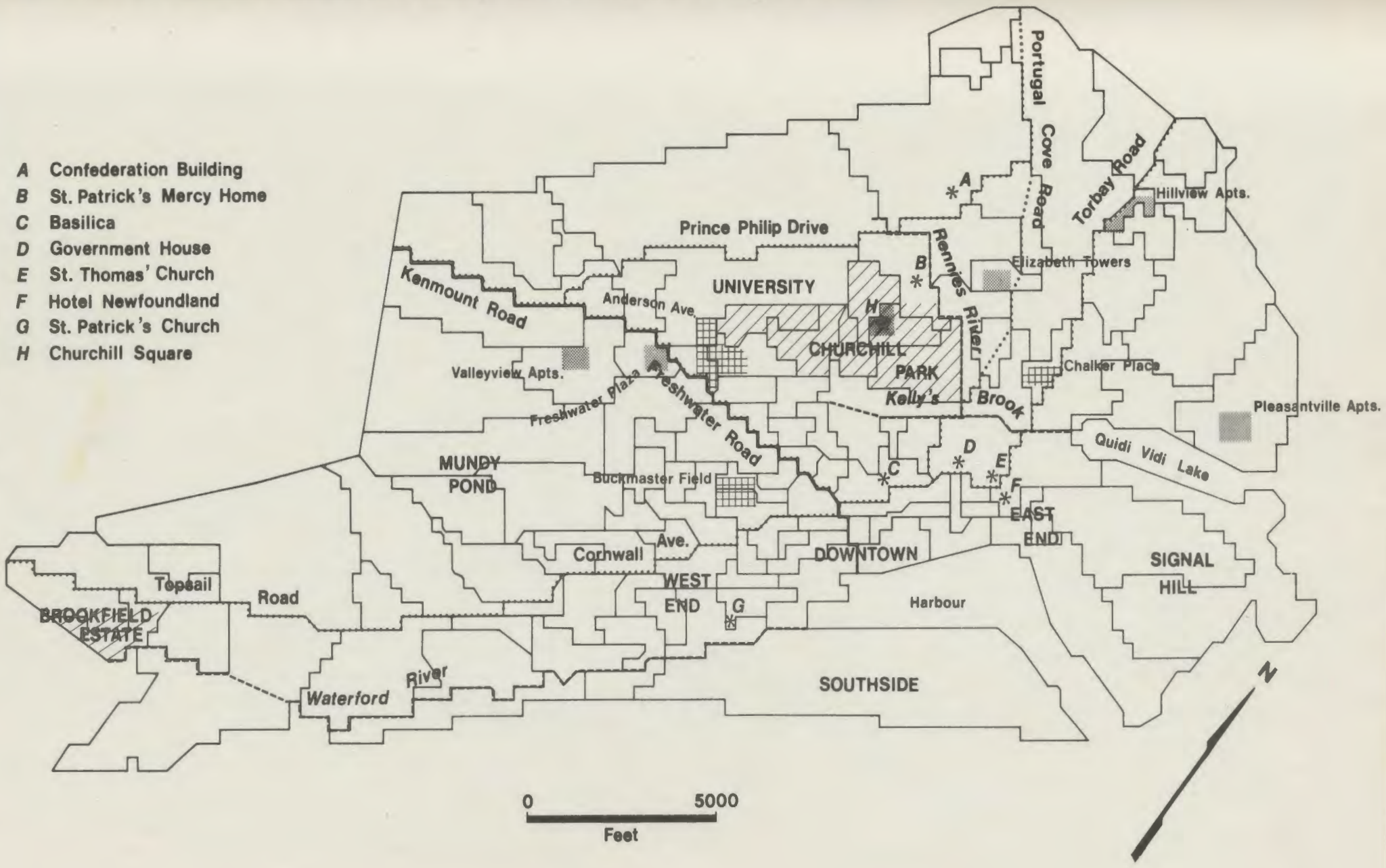

Figure 3.2

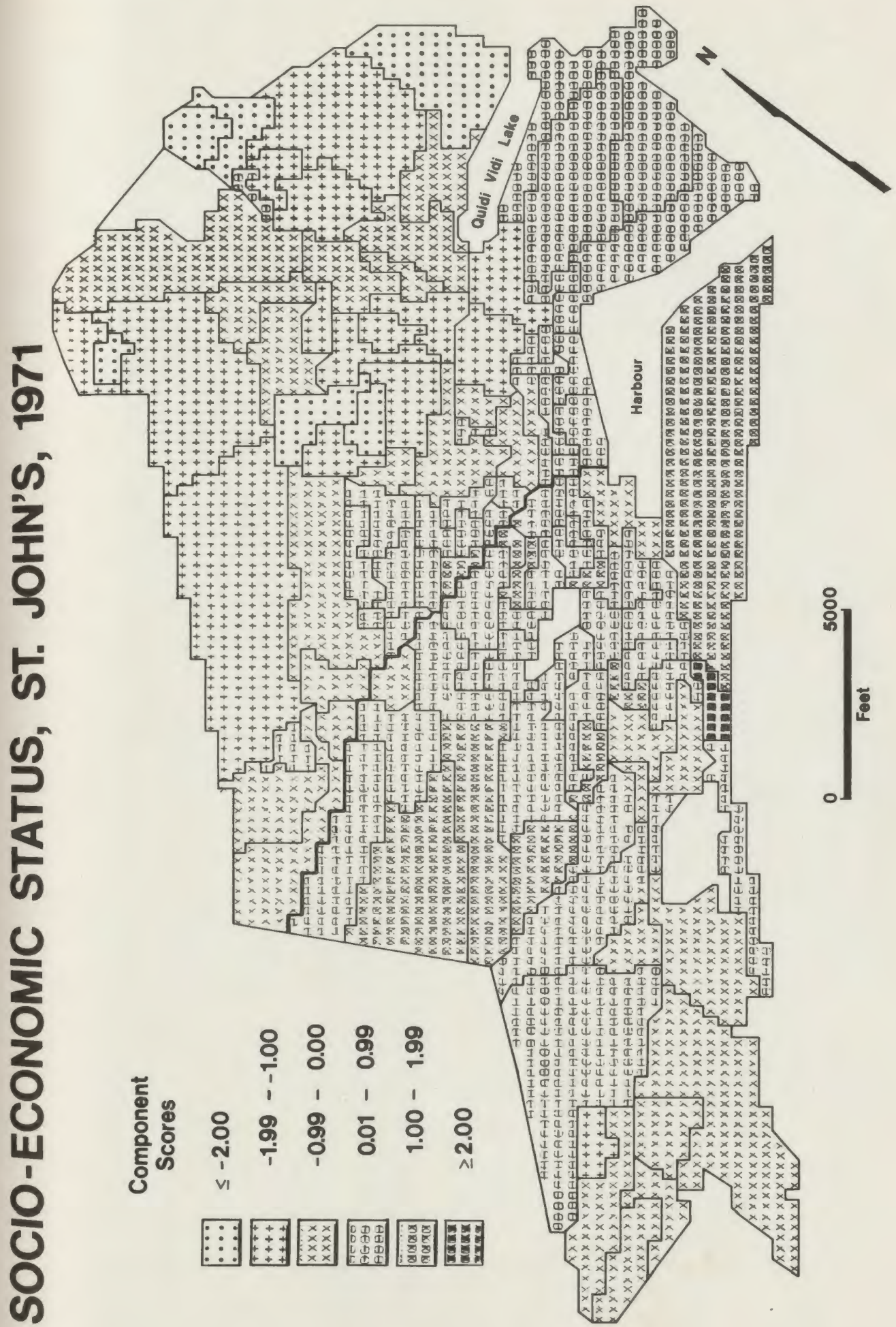
SOCIO-ECONOMIC STATUS, ST. JOHN'S, 1971
Component Scores
≤ -2.00
-1.99 - -1.00
-0.99 - 0.00
0.01 - 0.99
1.00 - 1.99
≥2.00
Quidi Vidi Lake
Harbour
N
0
5000
Feet

Figure 3.3

rooming houses the latter area still contains the residences of many of the elite families of the city. The Waterford Valley in the south was similarly favoured by the traditional merchant families. However, the northern high status section has become dominant, likely reflecting the existence of such institutionalized high status land uses as Government House, the Colonial Building and Bannerman Park, and the construction of Churchill Park in the late nineteen forties and the nineteen fifties. This large planned residential development consists of a mixture of low and middle density detached housing and high density apartments. More recent development to the north of Churchill Park has consisted of high income residences including low density housing (such as is found north of Confederation Building) and luxury apartment blocks (e.g. Elizabeth Towers).

2. Family Status (Component 2)

This is the second most important component, accounting for 13.3 percent of direct variance. It is clearly a family status component, relating as it does to those demographic and household characteristics associated with stages in the life cycle. However, while in many other studies housing type and tenure variables load on the family status component this is not the case in St. John's. In Davies and Barrow's (1973) study of three Prairie cities, in Murdie's (1969) study of Toronto, and in six of the eight small Canadian urban centres

considered by Bourne and Barber (1971) such variables load on a family status component. However, in the two other cities (Trois Rivières and Kingston) covered in the last of these analyses there is no family status dimension and tenure and type of dwelling load on a housing component. In Sherbrooke and Brantford there is a housing component in addition to a family status one, and this is the case in St. John's.

The distribution of family status component scores is seen in Figure 3.4. The city largely conforms to the concentric zone generalization regarding family status, with the downtown having negative scores reflecting concentrations of elderly and single people in non-family households. However, some of the highest negative values are found in the high socio-economic status areas in the vicinity of Government House, reflecting the fact that older residents of these areas are not financially obliged to sell or sub-let their homes after their children have left home.[1] The anomalously low family status of the Churchill Square, Freshwater Plaza and Elizabeth Towers apartments reflect the large proportion of bachelor and two bedroom apartments in these developments.

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[1] For a discussion of this point in relation to age structure see Shrimpton, 1971, p. 23.

FAMILY STATUS, ST. JOHN'S, 1971

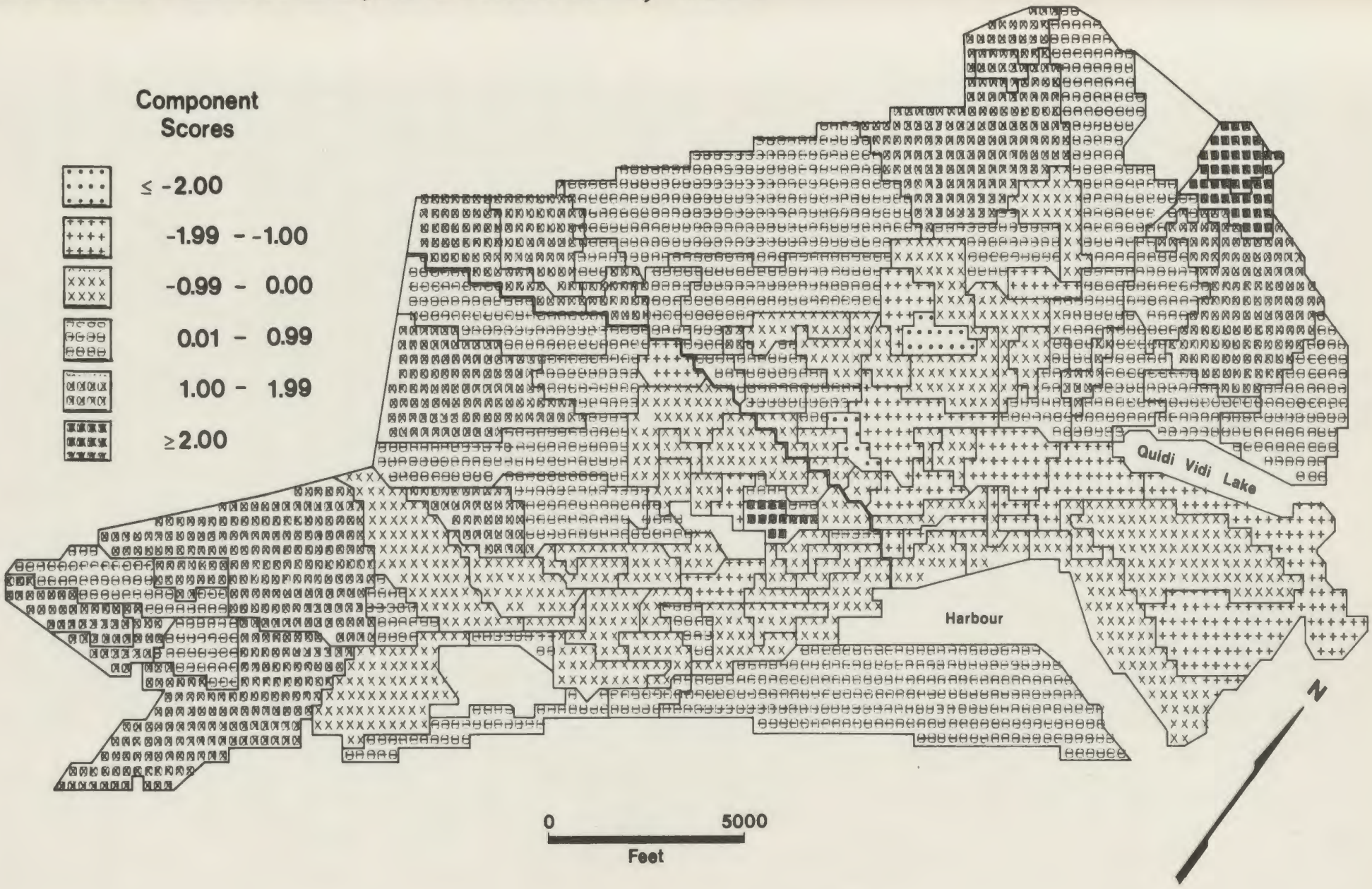


Figure 3.4

Positive scores are generally found in the lower density suburban areas, both with regard to the older sub-standard housing areas of Mundy Pond and the Southside and the newer sub-divisions. However, the highest positive value is exhibited by the subsidized housing of the St. John's Housing Authority at Buckmaster Field. All of the Authority's high density housing developments have high scores reflecting resident selection procedures which favour large low income families.

3. Religious Status (Component 1)

This, the third of the classical dimensions, accounts for a further 12.8 percent of direct variance. It is clearly a Catholic/Protestant religious dimension, with Catholicism being associated with large households, older housing, unemployment, single adults, children and low levels of ownership of household facilities. It should be noted, however, that the household size and children variables do not necessarily reflect any association between the Catholic population and high fertility rates. There is no historical evidence of inter-denominational variations of fertility in Newfoundland, and there is, furthermore, a slight positive correlation between religious and family status suggesting that high family status is, if anything, related to Protestantism (Figure 3.5). The fact that Catholicism is associated with older housing and low levels of ownership of household facilities reflects the generally inferior socio-economic status of the Catholic population

FIGURE 3.5

Intercomponent correlations (6.10)

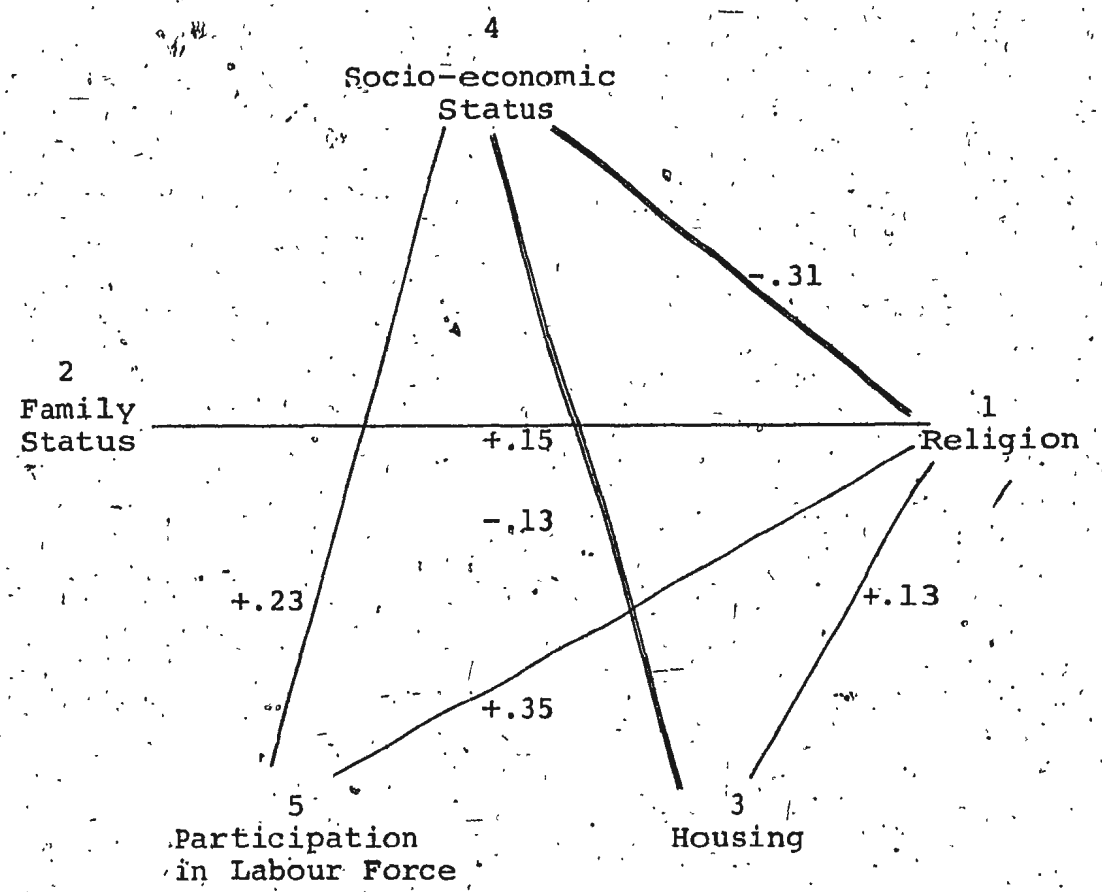


TABLE 3.8

Component Correlation Matrix

1	1.00000	0.15251	0.12590	-0.31475	0.35404
2	0.15251	1.00000	0.02758	-0.09984	0.07939
3	0.12590	0.02758	1.00000	-0.12975	0.01675
4	-0.31475	-0.09984	-0.12975	1.00000	-0.23359
5	0.35404	0.07939	0.01675	-0.23359	1.00000

in St. John's. This is also indicated by the negative correlation between the religious and socio-economic status dimensions (Figure 3.5).

