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DIFFERENTIAL CONCENTRATIONS OF IMMIGRANT GROUPS IN OTTAWA-HULL: SOCIAL DISTANCE, SOCIO-ECONOMIC AND FAMILY STATUSES OF THE TRADITIONAL VERSUS THE NON-TRADITIONAL IMMIGRATION

by

Anna Nieminen

A thesis
presented to the University of Ottawa
in fulfilment of the
thesis requirement for the degree of
Master of Arts in Geography

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ISBN 0-315-82543-X

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ACKNOWLEDGMENTS

I sincerely thank my supervisor Dr. Roger Roberge for his guidance, and for suggesting important readings in quantitative analysis and the urban mosaic. Thanks to Prof. Anne Gilbert for introducing me to Urban Social Geography and important references. Thanks to Donald Desmarais for instructing me in CorelDRAW! and to Xiaoping Shen for instructing me in ARC/INFO. Thanks to Nooreddin Azimi for helping me with SAS and Quatro Pro; and to Mehdi Gharakhalou-Narrei for helping me with SAS. Thanks to Carrie, Ekbal, Eshete, Saadia, Zahra, Wael and Fei for keeping me or getting me away from the office once in a while, and to Lee-Ann and Richard in Sudbury. A special thanks to Hassan (Dr. Bougrine!) for sending me a birthday card to tell me: "You still can have a lot of fun, 24 is not that old! However, you do want to finish your thesis as quickly as possible...", and for his many follow-up calls and e-mail messages!

For äiti - home-maker, literary critic, writer and environmentalist

For isä - carpenter, political and economic analyst and environmentalist

You have both set all your lapset a fine example

For my brothers, and my sister and her small family

ABSTRACT

This study attempts to describe and explain the differential residential concentrations of new immigrant groups in Ottawa-Hull, and to compare these to the concentrations of pre-1967 immigrant groups. The study is limited to an examination of a selection of ethnic and immigrant groups as they are defined in the 1986 Census, the source of the data.

The thesis begins with a rationale for the study of the ecology of immigrant groups in Ottawa-Hull based on the implications of an increasing proportion of visible minorities in the population. Chapter II of the thesis provides some background information on the changing "face" of immigration to Canada and on some of the characteristics and ecological aspects of ethnic and immigrant groups in Ottawa-Hull.

Chapter III involves theoretical considerations (in the form of a literature review) of the questions of residential concentration of ethnic and immigrant groups and of ecological differentiation in metropolitan areas, which inform the conceptual framework and identification of researchable hypotheses.

In Chapter IV, the social distance hypothesis is indirectly tested. The Index of Residential Concentration is used to map the spatial distributions of the selected ethnic and immigrant groups. The indices of dissimilarity (D INDEX) and replacement (R INDEX) are

used to examine how visibility affects the concentrations of the non-traditional ethnic and immigrant groups with respect to the rest of the population. In chapter V, the socio-economic and family status hypotheses are indirectly tested by the application of regression from Principal Components analysis. Thus, this thesis attempts to empirically evaluate the patterns of residential concentration of ethnic and immigrant groups in the contexts of both the broader social geography of the city and class (Independent, Family, Refugee) of immigration. In chapter VI, an attempt is made to pull together the results of the three tests, and to also consider the influences of recency of immigration and the language factor.

Finally, in the conclusion, an attempt is made to generalize on the results and to identify issues for future research. The results of this study of the differential residential concentrations of ethnic and immigrant groups in Ottawa-Hull indicate that family status, socio-economic status, recency of immigration and language facility are (in 1986) still important variables explaining residential concentration. The influence of each of these factors varies with the ethnic or immigrant group in question. Social distance based on race and visibility does not appear to be, as yet, the most important variable explaining residential concentration of the visible minority groups.

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I. RATIONALE FOR THE STUDY OF THE ECOLOGY OF IMMIGRANT GROUPS IN OTTAWA-HULL

A. Statement of the Problem

Increasingly, and especially most recently, multiculturalism, race relations and racism have become topics of concern and debate in Canada. While Ujimoto (1987, p.2) considered that "'[r]ace relations as currently practised in the United States may eventually filter across the border into Canada...'" as one likely socio-political impact of the Free Trade Agreement (cited in Samuel, 1990, pp.396-97), most of the studies and debate on race relations in Canada to date have focused on the implications of immigration and other population trends following changes in Canada's immigration regulations in the mid-nineteen-sixties. These changes in regulations set in motion a process of change in the "faces" of Canada's urban areas, to the point that the adequacy of Canada's multiculturalism policy is being questioned. For example, Burnet believes that the policy "...as proclaimed takes insufficient regard of the special problems and interests of those members of ethnic groups (in some ethnic groups a small proportion of the whole, in others virtually all) who are new arrivals in Canada" (1987, p.70). Burnet elaborates:

> The reason is not only the divergence of interest between the Canadian-born, whose concern is for persistence, and the immigrants, whose concern is for adjustment; it is also the administrative division of labour in the federal structure, which puts immigration under one federal ministry and multiculturalism

under another. It is probable that the immigrants belonging to the visible minorities are particularly disadvantaged by this inadequacy of the policy (Burnet 1975b). (pp.70-71).