With regard to the spatial pattern of the religious status component (Figure 3.6), the highest Catholic scores occur in the downtown area and the area immediately north west of it. The latter area extends from the Catholic Basilica to Kelly's Brook and includes much land owned by the church and many Catholic institutions. Respondents have commented on the preference of many Catholics for residences in this area. Similarly, that area in the West End recording the highest negative score is adjacent to the Catholic St. Patrick's Church, and more than eighty percent of the area's population are Catholics.

The areas south of Confederation Building which exhibit negative (i.e. Catholic) scores likely result from church land ownership (again reflected in such institutional land uses as the Pius X school and St. Patrick's Mercy Home for the elderly), while the Mundy Pond and Signal Hill areas were originally farmed by Irish Catholic families. Also associated with the negative correlation between religious and socio-economic status is the fact that the main St. John's Housing Authority areas of Buckmaster Field, Anderson Avenue and Chalker Place all record negative scores.

RELIGIOUS STATUS, ST. JOHN'S, 1971

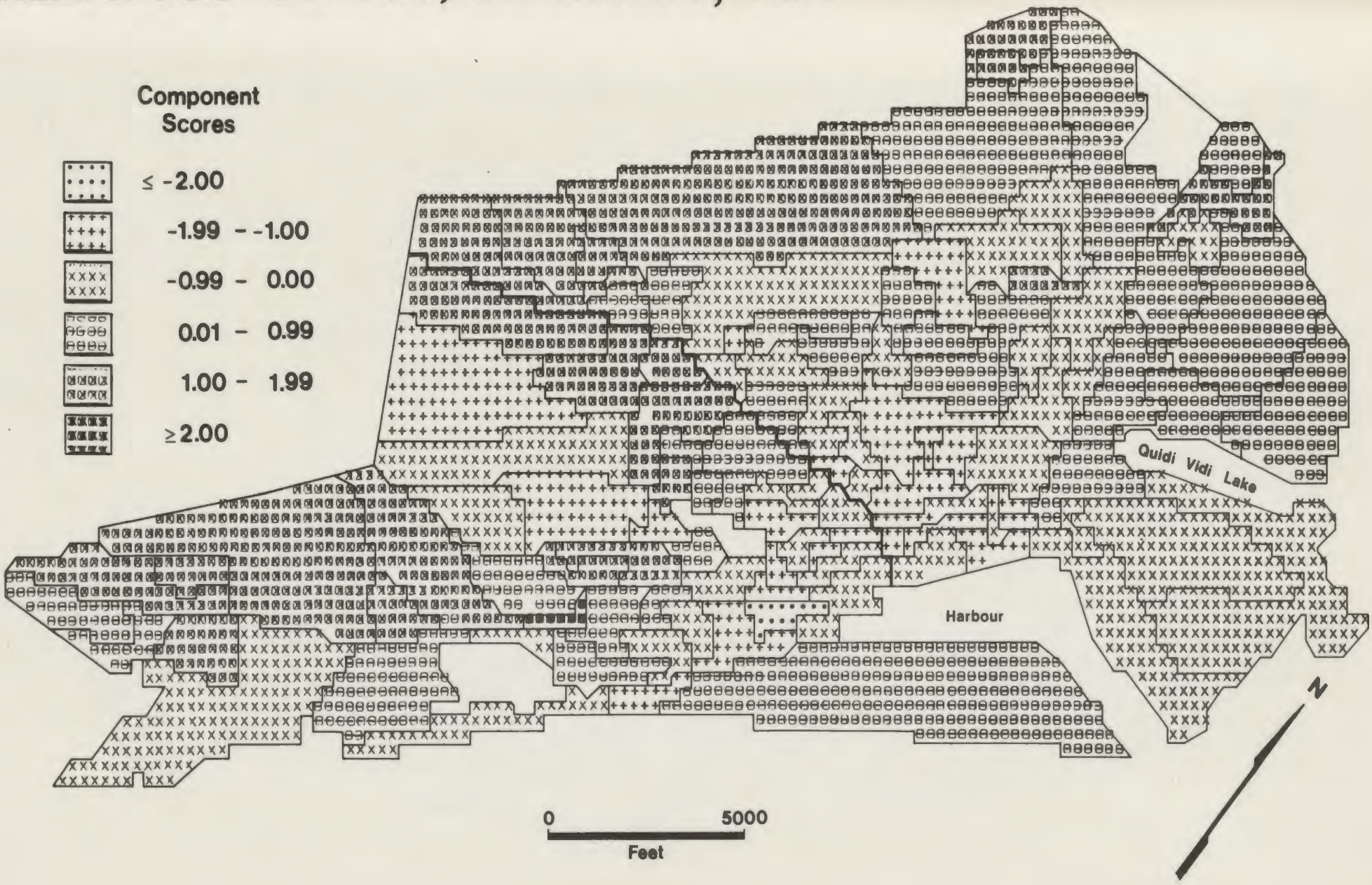


Figure 3.6

Positive scores are generally associated with the newly developed suburban sub-divisions, notably in the south and east of the city. The land between Hotel Newfoundland and Quidi Vidi Lake has historically been an Anglican area, as evidenced by the location of St. Thomas' Anglican Church and the Anglican Cemetery. The area south of Freshwater Road was largely settled by an influx of Protestants from the north east coast of Newfoundland during the nineteen thirties.

4. Participation in the Labour Force (Component 5)

This is the fourth of the five components extracted, and explains a further 9.7 percent of direct variance. It is clearly related to employment and occupation and has hence been titled "Participation in the Labour Force". It appears to be closely related to the dimension of "Economic Participation" identified in Davies and Lewis' study (1973). It also parallels the "Service Sector/Impoverishment" component found by Davies and Barrow (1973) in their study of three Prairie cities, with low educational attainment being associated with negative scores. However it is significant that whereas the women in the labour force variable loaded on the Family Status component in the Prairie cities study, here it is the variable with the strongest loading (+0.78) on the Participation in the Labour Force component. This likely reflects national social and economic changes between the 1961 census used in the Prairie cities analysis

and the 1971 data used in the present study. In particular it is probably a result of the increasing proportion of women in the labour force, including married women seeking to supplement the family budget. For Canada as a whole the period 1961 to 1971 saw the female participation rate rise from 29.7 to 39.9 percent, this change being largely accounted for by an increase in the married female participation rate from 22.0 to 37.0 percent. As such the Participation in the Labour Force component appears to be linked with the "Urbanism" component isolated by Sweetser (1965 B) in his study of Helsinki, 1960, which he subtitled "Career Women". Unfortunately further analysis of such interstudy variations is again frustrated by the considerable differences between variables and factorial procedures used.

The spatial distribution of component scores (Figure 3.7) is complex. The downtown and the unserviced areas of the Southside, Mundy Pond and the Battery have strong negative scores as a result of both the low proportion of people, and especially women, in the labour force, and the low proportion of men and women in white collar occupations. This doubtless reflects both low levels of educational attainment and attitudes towards the employment of women. It is likely that similar characteristics and attitudes are responsible for the negative scores recorded for the St. John's Housing Authority developments at Buckmaster Field and Anderson Avenue, for many of

PARTICIPATION IN LABOUR FORCE, ST. JOHN'S, 1971

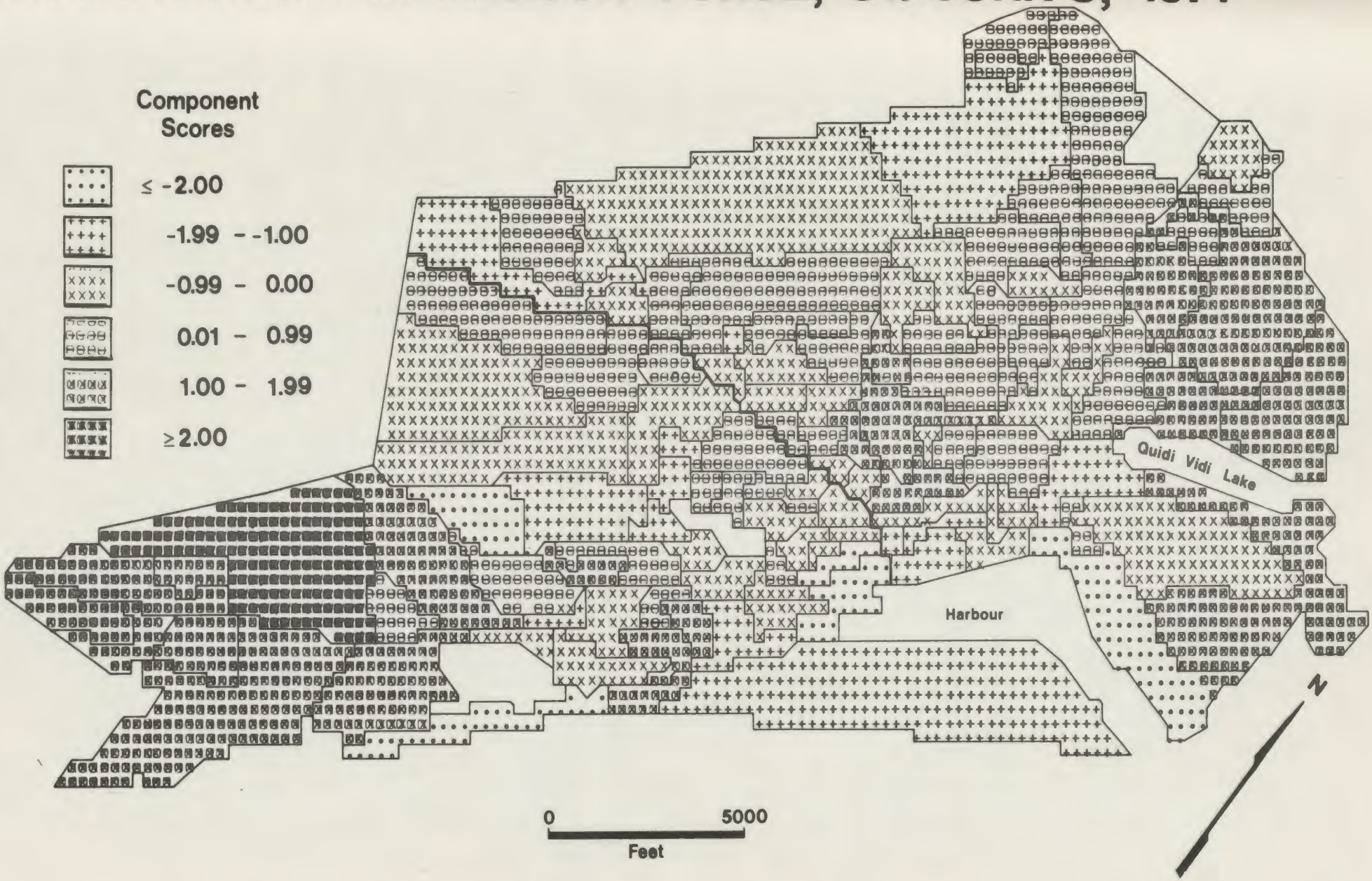


Figure 3.7

the residents of these areas have been resettled from sub-standard housing which is predominantly found in the down-town and unserviced areas. However, the negative scores recorded for the Forest Road (6-64), Smithville Crescent (6-70) and Dublin Road (6-120) areas, all of which have high rankings on the socio-economic status dimension, reflect very different causation. In these areas most employed persons are found in professional and managerial posts, and the low proportion of women in the labour force is a reflection of the fact that there is little financial pressure on married women and their families.

In contrast with the pattern of negative scores, positive values are found principally in the new, low-density sub-divisions. They are also characteristic of areas containing large un-subsidized apartment complexes (other than Churchill Square and Elizabeth Towers apartments which are, as noted above, atypical). The positive scores of the area north west of the Basilica probably results from the large numbers of members of Catholic religious orders attached to, and working in, the teaching institutions found there.

5. Housing (Component 3)

The last of the components extracted is clearly descriptive of variations in housing type, tenure and facilities (but not, it should be noted, housing age, which has a loading of only -0.12). It accounts for a further 9.7 percent of the direct variance explained.

Associated with owner-occupation, single detached housing and the ownership of domestic appliances are non-mobility (doubtless reflecting the fact that home ownership is only fully viable as a long term investment), high income and low proportions of fertile women. As such this component includes many of the variables which load onto the "Late Family Status" dimension identified by Davies and Barrow (1973). In the housing dimensions isolated in four small Canadian urban centres by Bourne and Barber (1971) the dominant variables were owner-occupation and single detached housing, as in this case. However, further comparison is again impossible.

As is seen in Figure 3.8, areas with strong positive scores on this component are mostly found in the north west of the city. This zone includes enumeration areas adjacent to Portugal Cove Road between the Rennies Mill River and Confederation Building, much of Churchill Park and the University. The major anomalies in this pattern are the areas containing the Elizabeth Towers and Churchill Square apartments. Other high positive scores are found in the Cornwall Avenue and Waterford Valley areas, the former predominantly consisting of middle income housing constructed during the nineteen sixties, the latter including a number of substantial older residences. Axiomatically, high negative scores are associated with areas of row housing and apartment complexes. Such areas include the entire downtown and a scattering of developments elsewhere in the city, including both commercial row housing

HOUSING, ST. JOHN'S, 1971

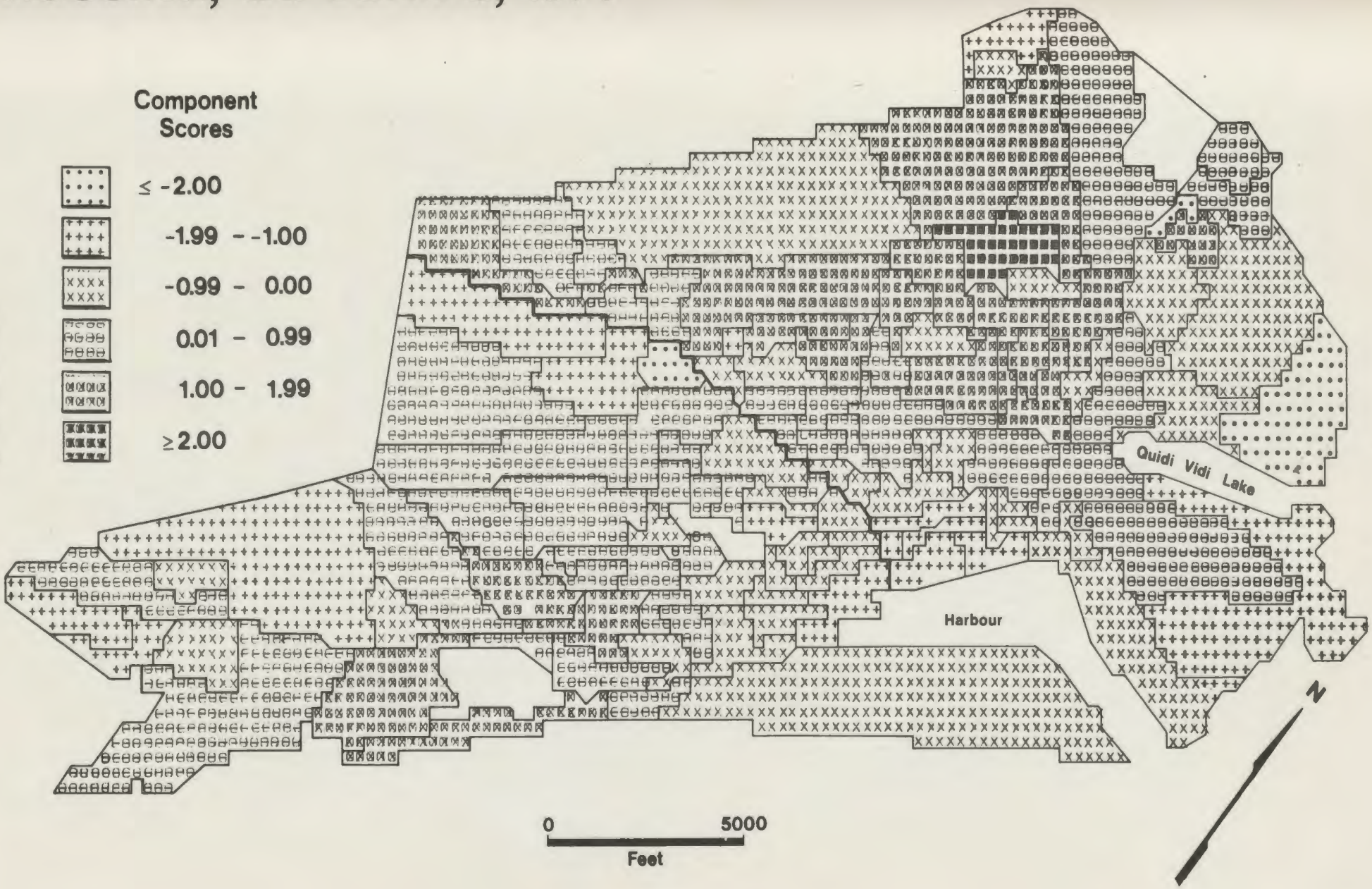


Figure 3.8

and apartments (Brookfield Estate, Freshwater Plaza, Elizabeth Towers and Valleyview, Churchill Square, Hillview and Pleasantville Apartments) and subsidized housing (Buckmaster Field, Anderson Avenue and Chalker Place).

D. Conclusions

The factor ecological analysis undertaken in this chapter appears highly effective in describing the form of urban social differentiation in St. John's. The components and their distributions conform to expectations as to the patterns of social differentiation in the city, and are comparable with the findings of urban ecological studies of other cities. In particular, the three classical dimensions of such differentiation - economic status, family status and segregation/ethnic status - emerge as the most important components in the St. John's analysis. The results suggest that these dimensions are not peculiar to analyses using census tract data, and that studies using enumeration area data isolate the same basic components while increasing the refinement of the description of the city and permitting a clearer understanding of the causes of inter-area variations. In the latter regard it should be noted that explanations of anomalies have often been made with reference to the characteristics of particular enumeration areas (as in the case of apartment blocks and subsidized housing), a level of definition not available using tract data.