Likewise, Samuel emphasizes that, "[t]he new dimension that multiculturalism has now acquired - multiracialism - is a much more fundamental change than the pre-1960s migration flows have produced" (1990, p.388). He poses the "million dollar question": "Will skin pigment be considered a trait that will mark [members of the newer ethnic groups] as different and render them unworthy of equality of opportunity in their own, or their parents' new land?" (ibid). As will be seen in Chapter III in the review of the literature, this new dimension of multiculturalism has necessitated a reconsideration of hypotheses regarding the differential residential concentrations of ethnic and immigrant groups in Canada's urban areas.

A new study by T. John Samuel of Carleton University indicates that by the year 2001, 5.7 million Canadians (or 17.7% of the projected population) will be members of a visible minority (Lowrie, 1992, p.A2). Approximately 2.5 million Canadians (9.6% of the population) are members of a visible minority today (ibid), a figure which was projected by Samuel for the year 2001 in an earlier study (Samuel, 1990, p.388 citing Samuel, 1987b, p.15). Toronto's visible minorities are projected to increase from 25% to 46% of the city's population by 2001, while Ottawa-Hull's visible minorities are projected to increase from 9% to 16%, just below the

projected national average (Lowrie, 1992, p.A2).

Recent events, such as the riot/uprising on Toronto's Yonge Street in May, 1992, highlight the importance of recognizing that tensions between racial groups already exist in Canadian cities, and that they may be expected to increase with the increase in the proportion of visible minorities. Lam and Richmond caution against taking an overly optimistic position on the accommodation of immigrants based on the Canadian experience of the past:

> Canada has not experienced the inner-city violence which has characterised Britain in the last decade. In part, this is due to the selective nature of Canada's immigration policy, which has enabled more highly skilled and qualified immigrants to enter the country while issuing only temporary employment visas to those who undertake less skilled work. It also reflects a more buoyant economy in the metropolitan areas where most immigrants have settled. Nevertheless, there is a growing 'second generation' of black and Asian youth for whom high youth unemployment rates are as threatening as those in Britain. ...The possibility of serious social unrest in the future cannot be ruled out (1987, p.239).

Urban ecological studies, among other types of studies, provide information on the "...socio-economic conditions that impact on race relations" (Hall, 1992, p.A3). Most studies of the ecology of ethnic/immigrant groups, and specifically visible minority groups, have focused on Canada's three major cities, since it is in these cities where most members of visible minorities continue to choose to live. However, since the percentages of visible minorities in smaller metropolitan areas, such as Ottawa-Hull, are also expected to double by 2001, an understanding of the ecological aspects of ethnic/immigrant settlement in these centres is also important.

B. Objectives of the Study

The three largest cities in Canada, namely Toronto, Montreal and Vancouver, have attracted most of the recent immigrants, especially those belonging to the visible minority groups (Balakrishnan and Kralt, 1987, p.138), and thus, these cities have been the focus of recent studies of residential segregation or concentration in Canada's urban areas (Balakrishnan and Kralt, 1987; Kralt, 1986a, 1986b, 1986c). Thraves claims that, until his examination of the residential status of six new immigrant groups in Winnipeg, similar studies of Canadian cities were restricted to these three urban giants (1991, p.95).

Lamarche and Perron's Principal Components analysis of 1971 Census data for the Ottawa-Hull region, a study which did not focus specifically on the ecology of immigrant groups, revealed "...pronounced ethnic and special feature dimensions...", traits which are characteristic of the social structure of metropolitan areas. In addition, the authors stated that Ottawa-Hull's interaction with other metropolitan areas was indicative of its metropolitan status. Further, Lamarche and Perron predicted that the region's unique role as Canada's governmental administrative capital would continue to attract and hold migrants, especially the young and the educated, and that the future growth of Ottawa-Hull would likely result in an increased level of ecological differentiation (1978, p.77).