The results of factor ecological analyses can be used for a variety of purposes. These include simple description of the city, provision of a sampling framework for further research (Robson, 1969) and the study of temporal (Murdie, 1969; Haynes, 1971) and inter-city variations (Sweetser, 1965 A; Bourne and Barber, 1971; Berry and Spodek, 1971; Salins, 1971; Timms, 1971; Davies and Barrow, 1973; Evans, 1973; Johnston, 1973). In the context of this thesis, however, the concern is with the significance of the dimensions revealed to a particular aspect of behaviour, social visiting.

IV. PATTERNS OF SOCIAL VISITING IN ST. JOHN'S

This chapter focuses upon the relationships between both geographic and social distance and social visiting. In particular, the following hypotheses proposed in Chapter Two are examined: that

(i) social visiting between geographic areas declines with increased geographic distance; and

(ii) social visiting between geographic areas declines with increased social distance.

With regard to the former, the relationship between variations in the spatial separation of areas (measured as straight line distance) and the number of inter-area social contacts is examined. To aid interpretation of the patterns revealed, and of the differences between the visiting behaviour of the populations of different sample areas, the effects of both the type of relationship involved, and the length of time the respondents had been resident in the sample areas, on the distance separating contacts is analyzed. In the case of the latter hypothesis the five social distance measures derived from the factor ecological study are used, although attention is concentrated upon the three most important components; socio-economic, family and religious status.

A. Geographic Distance and Social Visiting

1. Geographic Distance and the Number of Inter-Area Social Contacts

The effect of geographic distance on the number of social contacts is demonstrated by a frequency distribution of inter-area contacts by distance, based on the data collected in the questionnaire. Each questionnaire sought the addresses of the four social contacts visited most frequently, and certain information about the relationship (see Chapter Two). The total of 488 contacts on which data were obtained were categorized according to the distance between the residences of the respondent and his or her friends. The distance was measured as the straight line distance between the gravitational centres of the enumeration areas, the coordinate locations of which were provided by the SYMAP computer mapping program utilized.

Clearly straight line distance is only an approximation of the actual distance involved. However, Nordbeck has demonstrated that "if the road net between the two points in question is fairly homogeneous and regular... it is enough to multiply the rectilinear distance d... with a constant q and thus obtain a good approximation of the real road distance" (Nordbeck, 1964, p. 208). The requirements of homogeneity and

regularity are satisfied in St. John's, except for the isolated area south east of the harbour. In the case of trips to this area a pivotal point at the head of the harbour was chosen, and the distance measure used was the sum of the distances from both the areas in question to the pivot. Clearly a more complex measure than road distance would have been necessary had bus transportation, which is confined to a selective and directionally biased network, been a commonly used mode. However, bus transportation was the normal mode for only 1.2 percent of relationships.

Intra-enumeration area trips were assigned a value of 250 feet, rather than zero. This arbitrary figure reflects the observed form of relationships within areas, with many very short distance contacts involving immediate neighbours but a number of longer distance contacts with a theoretical maximum length of three thousand feet (the longest axial distance for any area). While some very short real distances, such as those between residences on the opposite sides of a road forming an enumeration area boundary, may be exaggerated by the distance measure used here, such cases occurred infrequently. Furthermore, any attempted solution would be both difficult to implement and would violate the use of the enumeration area as the basic

unit of analysis.

The first hypothesis posits a negative relationship between the amount of social visiting and distance. However, this relationship cannot be verified by simply establishing that the number of contacts declines with increased distance, for this would ignore the spatial aspect of the distribution of potential contacts.[1] Three main elements influence this distribution of potential contacts: the linear increase in the area of successive distance zones, the effect of boundaries, both artificial (the city limits) and natural (the harbour and coast), and population density variations within the city.

Given a uniform population density throughout the city and no boundary effects, there will be a linear

---

[1] The distance decay functions revealed by Stutz in his analysis of San Diego (Stutz, 1973) are suspect because this point is ignored. This is most clearly revealed when he states that the fact that College Heights has twice the number of desire lines to the south than it does to the north reflects the presence of physical barriers to the north. This ignores the fact that College Heights is in the north of the survey area and it is likely that a large majority of the population (and hence potential contacts) live to the south of it.

increase in the population of successive distance zones.[1] However, this linear increase will be counteracted by boundary cut-off and thus its effect will vary according to the position of the origin area within the city. Peripheral areas will be affected immediately, although the distance at which boundary effects become complete (i.e. when the entire zone is outside the boundary) will be relatively large. Further, the population density within a city is never uniform, but normally declines with distance from the downtown. Such a pattern is discernable for St. John's (see Figure 4.1) and will affect the population/distance relationship of each sample area. The effect of these relationships on the distributions of potential contacts from the twelve St. John's sample areas may be summarized as follows: (see Figures 4.2 to 4.4):

---

[1] The population within one distance unit of the origin will be proportional to the area of a circle of radius one unit,

$$2\pi d^2$$

where π is 3.142 and d is one distance unit. The population within two units may be calculated similarly, and the increase in population resulting from an increment of one unit can be calculated by the linear equation

$$P = d\,(4\pi d - 2n)$$

where P is the population of the zone, d is the population density, and n is the distance between the origin and the outer edge of the zone.

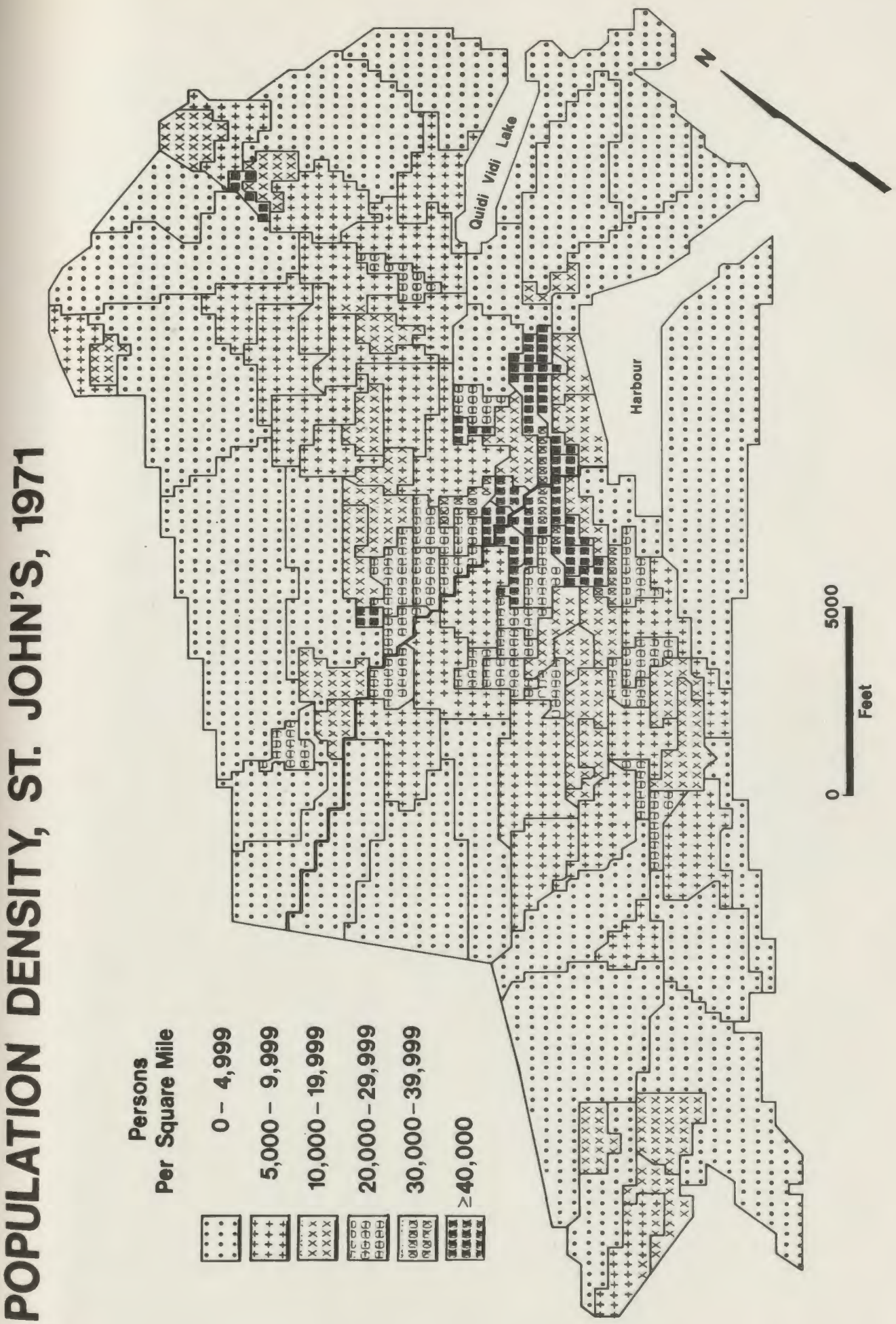

POPULATION DENSITY, ST. JOHN'S, 1971
Persons
Per Square Mile
0 – 4,999
5,000 – 9,999
10,000 – 19,999
20,000 – 29,999
30,000 – 39,999
≥40,000
Quidi Vidi Lake
Harbour
N
0
5000
Feet

Figure 4.1

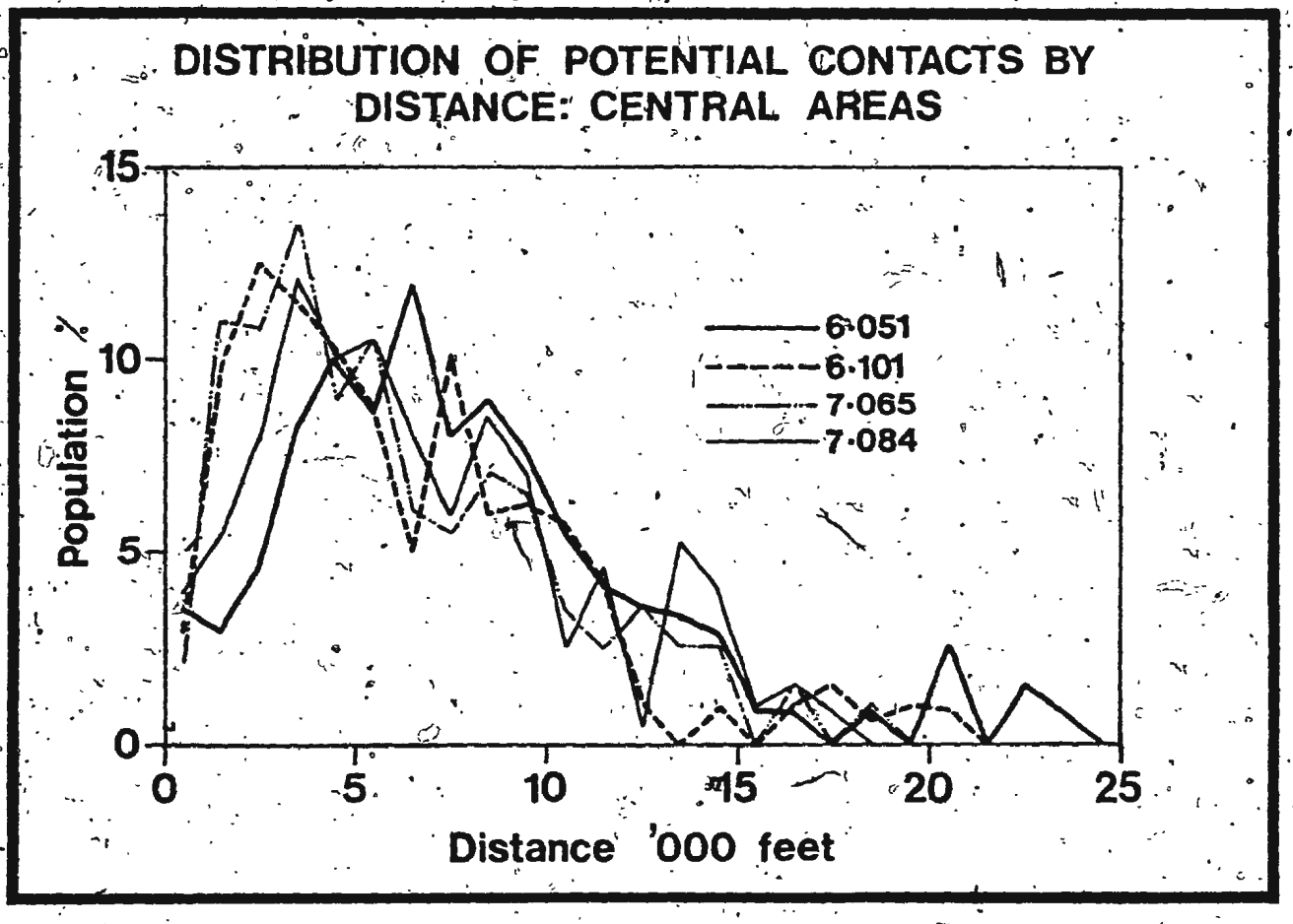

DISTRIBUTION OF POTENTIAL CONTACTS BY DISTANCE: CENTRAL AREAS
Population %
15
10
5
0
0
5
10
15
20
25
Distance '000 feet
6·051
6·101
7·065
7·084

Figure 4.2

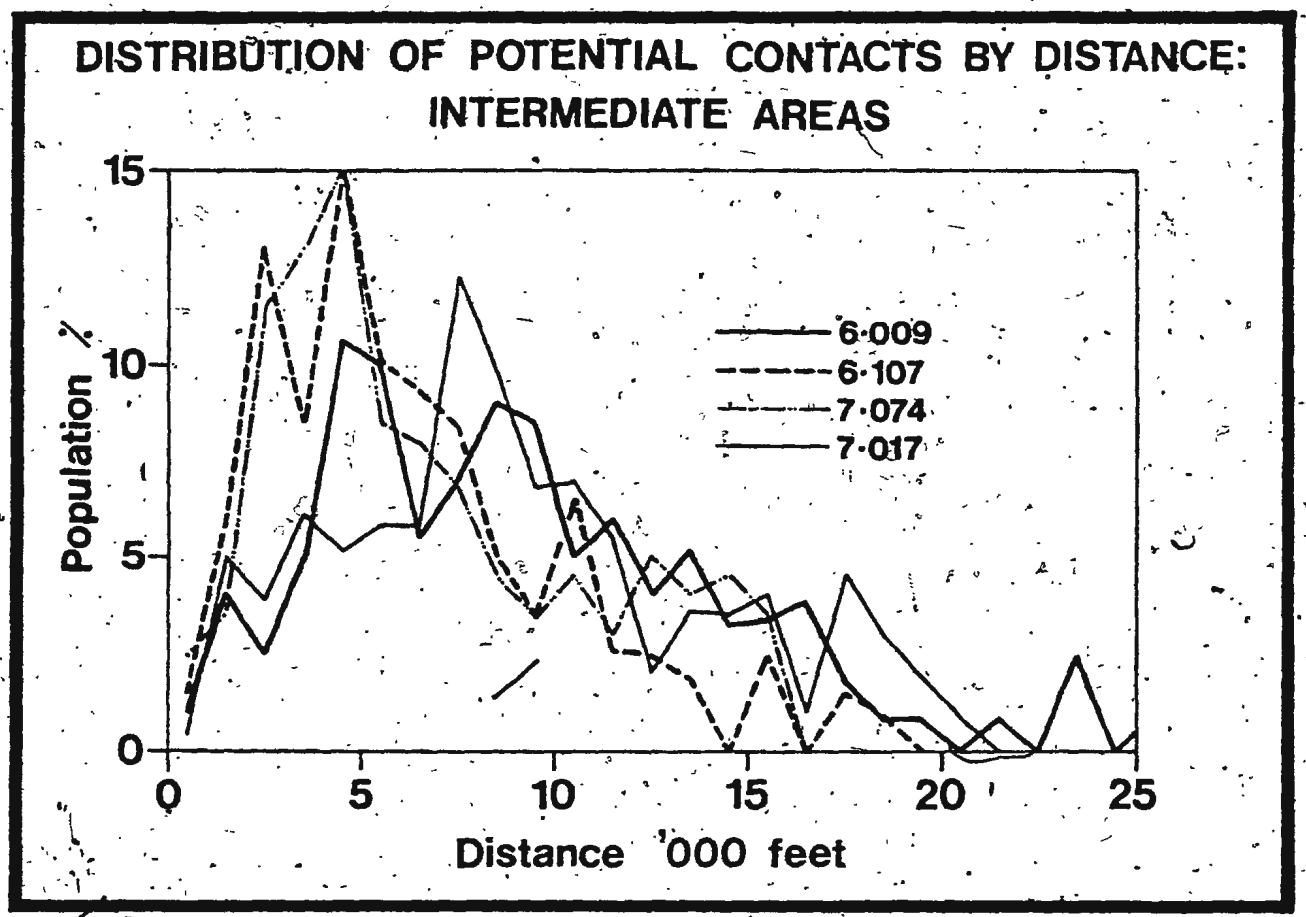

DISTRIBUTION OF POTENTIAL CONTACTS BY DISTANCE:
INTERMEDIATE AREAS
Population %
15
10
5
0
0
5
10
15
20
25
Distance '000 feet
6·009
6·107
7·074
7·017

Figure 4.3

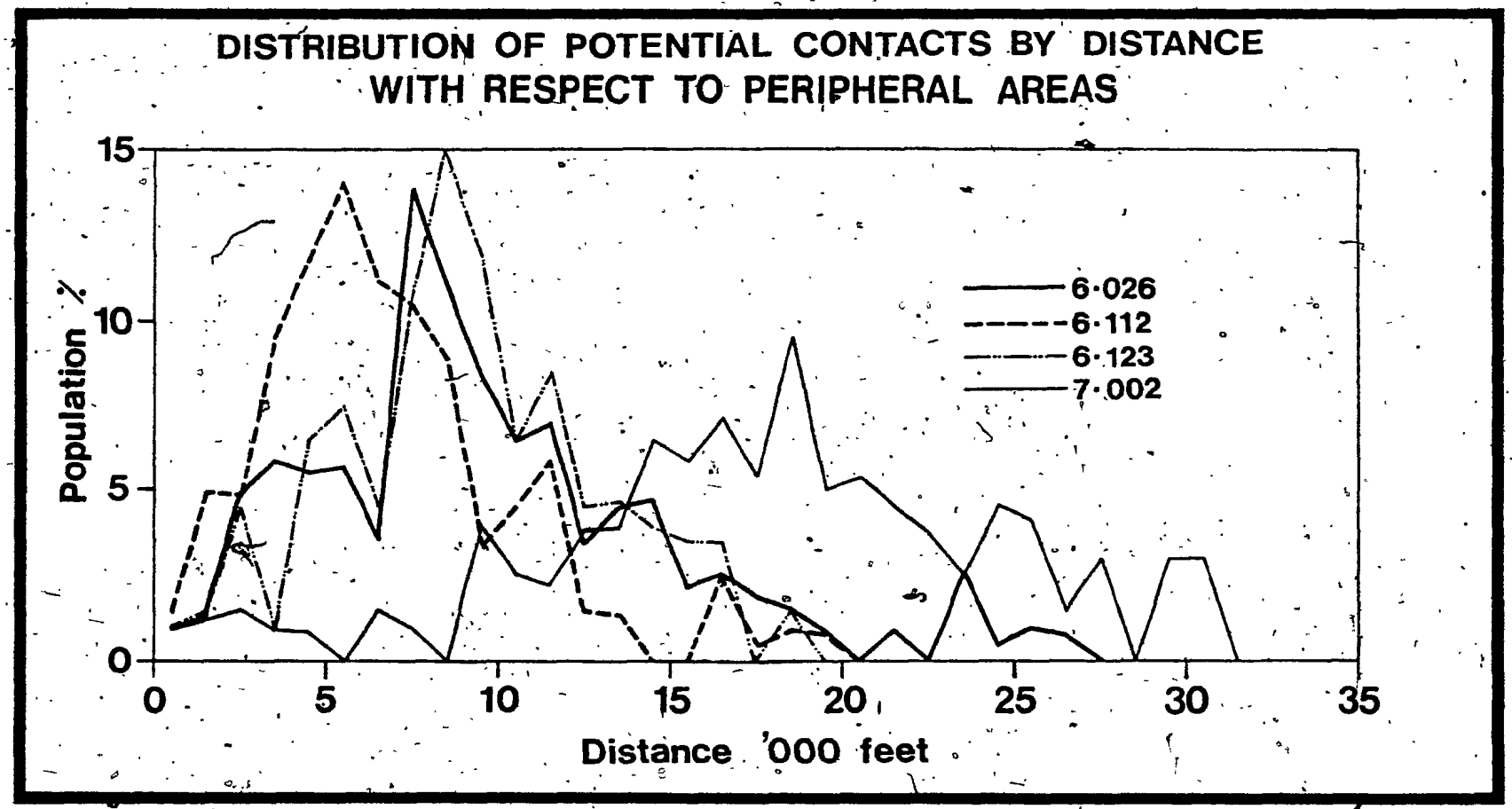

DISTRIBUTION OF POTENTIAL CONTACTS BY DISTANCE
WITH RESPECT TO PERIPHERAL AREAS
Population %
15
10
5
0
0
5
10
15
20
25
30
35
Distance '000 feet
6·026
6·112
6·123
7·002

Figure 4.4

Central enumeration areas: In these areas there is an initial rapid increase in population to a peak reflecting the geometric factor acting in an area of generally high population density, with few countervailing boundary effects. There is then a decline as a result of falling population density, and the onset of boundary effects causing a foreshortened "tail", and an overall strong positive skew (e.g. areas 6-101 and 7-065 in Figure 4.2).

Intermediate enumeration areas: Such areas have a smaller proportion of the population within short distances due to lower densities, rising with increased distance in response to geometric influence and, in the direction of the urban core, higher densities. The peak lies at approximately the distance to the highest density areas. At greater distances the proportion declines in response to boundary effects and, despite a longer tail than is found for central areas, there is a less pronounced positive skew (for example areas 6-009, 6-112 and 7-074 in Figures 4.3 and 4.4).

Peripheral enumeration areas: In these areas the proportion of the population found at short distances is relatively small, increasing only slowly at greater distances because of the early onset of boundary effects. The peak usually occurs at a considerable distance from

the area, and while the distribution of the population with respect to such areas has a long tail, they are of relatively unskewed form, as exemplified by areas 6-026, 6-123 and 7-017 (Figures 4.3 and 4.4). Area 7-002 (Figure 4.4) has a form unique among the sample areas as a consequence of its extreme peripherality. This results in the high density core lying at more than half the distance to the farthest edge of the city. Furthermore, this area lies at the end of a low dehsity arm of the city which extends south-west along the Waterford Valley. While, on average for all twelve sample areas fifty percent of the city's population live within 7,500 feet, the corresponding figure for area 7-002 is 17,500 feet.

The effect of the distribution of potential contacts upon the frequency distribution of social contacts by distance is seen in Figures 4.5 to 4.7. The frequency distribution of all 488 sample social contacts (Figure 4.5) exhibits a typical J-curve, with 21.7 percent of all contacts occurring with persons in the sample area itself or in areas with centres within five hundred feet of it. Fifty percent of contacts are found within one mile of the sample areas. The only major anomaly is the large number of contacts with areas approximately 12,500 feet from the sample areas. This may result from

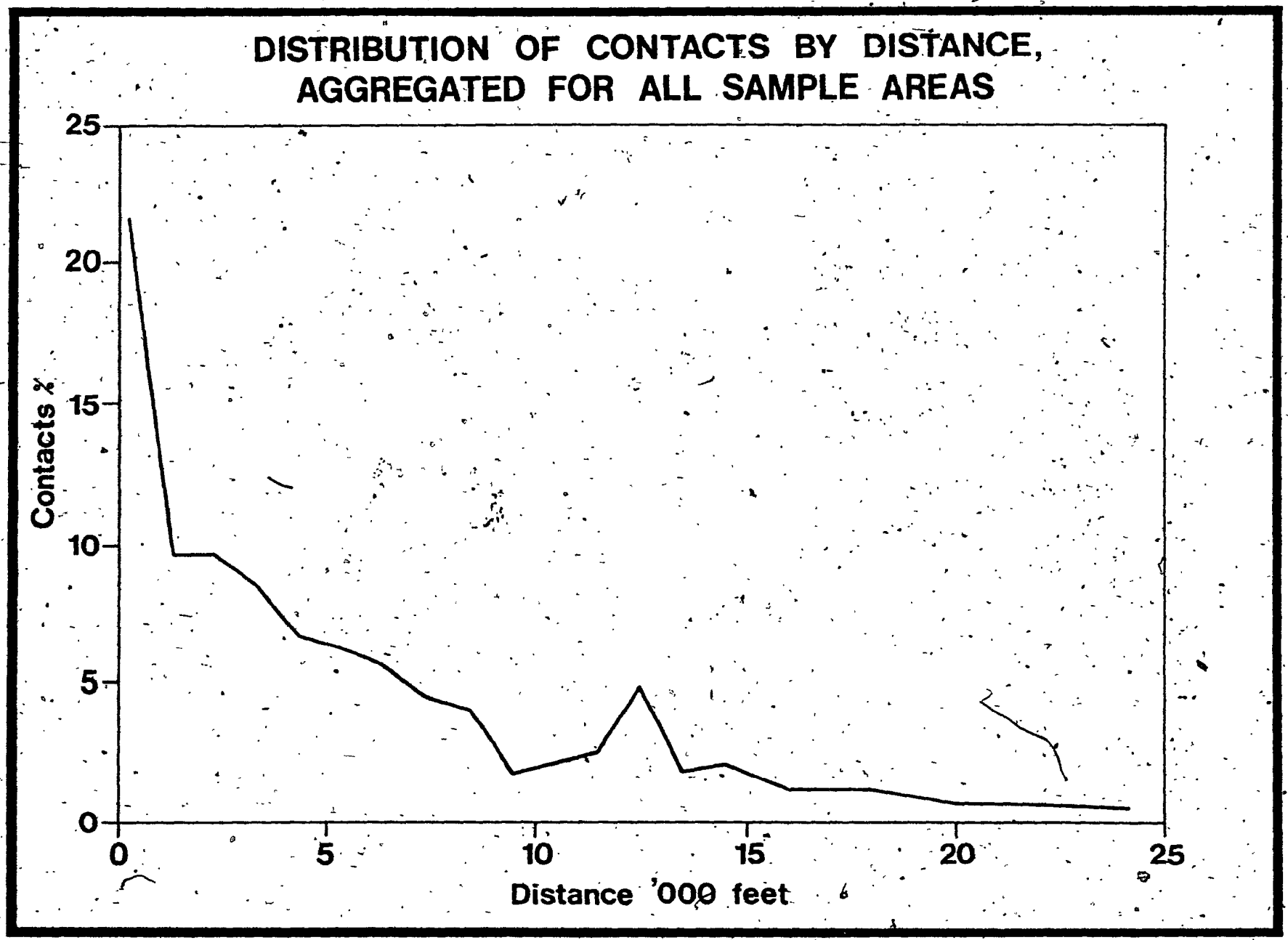

DISTRIBUTION OF CONTACTS BY DISTANCE,
AGGREGATED FOR ALL SAMPLE AREAS
Contacts %
25
20
15
10
5
0
0
5
10
15
20
25
Distance '000 feet

Figure 4.5

coincidental variations in the social distance dimensions such that different sample areas each have areas of similar social structure to their own at this distance.

The aggregate frequency distribution of potential contacts by distance for the twelve sample areas is seen in Figure 4.6. By dividing the proportion of social contacts living at any distance by the proportion of the population resident at that distance the effects of distance on the number of contacts is revealed (Figure 4.7). The decay over short distances is emphasized with a less pronounced decline for contacts up to ten thousand feet distant. There is fluctuation in the ratio for distances greater than ten thousand feet, reflecting the small proportions of the sample contacts and of the total population involved at such distances. Overall, however, it appears that the distance effect is most pronounced over short distances and then declines progressively with increased distance so that, beyond ten thousand feet, the proportion of contacts is largely invariant with distance.

The form of the distribution of contacts, weighted by population, for the aggregate data (Figure 4.7) is repeated for each individual sample area (Figures 4.8 to 4.10). Peripheral areas, such as 6-026, 6-123 and 7-002 have relatively large values for

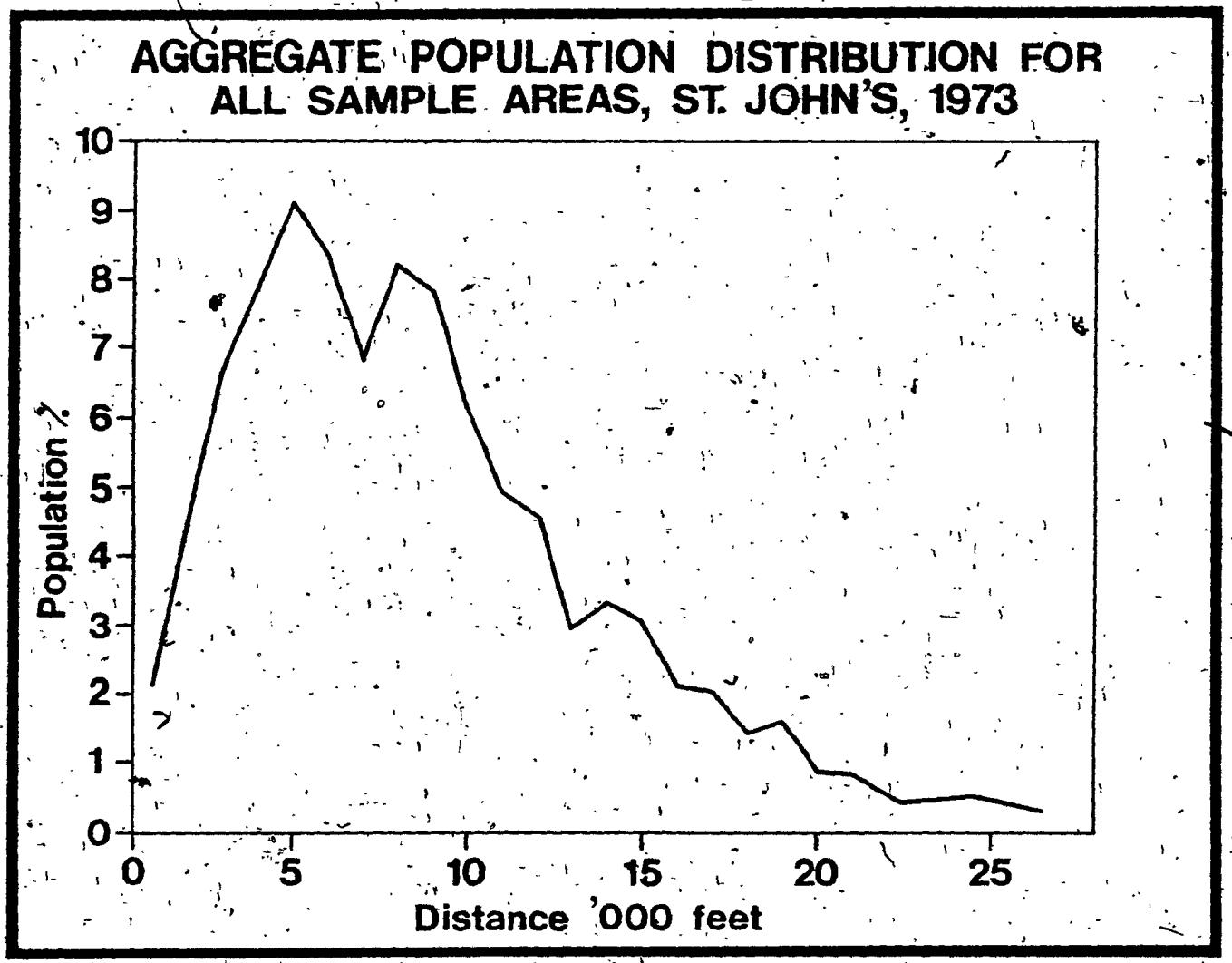

AGGREGATE POPULATION DISTRIBUTION FOR
ALL SAMPLE AREAS, ST. JOHN'S, 1973
Population %
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15
20
25
Distance '000 feet

Figure 4.6

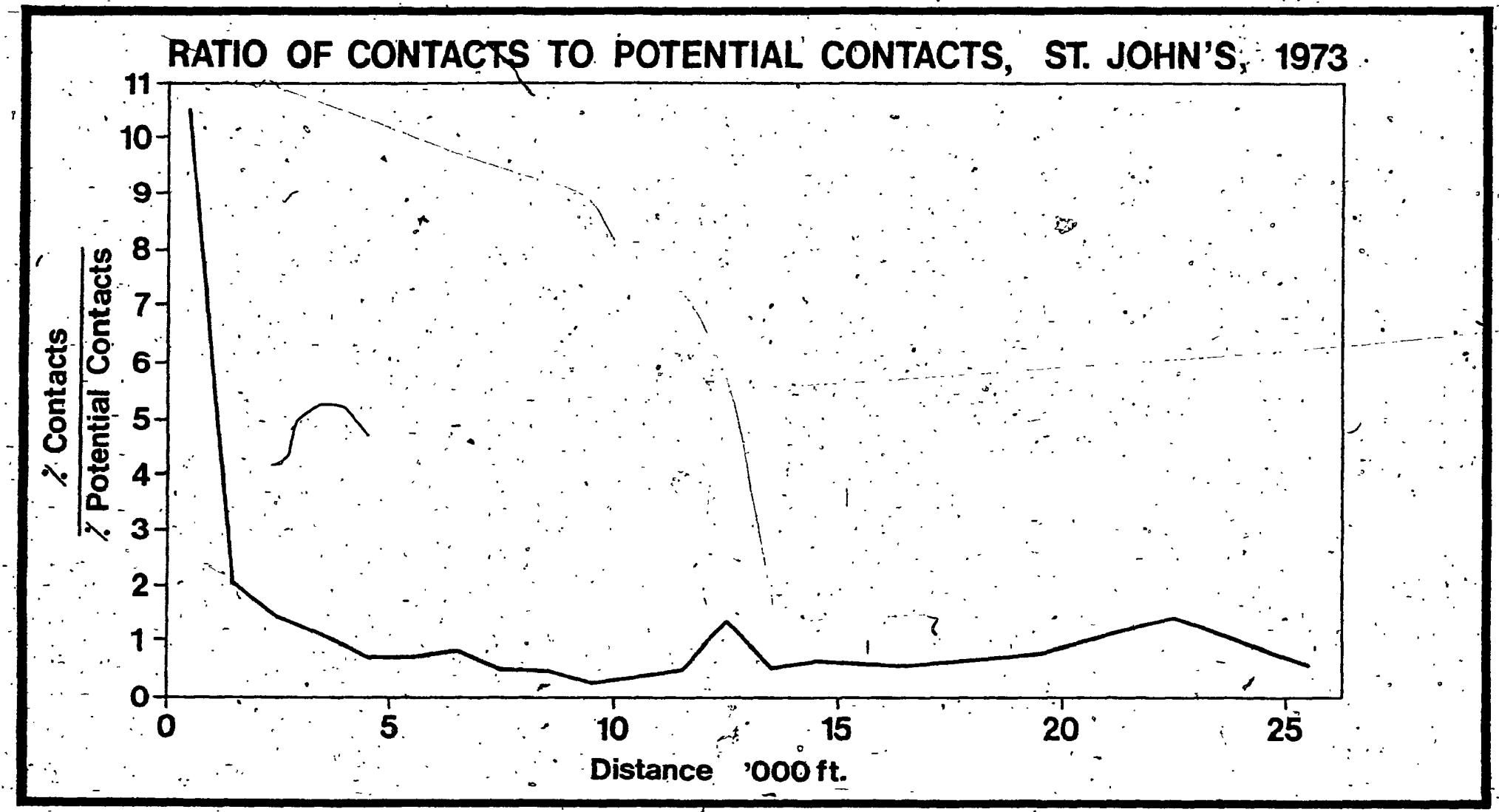

RATIO OF CONTACTS TO POTENTIAL CONTACTS, ST. JOHN'S, 1973
% Contacts / % Potential Contacts
11
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
Distance '000 ft.

Figure 4.7

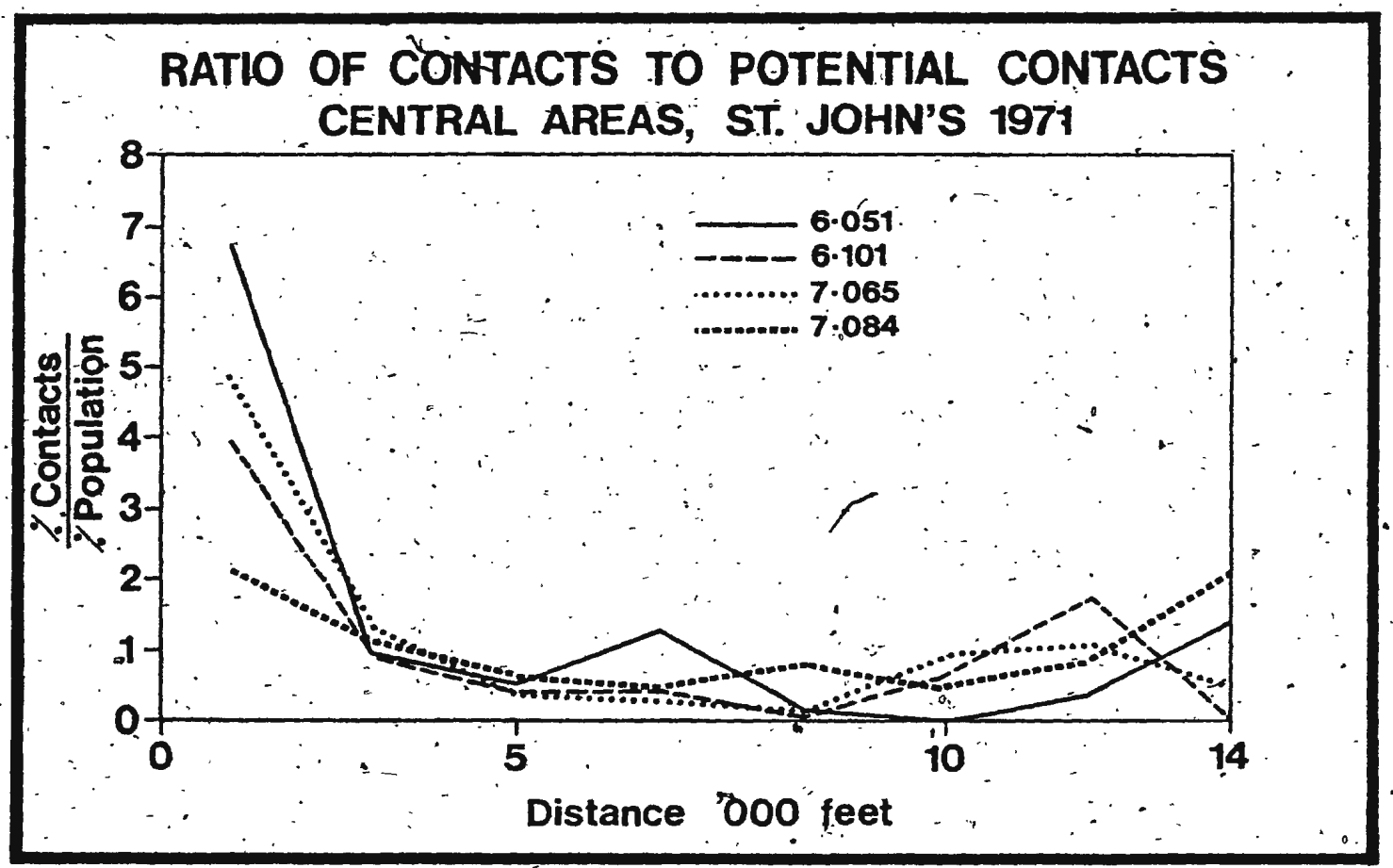

RATIO OF CONTACTS TO POTENTIAL CONTACTS
CENTRAL AREAS, ST. JOHN'S 1971
% Contacts / % Population
6·051
6·101
7·065
7·084
0
1
2
3
4
5
6
7
8
0
5
10
14
Distance '000 feet

Figure 4.8

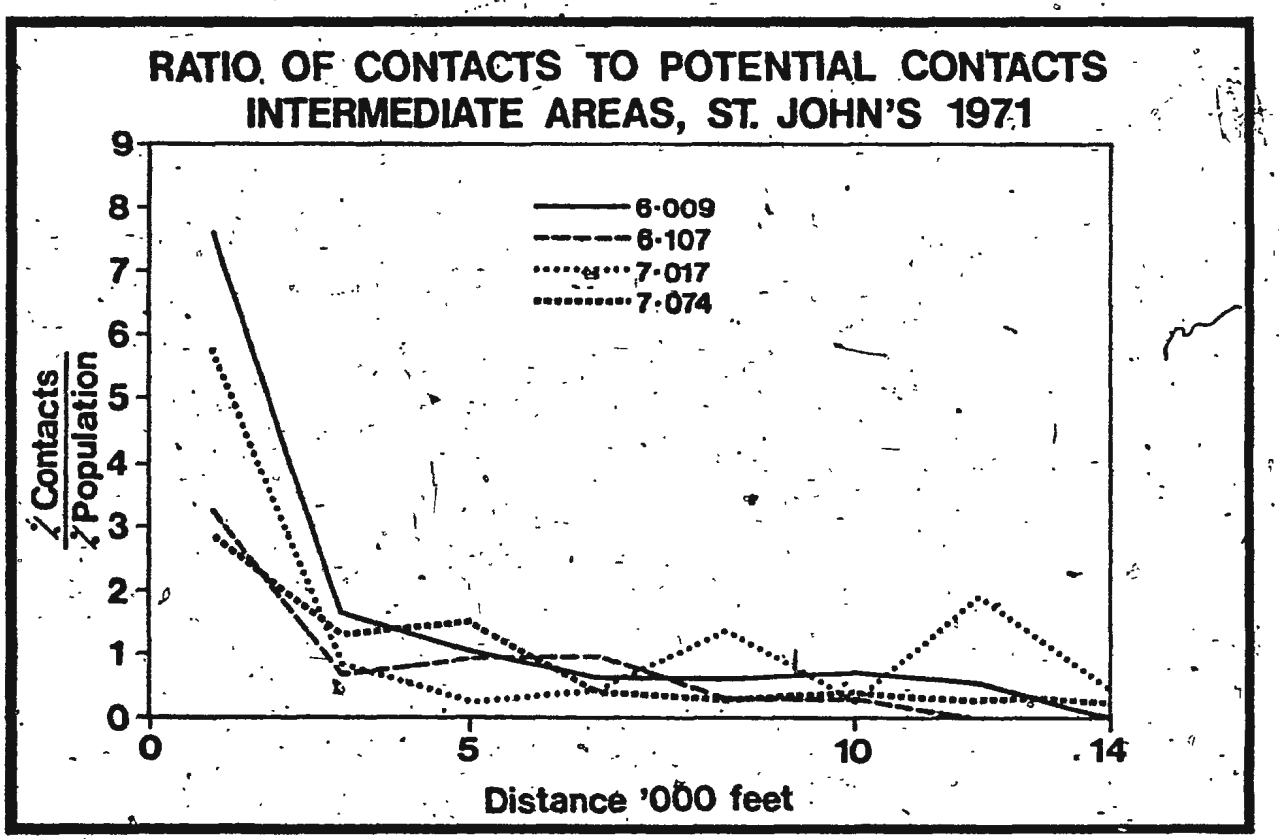

RATIO OF CONTACTS TO POTENTIAL CONTACTS
INTERMEDIATE AREAS, ST. JOHN'S 1971
6·009
6·107
7·017
7·074
% Contacts / % Population
0
1
2
3
4
5
6
7
8
9
0
5
10
14
Distance '000 feet

Fig. 4.9

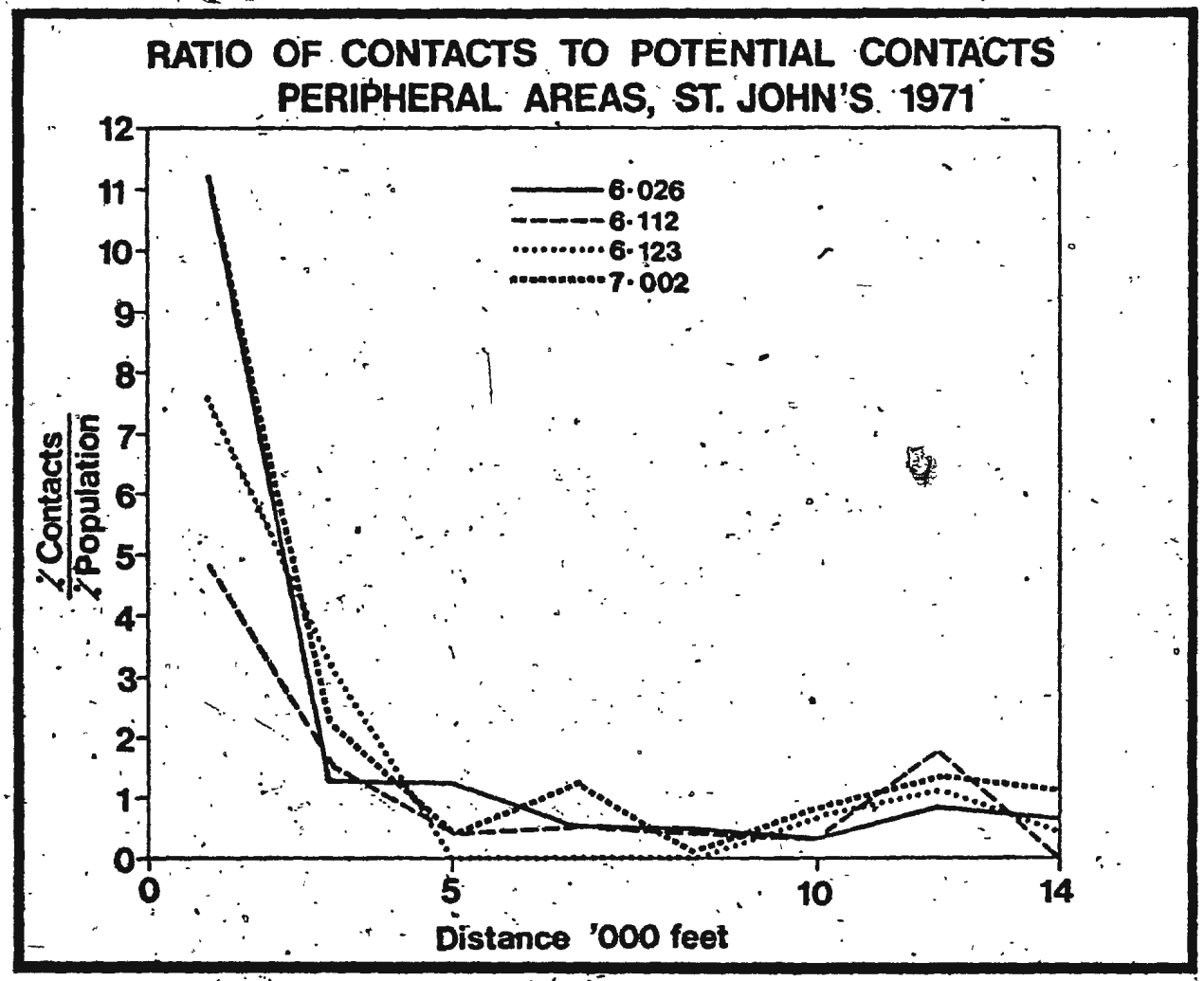

RATIO OF CONTACTS TO POTENTIAL CONTACTS
PERIPHERAL AREAS, ST. JOHN'S 1971
6·026
6·112
6·123
7·002
% Contacts / % Population
Distance '000 feet
0
5
10
14
0
1
2
3
4
5
6
7
8
9
10
11
12

Fig. 4.10

short distance visiting. It might be expected that these suburban areas would have lower values for such visiting than would the high density areas downtown, for it is commonly observed that low socio-economic status central areas exhibit strong locale based "community" behaviour (see, for instance, Smith et al, 1953, Young and Willmott, 1957, and Dennis, 1963), and this researcher's perceptions confirm this expectation. That this is in fact the case is clear from the untransformed data, for there are considerably more short distance social relationships in the central sample areas, but this is counteracted in the transformed data by variations in the population density which is particularly high near the downtown. For instance, while the residents of the centrally located area 7-054 have 43.7 percent of their contacts and 9.1 percent of the population within two thousand feet of their area, area 6-026 has 25.0 percent of contacts but only 2.2 percent of the population within the same distance. Thus, for distances of less than ten thousand feet there is strong confirmation of the hypothesis that social visiting between areas declines with increased distance, population being held constant. However, beyond this distance there is no clear relationship between distance and the number of contacts.

Further evidence of the constraining effect of distance is provided by the data on the frequency with which the respondents meet their friends. As was noted in Chapter I, Cox (1969) analyzed "acquaintance field spatial structures" in terms of the costs and benefits associated with different contacts. He suggested that "friendships with individuals at a distance are costlier to maintain... whether measured in terms of time, opportunity cost, mean distance per contact or whatever" (p. 152). The distance decay relationships described above are clearly one reflection of these costs of movement. Therefore it is to be expected that the frequency of contact with established friends will decline with increased spatial separation. The questionnaire collected frequency data on the basis of a five category interval scale of measurement, with two open categories, and hence it is hypothesized that trips made with greater frequency will be shorter than will more infrequent ones.

Table 4.1 expresses the median trip length for each of the five categories, the median being used because of the skewed nature of the data. For the sample as a whole use of the medians test for greater than two samples showed the differences between the category medians to be significant at the ninety-nine percent level,

TABLE 4.1

Median Distances (feet) to Social Contacts by Frequency of Contact

	Median contacts per month				
	<1	1	2-4	5-8	>8
Relatives (n=150)	8,028	8,565	5,330	4,125	4,465
Co-workers (n=56)	11,630	13,210	5,640	6,520	4,350
Others (n=282)	2,410	4,090	5,265	2,980	1,215
All Groups (n=488)	5,230	5,245	5,335	3,965	2,710

although it is clear that this is largely a reflection of the shorter distances involved in trips made with frequencies of more than once a week. For lesser frequencies the median distances involved are invariant.

2. Geographic Distance and the Type of Relationship

A number of researchers have investigated variations in social visiting behaviour according to the type of relationship involved. In his study of San Diego Stutz (1973) found distinct differences between the distance decay curves for contacts with neighbours, relatives and friends. Whilst no attempt was made to standardize these curves for the distribution of potential contacts, this will not affect inter-curve comparisons. Tomela's investigation of trip making in Detroit did not study the effect of distance per se, but did show co-worker acquaintanceship to be atypical of social contacts (Tomela, 1964, p. 31). Hence, to test such inter-

relationship differences in St. John's the data was disaggregated into relatives (n = 150), co-workers (n = 56) and other friends (n = 282).

It is clear from Table 4.2 that there are substantial differences between the three categories. Use of the medians test, which is again preferred because the distribution of contacts by distance is skewed, reveals that the difference between the median length of visits to relatives and to co-workers is not significant at the five percent level. However, the differences between the medians for relatives and others, and co-workers and others are both significant at the ninety nine percent level. The degree of skewness varies by category since most intra-area contacts occur between persons other than relatives and co-workers. Contacts less than a thousand feet distant account for 32.6 percent

TABLE 4.2

Median Distance to Social Contacts, by type of contact

	Median Distance (feet)
Co-workers (n=56)	6,520
Relatives (n=150)	5,080
Other Friends (n=282)	2,940

of other friend contacts, but only 8.7 percent of relatives and 7.0 percent of co-workers. Thus it appears that the maintenance of contacts with relatives and co-workers is less constrained by the effects of distance than are contacts with other friends.

3. Geographic Distance and the Length of Residence

The relationship between the number of years a person has resided in an area and the average distance to the residences of social contacts is complex. Cox-(1969) and Stutz (1973) have suggested that average contact distance declines with increased length of residence, reflecting a slow transition from relationships based on the previous residence or residences to ones centred on the new one. However, it is also likely that certain groups which are residentially immobile, such as the elderly and the poor, will also be immobile in terms of social visiting, independent of this "cost minimizing" adjustment to residential change. Thus, while Table 4.3 does show a decline in average trip length with increased length of residence it is not possible to state the precise nature of the causal relationship. However, Table 4.4 provides further evidence in support of the readjustment process theory, for it shows an initially low proportion of intra-area visiting after residential change, replicating Stutz's San Diego results (Stutz, 1973, p. 141).

TABLE 4.3

Median trip lengths by years of residence

Years of Residence		Median Trip Length (Feet)
2-3	(53)	5000
4-5	(57)	4670
6-7	(69)	5330
8-9	(53)	5030
10-19	(142)	3230
20-29	(75)	3285
30-39	(16)	6710
40-49	(9)	3540
>50	(14)	2110

TABLE 4.4

Percentage within-area contacts by years of residence

Years of Residence	Percentage of all contacts within sample area
2-3	12.5
4-5	21.3
6-7	19.6
8-9	22.5

B. Social Distance and Social Visiting

Having examined the relationships of geographic distance and social visiting the remainder of this chapter provides a preliminary assessment of the role of social (factorial) distance. The approach adopted is similar to that used when considering geographic distance effects, although there are five, rather than one, distance measures. For each of these measures the factor score of the respondents area was subtracted from the factor score of the area of the friends visited. Given that the frequency distributions of contacts with low status areas by respondents in high status areas and with high status areas by those living in low status areas are essentially similar, which is to be expected since all contacts with friends are, by their nature, reciprocal, the sign was ignored. Intra-area contacts were excluded from the analysis since, whilst it was possible to estimate an average geographic distance for such trips there were no grounds for such estimates in the case of social distance measures.

It was possible, then to construct a frequency distribution of contacts by social distance. However, this again had to be adjusted to take into account the (social) distributions of potential contacts, and hence a ratio measure was derived (Fig. 4.11).

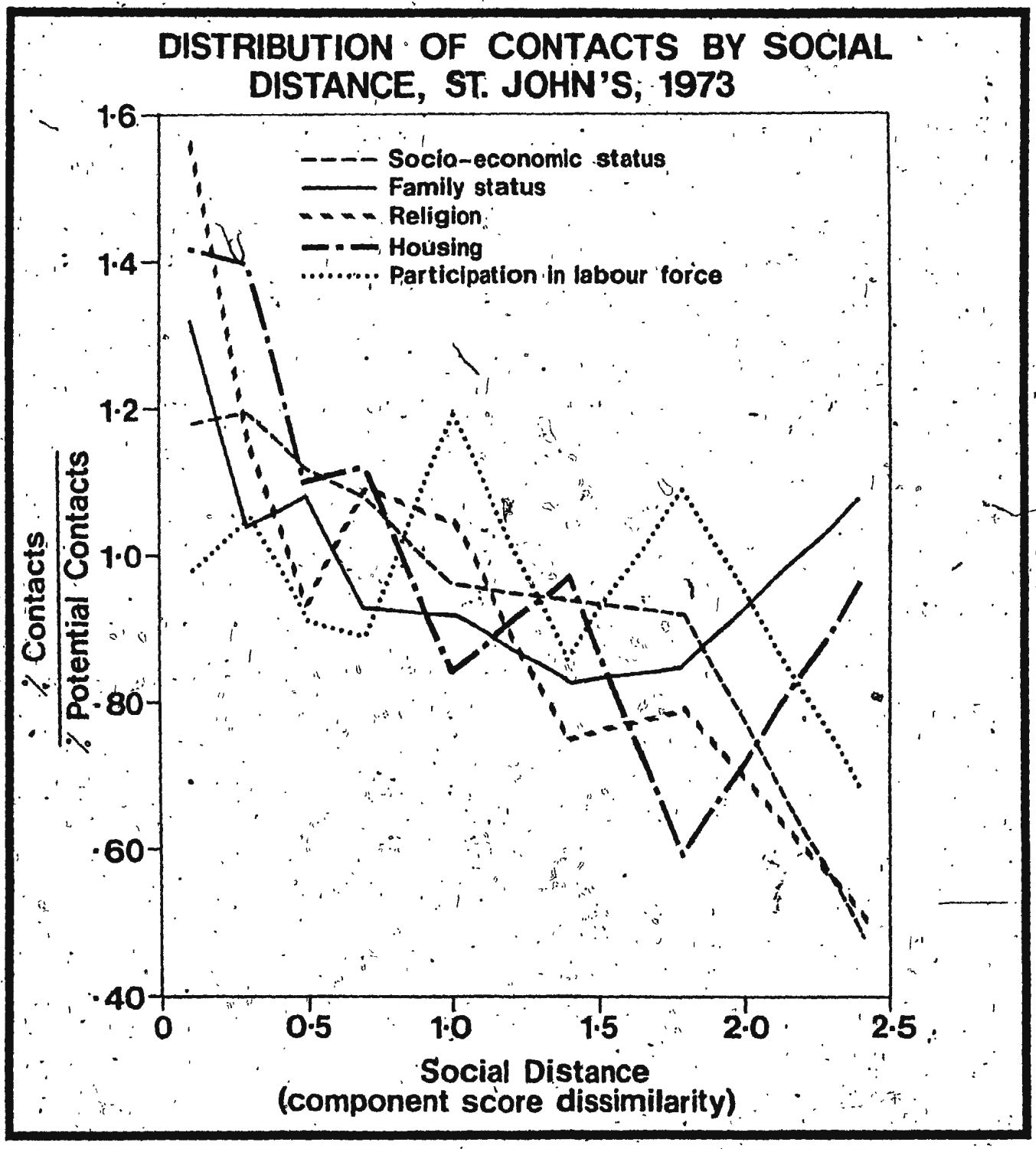

DISTRIBUTION OF CONTACTS BY SOCIAL DISTANCE, ST. JOHN'S, 1973
Socio-economic status
Family status
Religion
Housing
Participation in labour force
% Contacts / % Potential Contacts
1·6
1·4
1·2
1·0
·80
·60
·40
0
0·5
1·0
1·5
2·0
2·5
Social Distance
(component score dissimilarity)

Figure 4.11

There are major variations between the five curves so calculated. Considering them in order of their contributions to the factor ecological analysis, socio-economic status appears to most clearly approximate the hypothesized relationship. There is an initial, but very slight, rise in the contact ratio with increased social distance, but with increasing socio-economic dissimilarity the number of contacts relative to the number of potential contacts declines. Less than fifty percent of the expected number of contacts occur when socio-economic dissimilarity is extreme. In aggregate the ratio of contacts to potential contacts exceeds unity when the inter-area socio-economic score dissimilarity is less than 0.8.

The constraining effect of family status differentiation is generally comparable at other than extreme distances. The ratio exceeds that for socio-economic status for the shortest social distances, but declines more rapidly, falling below unity for factor score differences of greater than 0.5. However, beyond differences of 1.6 the ratio of contacts to potential contacts increases sharply to exceed unity. It was anticipated that this would result primarily from inter-generational contacts between relatives, for while contacts between relatives

account for thirty-nine percent of all inter-area contacts, they represent seventy-nine percent of social visiting between the areas of extreme (greater than 2.1) dissimilarity. When the contact ratios were recalculated for all contacts except relatives the increase in the ratio for dissimilar areas was greatly reduced (Figure 4.12).

Religious status differentiation also appears to support the hypothesis, with the ratio of contacts to potential contacts exhibiting an overall decline with increased dissimilarity. Indeed the ratios for religious status exhibit the greatest range of any component, with a value of 1.57 between similar areas and of 0.51 between extremely dissimilar ones. However, there are a number of fluctuations in the general pattern of decline, likely reflecting the influence of other dimensions of differentiation. Such fluctuations are also evident with regard to the last two dimensions considered, housing and participation in the labour force. In these cases the fluctuations are more pronounced, and whilst there is still some evidence of the hypothesized effect of social distance, it is largely obscured by these fluctuations. Thus there is evidence that the amount of social visiting between areas declines with increased social distance, although the constraining effect of the distance measures appears to vary between dimensions and, as was demonstrated with regard to family status, there is not always a simple decay relationship.

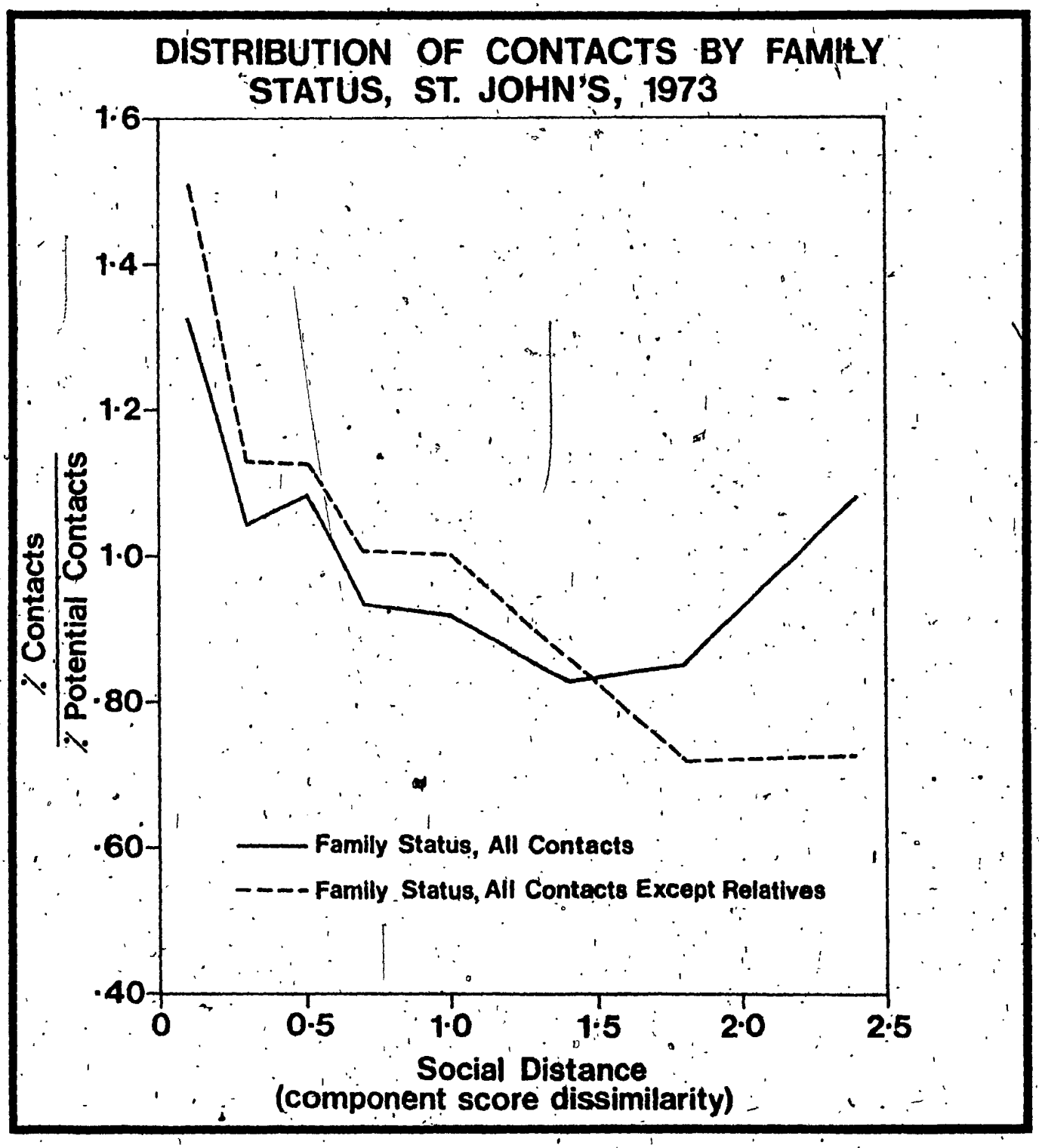

DISTRIBUTION OF CONTACTS BY FAMILY STATUS, ST. JOHN'S, 1973
1·6
1·4
1·2
1·0
·80
·60
·40
% Contacts / % Potential Contacts
Family Status, All Contacts
Family Status, All Contacts Except Relatives
0
0·5
1·0
1·5
2·0
2·5
Social Distance
(component score dissimilarity)

Figure 4.12

C. Conclusions

This analysis provides a valuable indication of the effects of geographic and social distance on social visiting. However, there are inherent in this consideration of social distance effects certain assumptions as to the linearity, and hence additivity, of factorial dimensions. Furthermore the analysis of the effects of geographic and social distance has been carried out with an implicit assumption of mutual independence; that is, ignoring problems of spatial auto-correlation. This problem of isolating the independent effects of geographic and social distance is the principal focus of the next chapter.

V. GEOGRAPHIC AND SOCIAL DIFFERENTIATION AND SOCIAL VISITING

A. Introduction

In Chapter Four evidence was presented in support of the contention that geographic distance and social distance (as measured in terms of the dimensions emerging from the factorial ecology) act as constraints on the number of social contacts between areas. That is, it appears that with increasing geographic and/or social distance between areas there is a decrease in the amount of inter-area social contact. However, it cannot be assumed that all the geographic and social dimensions are independent of one another. While there is substantial independence between the three main social distance measures (see Figure 3.5), reference to the component score maps (Figures 3.3 , 3.4 and 3.6) suggests that variations in the component scores are not independent of geographic distance, for it is the spatial clustering of areas with similar scores that makes the maps of interest. In general, then, areas near to a sample area in geographic space will also be near in social (factorial) space. This clustering of like areas constitutes a problem of spatial autocorrelation.

Hence, in the context of this research, it is not known whether the social distance decays that have been observed reflect the real effects of differentiation on the basis of these dimensions, or whether this impression

results from the fact that areas alike in their spatial location have similar component scores. Conversely, it is possible that geographic distance is not a real constraint, but that the effects of social distance combine to suggest that this is the case. Therefore, before any definitive statement as to the significance of geographic and social distance to social visiting can be made, it must be shown that they are of importance independent of one another. In particular, it is necessary to establish that geographic distance is a significant constraint independent of socio-economic, family and religious status, and that they, in turn, are significant independent of geographic distance.

B. Independent Effects of Geographic and Social Distance.

1. Methodology

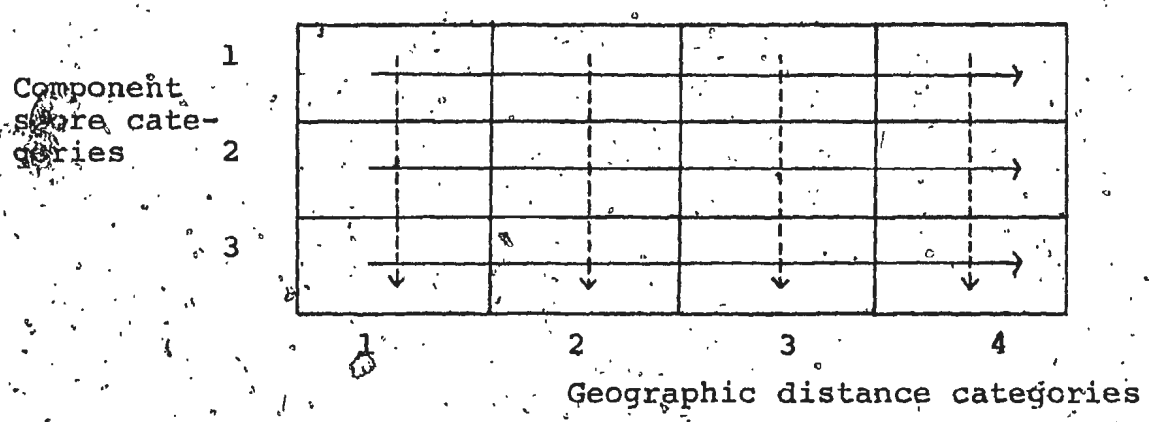
Every pair of enumeration areas in the city are separated in terms of both geographic and social space. Hence, with respect to any particular area, and any one social distance measure, it is possible to construct a two-dimensional matrix wherein the population of every other area is allocated on the basis of its geographic and social (component score) distance. For each of the twelve sample areas, or groups of like sample areas, the distribution of the contacts reported by respondents can be compared with the corresponding matrix. In particular,

with each axis divided into a number of categories (Figure 5.1) each geographic and social distance vector can be considered in isolation; that is, consideration of the individual rows shows geographic distance effects with social distance variations minimized, while the columns show the effects of social distance with geographic distance variations minimized. Thus, the expectation with respect to the original hypotheses is that the ratio of contacts to potential contacts will decline (i) with increased geographic distance and (ii) with increasingly dissimilar component scores, for each vector. Such independent analyses of geographic and social distance effects can be undertaken for groups of like sample areas for each of the three social distance measures, thus providing a test of the hypothesized "systematic differences in the social visiting behaviour of the populations of sociographic areas according to their social characteristics."

Accordingly, the range of possible geographic and social distances between areas were categorized. In the former case consideration of the analyses undertaken in Chapter Four suggests that significant break points occur at approximately five and ten thousand feet. All possible contact lengths were therefore grouped into four categories; less than five thousand, five to ten thousand, ten to fifteen thousand, and more than fifteen thousand feet. Similarly the preliminary findings as to the effects of

FIGURE 5.1

Format for Independent Analysis of Distance Effects



Expected direction of ratio decline with respect to sample areas with component scores falling into category 1

a) Geographic distance decay effects ——→

b) Social distance decay effects - - - - →

social distance were examined, and it was decided that a sufficient degree of differentiation was achieved by a three category classification with the break points being factor scores of plus and minus 0.5 so as to have categories of near equal size. Consequently three 4 x 3 matrices were drawn up for each component, one for sample areas with scores greater than +0.5, one for those with values of less than -0.5 and one for intermediate areas.

For the appropriate cell of each matrix, then, the number of potential contacts and the number of sample contacts was known and it was possible to calculate, for each vector, the expected number of sample contacts in each cell were they allocated solely on the basis of the distribution of potential contacts. That is, the total number of sample contacts for the vector was multiplied by the proportion of the vector population in each cell to give the expected number of contacts for that cell. Thus, for each geographic distance vector and for each social distance vector, it was possible to test the null hypothesis: that the number of contacts occurring for each category varies solely in response to variations in the number of potential contacts, and any observed differences are merely chance variations to be expected in such a sample.

The data in this form is amenable to testing by a number of nonparametric statistical procedures which

do not require normally distributed data. While the χ^2 one sample test would appear to satisfy the requirements of the hypothesis, it is not the most appropriate one in that there is a question of order involved, and "the χ^2 test is insensitive to the effects of order" (Siegel, 1956, p. 45). As a consequence the Kolmogorov - Smirnov one sample test is more appropriate, and, furthermore, Siegal considers it the most powerful goodness-of-fit test of a number he considered. It is accordingly used in this analysis.

C. Geographic Distance and Socio-Economic Status

The three matrices of actual and expected contacts for the socio-economic status component are presented in Table 5.1.[1] In each cell is recorded the actual number of contacts made with areas falling into the appropriate

---

[1] Key to Tables 5.1 to 5.4

17 = actual number of contacts

[12] = expected number of contacts given a redistribution of row totals on the basis of population.

(15) = expected number of contacts given a redistribution of column totals on the basis of population.

Significance levels: * = 80% **** = 95%
** = 85% ***** = 99%
*** = 90%

geographic and social distance group, and column and row vector totals are given. The figures in parentheses are the expected numbers of contacts for each cell, given a redistribution of the vector totals on the basis of the cell populations, both with respect to row and column totals. For example, in the case of the first cell in Table 5.1, the actual number of contacts made with areas both less than five thousand feet away and with similar component scores (less than -0.5) is seventeen, while, had geographic distance not been a constraint (the only factor causing variations being the distribution of potential contacts) twelve contacts would have been expected. Similarly, the expected number of contacts had social distance not been a constraint is fifteen. Row and column totals of expected contacts are given, and whilst they may similarly be compared with the actual totals there is no minimization of auto-correlation effects when these aggregate figures are compared.

It is clear from Table 5.1 that geographic distance is, in general, a constraint on inter-area social visiting even when the effects of socio-economic status variations have been abstracted. However, there are also variations in its effects, both between and with regard to groups of sample areas. Considering first the aggregate geographic distance effects, as expressed by the column totals, it is clear that the actual distribution differs from that anticipated under the null-hypothesis for the contacts of

TABLE 5.1

Geographic Distance and Socio-Economic Status

a) Sample areas with high socio-economic status (<-0.5)

				Significance
17 [12]	13 [10]	10 [16]	13 [15]	53 *
(15)	(5)	(4)	(12)	(36)
17 [9]	16 [20]	6 [10]	16 [17]	55
(11)	(15)	(6)	(12)	(44)
4 [3]	7	7 [6]	6 [5]	24
(12)	(16)	(13)	(10)	(51)
38 [24] **	36 [40] ***	23 [32] **	35 [37]	132 ***** **

b) Sample areas with medium socio-economic status (-0.5 to +0.5)

				Significance
12 [7]	11 [15]	11 [12]	4 [4]	38
(9)	(7)	(8)	(4)	(28)
8 [3]	2 [6]	1 [3]	2 [1]	13
(6)	(4)	(2)	(1)	(13) ***
6 [5]	10 [11]	1 [1]	1 [1]	18
(11)	(12)	(3)	(2)	(28)
26 [15]	23 [32]	13 [16]	7 [6]	69 **

c) Sample areas with low socio-economic status (+0.5)

				Significance
7 [5]	14 [17]	12 [11]	3 [3]	36
(12)	(11)	(9)	(3)	(44)
39 [29]	16 [21]	6 [11]	3 [3]	64 ***
(48)	(21)	(7)	(3)	(70)
77 [54]	18 [35]	0 [6]	0 [0]	95 *****
(63)	(15)	(2)	(0)	(80)
123 [88] ***	48 [73]	18 [28]	6 [6]	195 ***** *

populations of high, medium and low socio-economic status, and that distance effects are most significant for the last of these. Whilst care must be taken in comparing significance levels reached for samples of different sizes (since the level of significance reflects both the size of variation and the size of sample involved) there is still a strong contrast between the distance effects for the extreme samples. Even when status variations are minimized by disaggregation there is evidence that distance is a greater constraint on contact for populations of low socio-economic status than for others. This is to be expected since reference to the original factor loadings (Table 3.5) shows low income to be associated with low socio-economic status, and a number of studies have demonstrated that income and mobility are positively correlated (see, for instance, Chicago Area Transportation Study, 1958).

At the aggregated data level, the effects of socio-economic status differentiation on the maintenance of contacts are significant only in the case of high status sample areas, while it is barely significant for low status populations. This is confirmed at the disaggregated data level (i.e. when individual columns are considered) with both low and high status areas showing socio-economic status differences to have a significant effect. While there is some evidence that socio-economic status differentiation is a greater constraint on contacts over short

geographic distances (see especially Table 5.1c) the effect of geographic distance decay on sample sizes makes a definitive statement on this point impossible.

D. Geographic Distance and Family Status

Examination of Table 5.2 reveals the overall effects of geographic distance for populations of differing family status, and shows it to be a significant constraint on social visiting for all groups. The fact that this is less so for populations of young family status than those of old status suggest that young families are generally, despite the constraints imposed by child rearing, more geographically mobile than other groups. However, it should be noted that this analysis is concerned only with contact length, and not with contact frequency. There is further evidence of the reduced effect of distance constraints for young family status populations when the data is disaggregated since the actual numbers of contacts relative to the expected numbers under the null hypothesis do not differ at even the eighty percent significance level. In contrast, the old status sample, which is of a similar size, differs at the ninety five percent level for two of the three subsets. The fact that the third subset represents contacts with areas of young family status suggests that contacts, which are by their nature reciprocal, reflect the distance constraints associated with the populations of both areas involved.

TABLE 5.2

Geographic Distance and Family Status

a) Sample areas with old family status (< -0.5)

				Significance
25 [16]	10 [18]	4 [5]	0 [0]	39 ****
(22)	(11)	(3)	(0)	(36)
20 [12]	9 [15]	4 [6]	1 [1]	34 ****
(23)	(10)	(4)	(1)	(38)
11 [6]	11 [12]	4 [6]	4 [6]	30
(11)	(9)	(5)	(4)	(29)
56 [34]	30 [45]	12 [17]	5 [7]	103 *****
Significance				

b) Sample areas with medium family status (-0.5 to +0.5) Significance

32 [24]	18 [25]	5 [6]	1 [1]	56 *
(30)	(19)	(3)	(1)	(53)
50 [32]	16 [26]	7 [14]	1 [3]	74 *****
(44)	(20)	(8)	(3)	(75)
15 [15]	20 [19]	11 [19]	19 [12]	65
(22)	(15)	(12)	(17)	(66)
97 [71]	54 [70]	23 [59]	21 [16]	195 *****
Significance				

c) Sample areas with young family status (> 0.5) Significance

12 [7]	8 [11]	2 [5]	9 [8]	31
(9)	(5)	(4)	(6)	(24)
9 [6]	8 [11]	3 [3]	6 [6]	26
(14)	(12)	(5)	(9)	(40)
13 [8]	7 [99]	14 [14]	7 [10]	41
(11)	(4)	(9)	(7)	(35)
34 [21]	23 [31]	19 [22]	24 [22]	98 ****
Significance				

Turning to the effects of family status differentiation on the amount of contact between areas it is clear that it is not a significant constraint, at either the aggregate or disaggregated levels, for any of the status groups. However, it has already been shown (see page above) that this is largely the result of inter-generational family contacts, and reference to Table 5.2 (a) and (c) shows that there is a tendency for the ratio of contacts to the number expected under the null-hypothesis to exceed unity for contacts between young and old status areas. The matrices were therefore recalculated with contacts with relatives excluded and the tendency for the ratio to initially decrease and then increase with increased family status distance was substantially reduced (Table 5.3). However, family status differentiation remained insignificant as a constraint on interaction at both the aggregate and disaggregate levels. Given that contacts with relatives have been shown to extend over longer distances than other contacts (see page 115), above), it is not surprising that the reduced matrices show geographic distance to be an even more significant constraint despite reduced sample sizes. Again, the reduced matrix confirms the suggestion that geographic distance is less of a constraint for populations of young family status.

TABLE 5.3

Geographic Distance and Family Status; non-relatives only

a) Sample areas with old family status (< -0.5)

				Significance
18 [11]	10 [13]	0 [4]	0 [0]	28 ***
(16)	(7)	(0)	(0)	(23)
15 [8]	6 [10]	1 [4]	1 [1]	22 ***
(16)	(7)	(1)	(0)	(24)
8 [3]	4 [6]	1 [3]	1 [3]	14 ****
(8)	(6)	(1)	(0)	(15)
40 [22]	20 [29]	2 [11]	2 [4]	64 *****

Significance:

b) Sample areas with medium family status (-0.5 to +0.5)

				Significance
19 [13]	11 [14]	0 [3]	1 [1]	31 *
(20)	(11)	(1)	(1)	(33)
38 [22]	7 [18]	5 [9]	0 [2]	50 *****
(30)	(11)	(4)	(2)	(47)
9 [8]	13 [10]	6 [9]	11 [6]	39
(15)	(9)	(6)	(10)	(40)
66 [43]	31 [42]	11 [21]	12 [9]	120 *****

Significance:

c) Sample areas with young family status (> +0.5)

				Significance
8 [3]	1 [5]	0 [2]	4 [4]	15 ***
(7)	(3)	(2)	(4)	(16)
8 [5]	6 [8]	1 [2]	5 [5]	20
(10)	(7)	(3)	(7)	(27)
9 [6]	6 [7]	10 [11]	7 [8]	32
(8)	(3)	(7)	(5)	(23)
25 [14]	13 [20]	11 [15]	16 [17]	67 ***

Significance: *

Significance levels: See Table 5.1

E. Geographic Distance and Religious Status

Table 5.4 shows the effects of geographic and religious status differentiation on social visiting for the populations of three groups of sample areas of contrasting religious status. Again, consideration of the constraining effect of geographic distance on social visiting shows it to be highly significant for all groups at the aggregate level. At the disaggregated level (i.e. with religious status variations minimized) it is highly significant for contacts between areas with low component scores and between areas with medium scores, but less significant as a constraint on populations with high scores. That geographic distance should have a less significant constraining effect on the latter, "Protestant", groups, is to be expected given that car ownership has a positive loading (of 0.42) on religious status, and that there is a weak negative correlation between the religious and socio-economic status components, with "Protestant" areas being of generally higher socio-economic status.

In considering the effects of religious status differentiation on inter-area contacts the aggregate data shows it to be highly significant only in areas of positive ("Protestant") religious status. Disaggregation of the data (i.e. with geographic distance variations minimized) suggests that its effects are concentrated in the case of short distance contacts, although the differences in

TABLE 5.4

Geographic Distance and Religious Status

a) Sample areas with more Catholic religious status (<-0.5)

				Significance
34 [20]	6 [17]	0 [3]	0 [0]	40 *****
(24)	(6)	(1)	(0)	(31)
8 [7]	8 [8]	1 [3]	1 [2]	18
(16)	(6)	(2)	(1)	(25)
4 [2]	4 [6]	5 [4]	1 [2]	14
(6)	(6)	(3)	(1)	(16)
46 [29] ****	18 [31]	6 [10]	2 [4]	72 ***** *

b) Sample areas with medium family status (-0.5 to +0.5)

				Significance
27 [17]	11 [16]	0 [4]	0 [1]	38 ****
(37)	(19)	(4)	(2)	(62)
35 [24]	16 [24]	4 [8]	5 [4]	60 ****
(24)	(16)	(4)	(6)	(50)
16 [16]	20 [20]	15 [20]	14 [9]	65
(17)	(12)	(11)	(11)	(51)
78 [57] ***	47 [60] **	19 [32]	19 [14]	163 *****

c) Sample areas with more Protestant religious status (>+0.5)

				Significance
16 [6]	6 [12]	5 [5]	5 [4]	27
(20)	(14)	(8)	(8)	(50)
25 [14]	13 [21]	12 [12]	12 [16]	62 ****
(21)	(12)	(9)	(11)	(53)
27 [19]	23 [20]	12 [17]	10 [16]	72 ***
(22)	(16)	(12)	(9)	(59)
63 [39] **	42 [53] ***	29 [34]	27 [36]	161 ***** *****

sample sizes again make comparison hazardous. If, however, contacts over more than ten thousand feet in Table 5.4c are merged, the effect of religious differentiation are still not significant, even given a comparable sample size.

F. Geographic and Social Distance

This analysis largely confirms the findings of Chapter Four. In particular, geographic distance has a significant overall effect in constraining inter-area social interaction, with the probability of social contacts being maintained between areas decreasing with increased distance, independent of variations in measures of social differentiation. Even where variations in geographic and component distributions result in small sample sizes there is still a consistent tendency for the ratio of contacts to potential contacts at distances of less than five thousand feet to exceed unity. While the constraining effects of geographic distance are clear, they are less pronounced for some groups than for others. In particular it is less important a constraint on populations of high socio-economic status, of young family status and of more Protestant religious status. It seems likely that the first and last of these are partially linked, a reflection of the slight inter-correlation between the two components.

With regard to the three social distance measures considered, it is clear that family status differences have no significant effect on the amount of social visiting between areas. Indeed, there is a tendency for the number of contacts to increase at extreme family status distances, and whilst this is substantially reduced when only non-relative contacts are considered, there are still no significant overall social distance effects. It can be concluded that family status differentiation is not a significant constraint on inter-area social visiting. However, both socio-economic and religious status do have a significant effect, although this varies according to the status group involved. In particular, they are specially significant as constraints on high socio-economic and Protestant religious status populations respectively. The fact that both of these groups are less constrained by geographic space suggests that this may permit them to be more wide ranging and hence selective in terms of their social contacts.

Furthermore, socio-economic and religious differentiation appear to be greater constraints for areas with extreme rather than average component scores. That is, there appears to be a greater than proportional increase in the constraining effect of social distance with increased differentiation, especially with respect to high socio-economic and religious status areas. In this context the

proportions of contacts of high socio-economic status populations in low status areas, and of highly Protestant populations in Catholic areas are particularly small.

VI. CONCLUSIONS

A. The Factor Ecology of St. John's

One of the main priorities in the factorial ecology of St. John's was to achieve comparability with other Canadian studies in terms of variable selection and factorial techniques. The major difference was the type of areal unit used, for while most studies have analyzed census tract data, the small size of St. John's dictated the use of the enumeration area as the observational unit. It is not clear from past research whether there are significant variations between the factors derived using data for units of different sizes, or whether, if there are differences, the results of a tract analysis are inherently superior. In this thesis, however, it was assumed that the size of unit would not have any major effect on the factors derived, and that St. John's was similar to other North American cities. Hence it was posited that the components emerging would include the socio-economic status, family status and segregation dimensions common to most tract based studies of North American cities, with prior knowledge of St. John's leading to the expectation that segregation would be on the basis of religious differentiation.

While factor labelling is essentially subjective, the hypothesis was clearly confirmed with the expected dimensions the three most important of five components extracted. This suggests that observational unit size is

not critical to the form of the factors derived, and that census tract and enumeration area based results are largely comparable. In this case enumeration area data has the advantage of increasing the refinement of the description of the city and permitting a fuller understanding of inter-area variations. However, a comprehensive study of scale differences and the related problem of factor significance is necessary before any definitive statement can be made as to the relative merits of the two scales of analysis.

B. Geographic and Social Distance and Social Visiting

1. Geographic Distance

Analysis of the patterns of social visiting in St. John's revealed geographic distance to be a strong constraint on informal social interaction, even when the effects of variations in the distributions of potential contacts and the non-independence of geographic and social distance measures were minimized. The number of inter-area contacts decreases progressively with increased distance up to ten thousand feet. Beyond that distance the number of contacts is largely invariant. While the constraining effect of distance is clear, there are, as hypothesized, "systematic differences in the social visiting behaviour of the populations of sociographic areas according to their social characteristics." In particular, geographic distance is a less important con-

straint on populations of high socio-economic status, of young family status, and of Protestant religious status.

2. Social Distance

Evaluation of the effects of social (factorial) distance on social visiting concentrated on the socio-economic, family and religious status components generated by the factorial ecology of St. John's. Of these the first and last are shown to be influential in constraining social visiting, although there are again differences between areal populations according to their status rankings. In particular, social distance is a greater constraint on visiting for groups of high socio-economic and more Protestant religious status. With regard to the family status dimension, however, there is a tendency for the number of contacts to increase at extreme family status distances, and whilst there is a substantial reduction in this tendency when only non-relative contacts are considered, the effects of social distance remain insignificant.

C. Urban Ecological Differentiation and Social Visiting

Thus, while geographic and social (socio-economic and religious status) differentiation are constraints on the number of social relationships between urban sub-areal populations, their importance varies according to the characteristics of the populations involved. In particular, groups of low socio-economic status, old family status, and Catholic religious status are more constrained by

geographic distance. It has been shown that socio-economic and religious status is also a significant constraint on short distance (less than five thousand feet) contacts by such populations. Thus spatial clusters of areas alike in terms of low socio-economic status, Catholic religious status and (less critically) young family status will be linked by a strongly localized network of social contacts. Previous research on the role of social interaction in the establishment and reinforcement of normative behaviour suggests that the residents of such clusters of like areas will have common behavioural traits. Such a linking of locale, social and economic characteristics and behaviour produces areas exhibiting many of the attributes of the traditional urban "community". Indeed, such areas are found only in the old residential core of St. John's.

In contrast, populations with high socio-economic status, young family status and Protestant religious status have social contacts over a wider geographic area since they are less constrained by distance. However, such groups are more affected by socio-economic and religious status differences, and hence their contacts, while more diffuse spatially, are more homogeneous socially. Populations which combine high socio-economic status, young family status and Protestant religious status, whilst not unconstrained by distance are more nearly members of a "non-place community". There is still likely to be an establishment and reinforcement of normative behaviour,

but such behaviour will not be specifically based on locale, but common to a spatially dispersed community throughout the city.

These two patterns of social visiting behaviour represent extremes occurring only when populations have particular rankings on these three largely independent social dimensions. At one extreme is the "archaic" locale based community, at the other a more diffuse non-place community. This thesis has thus provided evidence that a structural analysis of St. John's defines areas which are distinctive in terms of behavioural patterns. This research suggests that further integration of structural and behavioural approaches may be fruitful, and supports the existing, but limited, use of factorial studies as providing sampling frames for the selection of areas for comparative studies. There is a need, however, for further micro-scale research into the importance of sociographic differentiation, through a comprehensive examination of the behavioural contrasts between adjacent sociographic areas. Such analysis should consider a wider range of behavioural characteristics, including perceptual and attitudinal variations. This would permit a better understanding of the behaviour of sub-areal populations with respect to such aspects of urban change as intra-urban residential movement and major urban planning developments.

APPENDIX I

Social Interaction Survey - Strictly Confidential

If you care to fill out this form yourself, please do so and return it to the Survey interviewer who will call to collect it. If you prefer it the interviewer will be glad to fill it out for you or help you with any difficulties you may have:

YOURSELF:

(1) What is your address in St. John's?

_____ _____

\# Street

(2) For how many years have you been living at this address?

_____ years.

(3) If you have been living at this address for less than ten years please list your previous address (or addresses) during the last ten years. (If you have had more than three, just list the three most recent.)

#	Street	Town

YOUR SOCIAL CONTACTS:

In this part of the form we want to find out where your friends live (not who they are) and how you and they travel to meet. We only want to know about those people you meet socially; we are not interested in people you work with unless you also meet them outside work hours. Include any relatives that you meet socially (but not, of course, those with whom you live).

Please, then, answer a few questions on each of the FOUR persons you meet socially most often.

A. (1) What is the address of the first of these four people you meet socially most often?

_____ _____ _____

\# Street Town

(2) How long has he/she been living at that address?

_____ years.

(3) How did you first meet him/her? (i.e. is he/she a relative, a workmate, a school friend etc.).

_____

_____

(4) How often do you meet him/her socially? (Check one x)

Less than once a month ___

Once a month ___

2 to 4 times a month ___

5 to 8 times a month ___

More than 8 times a month ___

(5) Where do you usually meet him/her socially? (Check one x)

Your home ___

His/her home ___

Neither ___

If 'Neither', where do you usually meet? (e.g. do you usually meet at church, a club, a cafe, a tavern, a restaurant?)

_____

(6) How do you usually travel to wherever you and he/she usually meet OR if you usually meet at your home, how does he/she travel to your home? (Check one or more x)

Walking ___

Metrobus ___

Taxi ___

Private car ___

B. (1) What is the address of the second of these four people you meet socially most often?

_____ _____ _____

\# Street Town

(2) How long has he/she been living at that address?

_____ years.

(3) How did you first meet him/her? (i.e. is he/she a relative, a workmate, a school friend, etc.).

_____

_____

(4) How often do you meet him/her socially? (Check one x)

Less than once a month ___

Once a month ___

2 to 4 times a month ___

5 to 8 times a month ___

More than 8 times a month ___

(5) Where do you usually meet him/her socially? (Check one x)

Your home ___

His/her home ___

Neither ___

If Neither, where do you usually meet? (e.g. do you usually meet at church, a club, a tavern, a restaurant?)

_____

(6) How do you usually travel to wherever you and he/she usually meet OR if you usually meet at your home, how does he/she travel to your home? (Check one or more x)

Walking ___

Metrobus ___

Taxi ___

Private car ___

C. (1) What is the address of the third of these four people you meet socially most often?

_____ _____ _____

\# Street Town

(2) How long has he/she been living at that address?

_____ years.

(3) How did you first meet him/her? (i.e. is he/she a relative, a workmate, a school friend etc.).

_____

_____

(4) How often do you meet him/her socially? (Check one x)

Less than once a month ___

Once a month ___

2 to 4 times a month ___

5 to 8 times a month ___

More than 8 times a month ___

(5) Where do you usually meet him/her socially? (Check one x)

Your home ___

His/her home ___

Neither ___

If 'Neither', where do you usually meet? (e.g. do you usually meet at church, a club, a cafe, a tavern, a restaurant?)

_____

(6) How do you usually travel to wherever you and he/she usually meet OR if you usually meet at your home, how does he/she travel to your home? (Check one or more x)

Walking ___

Metrobus ___

Taxi ___

Private car ___

D. (1) What is the address of the last of these four people you meet socially most often?

_____ _____ _____

\# Street Town

(2) How long has he/she been living at that address?

_____ years.

(3) How did you first meet him/her? (i.e. is he/she a relative, a workmate, a school friend, etc.).

_____

_____

(4) How often do you meet him/her socially? (Check one x)

Less than once a month ___

Once a month ___

2 to 4 times a month ___

5 to 8 times a month ___

More than 8 times a month ___

(5) Where do you usually meet him/her socially? (Check one x)

Your home ___

His/her home ___

Neither ___

If 'Neither', where do you usually meet? (e.g. do you usually meet at church, a club, a tavern, a restaurant?)

_____

(6) How do you usually travel to wherever you and he/she usually meet OR if you usually meet at your home, how does he/she travel to your home? (Check one or more x)

Walking ___

Metrobus ___

Taxi ___

Private car ___

Thank you for your help in this survey.

BIBLIOGRAPHY

Abu-Lughod, J. 1969. "Testing the Theory of Social Area Analysis: A Factorial Ecology of Cairo, Egypt," American Sociological Review, 34, 189-212.

Anderson, N. 1923. The Hobo. University of Chicago Press, Chicago.

Anderson, T.R. and Egeland, J. 1961. "Spatial Aspects of Social Area Analysis," American Sociological Review, 26, 392-9.

Bell, W. 1955. "Economic, Family, and Ethnic Status," American Sociological Review, XX, 45-52.

Bell, W. and Force, M.T. 1956. "Urban Neighbourhood Types and Participation in Formal Associations," American Sociological Review, 21, 25-34.

Bell, W. 1957. "Anomie, Social Isolation and Class Structure," Sociometry, 20, 105-16.

Bell, W. and Boat, M.D. 1957. "Urban Neighbourhoods and Informal Social Relations," American Journal of Sociology, 62, 391-8.

Bell, W. 1959. "Social Areas: Typology of Urban Neighbourhoods," in Community Structure and Analysis, edited by M. Sussman, Crowell, New York.

Bell, W. and Moskos, C.C. Jr. 1964. 'A Comment on Udry's "Increasing Scale and Spatial Differentiation,"' Social Forces, 42, 415.

Bernard, J.S. 1973. The Sociology of Community, Scott Foresman, Glenview, Ill.

Berry, B.J.L. 1965. "Internal Structure of the City," Law and Contemporary Problems, XXX, 111-119.

Berry, B.J.L. and Rees, P.H. 1969. "The Factorial Ecology of Calcutta," American Journal of Sociology, 74, 445-91.

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

Berry, B.J.L. and Spodek, G.F. 1971. "Comparative Ecologies of Large Indian Cities," Economic Geography, 47, 2 (Supplement), 266-285.

Beshers, J.M. 1957. "Census Tract Data and Social Structure: A Methodological Analysis," unpublished Ph.D. dissertation, University of North Carolina.

Bloch, D. 1952. "Identification and Participation in Urban Neighbourhoods," unpublished M.A. thesis, University of Chicago.

Boal, F.W. 1971. "Territoriality and Class: A Study of Two Residential Areas in Belfast," Irish Geography, 6, 229-248.

Boalt, G. and Janson, C.G. "Distance and Social Relations," Acta Sociologica, 2, 73-97.

Bossard, J.H.S. 1932. "Residential Propinquity as a Factor in Marriage Selection," American Journal of Sociology, 38, 219-224.

Bourne, L.S. and Barber, G.M. 1971. "Ecological Patterns of Small Urban Centers in Canada," Economic Geography, 47, 2 (Supplement), 258-65.

Burgess, E.W. 1961. "The Growth of the City," in Studies in Human Ecology, edited by Theodorson, G.A., Harpers, New York.

Caplow, T. and Forman, R. 1950. "Neighbourhood Interaction in a Homogeneous Community," American Sociological Review, 15, 357-67.

Cattell, R.B. 1966. "The Scree Test for the Number of Factors," Multivariate Behavioural Research, I, 245-76.

Chicago Area Transportation Study. 1958. "Forecasting Economic Activity: Consumer Expenditures," C.A.T.S. Chicago.

Cox, K.R. 1968. "Suburbia and Voting Behavior in the London Metropolitan Area," Annals of the American Association of Geographers, 58, 111-127.

Cox, K.R. 1969. "The Genesis of Acquaintance Field Spatial Structures: A Conceptual Model and Empirical Tests," in Behavioral Problems in Geography: A Symposium, edited by K.R. Cox and R.G. Golledge. Studies in Geography, No. 17. Department of Geography, Northwestern University, Evanston.

Cressey, P.G. 1932. The Taxi Dance-Hall. Chicago University Press, Chicago.

Davies, W.K. 1971. "Varimax and the Destruction of Geneality: A Methodological Note," Area, 3, 2, 112-117.

Davies, W.K. and Barrow, G.T. 1973. "A Comparative Factorial Ecology of Three Canadian Prairie Cities," Canadian Geographer, XVII, 4, 327-353.

Davies, W.K. and Lewis, G.J. 1973. "The Urban Dimensions of Leicester, England," in Social Patterns in Cities, edited by Clark, B.D. and Gleave, M.B., I.B.G. Special Publication No. 5, I.B.G., London.

Festinger, L, Schachter, S. and Back, K. 1950. Social Pressures in Informal Groups, Harpers, New York.

Foldare, I.S. 1968. "The Effects of Neighbouring on Voting Behaviour," Political Science Quarterly, 83, 516-29.

Foley, D.F. 1952. "Neighbors or Urbanites," mimeo. manuscript, University of Rochester.

Government of Newfoundland. 1970. Historical Statistics of Newfoundland. St. John's.

Greer, S. 1956. "Urbanism Reconsidered: A Comparative Study of Local Areas in a Metropolis," American Sociological Review, 21, 19-25.

Greer, S. and Kube, E. 1959. "Urbanism and Social Structure: A Los Angeles Study," in Community Structure and Analysis, edited by M. Sussman, Crowell, New York.

Hagood, M.J., Danilevsky, D. and Blum, C. 1941. "An Examination of the Use of Factor Analysis in the Problem of Subregional Delineation," Rural Sociology, 6, 216-33.

Harman, H.H. 1967. Modern Factor Analysis. University of Chicago Press, Chicago.

Harris, C.D. and Ullman, E.L. 1945. "The Nature of Cities," Annals of the American Academy of Political and Social Science, CCSLII, 7-17.

Harvey, D. 1973. Social Justice and the City. Johns Hopkins University Press, Baltimore.

Hatt, P. 1961. "The Concept of Natural Area," in Studies in Human Ecology, edited by Theodorson, G.A., Harpers, New York.

Hawley, A.H. and Duncan, O.D. 1957. "Social Area Analysis: A Critical Appraisal," Land Economics, XXXIII, 337-45.

Haynes, K.E. "Spatial Change in Urban Structure: Alternative Approaches to Ecological Dynamics," Economic Geography, 47, 2 (Supplement), 324-35.

Herbert, D.T. and Rodgers, H.B. 1967. "Space Relationships in Neighbourhood Planning," Town and Country Planning, 35, 196-9.

Herbert, D.T. 1967. "Social Area Analysis: A British Study," Urban Studies, IV, 41-60.

Hoyt, H. 1939. The Structure and Growth of Residential Neighbourhoods in American Cities. Federal Housing Administration, Washington.

Jansen, C.J. 1969. "Social Aspects of Internal Migration," in Migration, edited by Jackson, J.A., Cambridge University Press, Cambridge.

Janson, C.G. 1968. "The Spatial Structure of Newark, New Jersey; Part I, The Central City," Acta Sociologica, II, 144-169.

Johnston, R.J. 1973. "Residential Differentiation in Major New Zealand Urban Areas: A Comparative Factorial Ecology," in Social Patterns in Cities, edited by Clarke, B.D. and Gleave, M.B., I.B.G. Special Publication No. 5, I.B.G., London.

Küchemann, C.F., Harrison, G.A., Hiorns, R.W. and Carrivick, P.J. 1974 A. "Social Class and Marital Distance in Oxford City," Annals of Human Biology, I, 13-27.

Küchemann, C.F., Harrison, G.A., Hiorns, R.W. and Carrivick, P.J. 1974 B. "Social Mobility, Assortative Marriage and their Interrelationships with Marital Distance and Age in Oxford City," Annals of Human Biology, I, 211-223.

Lawley, D.N. and Maxwell, A.E. 1963. Factor Analysis as A Statistical Method. Butterworths, London.

Lee, T.R. 1964. "Psychology and Living Space," Transactions of the Bartlett Society, 2, 9-36.

Mann, P.H. 1965. An Approach to Urban Sociology. Routledge and Kegan Paul, London.

McElrath, D.C. 1962. "The Social Areas of Rome: A Comparative Analysis," American Sociological Review, XXVII, 376-91.

McKenzie, R. 1923. The Neighborhood: A Study of Local Life in the City of Columbus, Ohio. University of Chicago Press, Chicago.

Mogey, J.M. 1956. Family and Neighbourhood. Oxford University Press, Oxford.

Moser, C.A. and Kalton, G. 1971. Survey Methods in Social Investigation. Heinemann Educational, London.

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

Myers, J.K. 1950. "Ecological and Social Systems of a Community," American Sociological Review, 15, 367-73.

Nordbeck, S. 1964. "Computing Distances in Road Nets," Papers and Proceedings of the Regional Science Association, 12, 207-220.

Norman, P. 1969. "Third Survey of London Life and Labor: A New Typology of London Districts," in Quantitative Ecological Analysis in the Social Sciences. Edited by M. Dogan and S. Rokkan, M.I.T. Press, Cambridge.

Palm, R. and Caruso, D. 1972. "Factor Labelling in Factorial Ecology," Annals of the American Association of Geographers, 62, 122-133.

Palm, R. 1973. "Factorial Ecology and the Community of Outlook," Annals of the American Association of Geographers, 63, 3, 341-346.

Park, R.E. 1926. "The Urban Community as a Spatial Pattern and a Moral Order," in The Urban Community. Edited by E.W. Burgess, University of Chicago, Chicago.

Park, R.E. 1952. Human Communities: The City and Human Ecology. Free Press of Glencoe, Illinois.

Pedersen, P.O. 1967. "An Empirical Model of Urban Population Structure: A Factor Analytic Study of the Population Structure in Copenhagen," in Proceedings of the First Scandinavia-Polish Regional Science Seminar, Polish Scientific Publishers, Warsaw.

Polk, K. 1967. "Urban Social Areas and Delinquency," Social Problems, 14, 320-5.

Putnam, R.D. 1966. "Political Attitudes and the Local Community," American Political Science Review, 60, 640-54.

Ramsøy, N.R. 1966. "Assortative Mating and the Structure of Cities," American Sociological Review, 31, 773-86.

Rees, P.H. 1970. "The Factorial Ecology of Chicago: A Case Study," in Geographic Perspectives on Urban Systems. Edited by Berry, B.J.L. and Horton, F.E., Prentice-Hall, Englewood Cliffs, New Jersey.

Rees, P.H. 1972. "Problems of Classifying Subareas within Cities," in City Classification Handbook: Methods and Applications. Edited by Berry, B.J.L. Wiley-Interscience, New York.

Riemer, S. 1951. "Villagers in Metropolis," British Journal of Sociology, 2, 31-43.

Robson, B.T. 1969. Urban Analysis. Cambridge University Press, Cambridge.

Romsa, G., Hoffman, W., and Brozowski, R. 1972. "A Test of the Influence of Scale in Factorial Ecology on Windsor, Ontario," Ontario Geographer, 87-92.

Ross, H.L. 1962. "The Local Community: A Survey Approach," American Sociological Review, 27, 75-84.

Rummell, R.J. 1967. "Understanding Factor Analysis," Journal of Conflict Resolution, XI, 4.

Salins, P.D. 1971. "Household Location Patterns in America Metropolitan Areas," Economic Geography, 47, 2 (Supplement), 234-348.

Schmid, C.F. 1960 A. "Urban Crime Areas: Part 1," American Sociological Review, 25, 527-42.

Schmid, C.F. 1960 B. "Urban Crime Areas: Part 2," American Sociological Review, 25, 655-78.

Schmid, C.F., Tagaschira, K. 1964. "Ecological and Demographic Indices," Demography, 1, 194-211.

Schwirian, K.P. and Matre, M. 1974. "The Ecological Structure of Canadian Cities," in Comparative Urban Structure: Studies in the Ecology of Cities. Edited by Schwirian, K.P., Heath, Lexington.

Shaw, C.R., Zorbaugh, F.M., McKay, H.D. and Cottrell, L. 1929. Delinquency Areas. University of Chicago Press, Chicago.

Shevky, E. and Bell, W. 1955. Social Area Analysis: Theory, Illustrative, Application and Computational Procedures. Stanford University Press, Stanford.

Shrimpton, M. 1971. "The Age Structure Index: Spatial and Temporal Variations," unpublished B.A. dissertation, Department of Geography, University of Reading, England.

Siegel, S. 1956. Nonparametric Statistics for the Social Sciences. McGraw-Hill, New York.

Smith, J., Form, W.H., and Stone, G.P. 1954. "Local Intimacy in a Middle Sized City," American Journal of Sociology, 60, 276-283.

Stutz, F.P. 1973. "Distance and Network Effects on Urban Social Travel Fields," Economic Geography, 49. 2. 134-144.

Sweetser, F.L. 1965 A. "Factor Structure as Ecological Structure in Helsinki and Boston," Acta Sociologica, 8, 205-225.

Sweetser, F.L. 1965 B. "Factorial Ecology: Helsinki, 1960," Demography, 1, 372-386.

Thrasher, F.M. 1927. The Gang. University of Chicago Press, Chicago.

Timms, D. 1971. The Urban Mosaic: Towards a Theory of Residential Differentiation. Cambridge University Press, Cambridge.

Tingsten, H.L.G. 1937. Political Behaviour: Studies in Election Statistics. P.S. King, London.

Tomela, A.K. 1964. "Informal Group Participation and Residential Patterns," American Journal of Sociology, 70, 28-35.

Udry, J.R. 1964. "Increasing Scale and Spatial Differentiation," Social Forces, 42, 408-9.

Van Arsdol, M.J., Jr., Camilleri, S.F. and Schmid, C.F. 1958. "The Generality of the Shevky Social Area Indexes," American Sociological Review, 23, 277-84.

Villeneuve, P.Y. 1972. "Urban Ethnic Acculturation: A Functional Approach," in International Geography 1972. Edited by Adams, W.P. and Helleiner, F.M., University of Toronto Press, Toronto, 846-48.

Webber, M.M. 1968. "The Post City Age," Daedelus, Fall 1968, 1091-1110.

Western, J. 1973. "Social Groups and Activity Patterns in Houma, Louisiana," Geographical Review, 63, 301-21.

Whyte, W.H. 1960. The Organization Man. Penguin, London.

Young, M. and Willmott, P. 1957. Family and Kinship in East London. Routledge and Kegan Paul, London.