Indeed, the total population of Ottawa-Hull grew from 602,510 (Metropolitan Area) in 1971 (1971 Census of Canada, Catalogue 95-710) to 819,265 (consolidated, including institutional residents) in 1986 (Census Canada 1986, Catalogue 95-136), an increase of 36%. Robineault reported that immigrants were an important factor in Metropolitan Ottawa's growth in the 15-year period following WWII, since those who settled in the area between 1946 and 1961 totalled 7.9% of the metropolitan population in 1961 (1970, Appendix IV). In 1967, a revision of Canadian immigration regulations eliminated race and national origin as criteria in immigrant selection (Thraves, 1991, p.95). In 1976, further changes in the Immigration Act resulted in a higher proportion of immigrants in the family reunification class. These new changes increased the proportion of immigrants with lower educational attainment, thus producing greater economic disparities between immigrants from the Third World and Canadian-born residents (Ray and Moore, 1991, pp.18-19). The number of immigrants who settled in Ottawa-Hull in the 20-year period from 1967 to 1986 totalled 7.1% of the non-institutional population of 1986 (calculated from the 20% Sample of 1986 Census data available on CD-ROM). Despite the slight decline in the importance of immigrants to the growth of the region, they nevertheless have posed and continue to pose a challenge with respect to their accommodation or integration, given their new diversity.

Since most of the previous studies of the spatial organization of the social structure in Ottawa-Hull were undertaken prior to or too soon after the changes in Canadian immigration regulations and law noted above, these studies do not provide much information on the residential concentrations, or the social distance, socio-economic and family life-cycle profiles of non-traditional immigrants in Ottawa-Hull.

In the tradition of Social Area Analysis-Factorial Ecology studies, this thesis proposes to examine the social structure and spatial differentiation of the Ottawa-Hull Census Metropolitan Area, using 1986 Census data. However, unlike previous studies of the urban social geography of Ottawa-Hull (Robineault, 1970; Hill, 1977; Lamarche and Perron, 1978; Statistics Canada, 1989), the present study focuses specifically on the differential concentrations of ethnic-immigrant groups representing different ethnic origins, places of birth and periods of immigration with respect to their socio-economic status and family status. Thus, another multivariate statistical technique, regression analysis, is used in the hope that it will provide a better understanding of possible causal relationships by examining statistical relationships, as well as provide a basis for comparison with future studies of other metropolitan areas. The various indices measuring residential concentration or segregation of Ottawa's ethnic and immigrant groups will provide a basis for comparison with previous studies of social distance (social standing; social prestige) in Ottawa-Hull

and in other Census Metropolitan Areas in Canada.

The contribution of this present study is, then, its attempt to describe and explain the differential concentrations of new immigrant groups in another major Canadian urban centre, and to compare these to the concentrations of pre-1967 immigrant groups. Of course, this study is limited to an examination of a selection of ethnic and immigrant groups as they are defined in the 1986 Census, given that the census is the source of the data.

Chapter II of the thesis provides some background information on the changing "face" of immigration to Canada and on some of the characteristics and ecological aspects of ethnic and immigrant groups in Ottawa-Hull, the study area. Chapter III involves theoretical considerations of the questions of residential concentration of ethnic and immigrant groups and of ecological differentiation in metropolitan areas, which inform the conceptual framework and identification of the researchable hypotheses. Chapters IV, V, VI and VII of the thesis present the methodology, results and conclusions. An introduction to these last four chapters can be found at the end of chapter III.

II. THE "TRADITIONAL" AND THE "NEW" IMMIGRATION

A. Policy Changes and the Origins and Some Characteristics of Post-1945 Immigrants to Canada

A Newcomer's Guide to Canada states that "[a]ll newcomers enter Canada under the rules of the Canadian Immigration Act, which does not discriminate on the grounds of race, national or ethnic origin, colour, religion or sex" (Employment and Immigration Canada, 1991, p.79). Prior to 1968, however, Canadian immigration policy "...had been based on a nationality preference system which was racist in tone and which favoured immigrants from Europe" (Simmons, 1990, p.141). The "traditional" immigration refers to the immigration of Europeans to Canada. The shift in the region of origin of most immigrants to Canada has been dramatic: in the 1950s, 84.3% of Canadian immigrants were born in Europe. During the years 1981-86, 63.5% of immigrants to Canada were born in the Third World (Samuel, 1990, pp.384-85).

Not only have the racial, national and ethnic characteristics of immigration to Canada changed since 1968, but the socio-economic and demographic characteristics have also changed, and continue to change, as a result of the relative emphasis of one or another "class" of immigration (i.e., independent, sponsored/family, nominated, refugee). Samuel states that: "[i]mmigration policy, until 1986, despite the significant role assigned to demographic factors in the 1976 Immigration Act, was directed primarily by non-demographic concerns, especially by labour market considerations"

(1990, p.385, citing Samuel, 1988a). For example, Simmons explains that the decline in the number of immigrant arrivals during the late 1970s and again during the mid-1980s:

> ...reflected official concern with stagflation and unemployment levels.... Correspondingly, the rise and fall of immigration levels over this period takes place almost entirely through fluctuations in the number of Independent Class immigrants--that is workers whose entry is geared to labour market conditions [as opposed to fluctuations in the number of Family Class immigrants]...(1990, p.143).

In the early 1980s, there was a slight rise in the number of immigrant arrivals due to pressure to admit refugees (ibid). Canada plans to admit 250,000 immigrants annually from 1992 to 1995 (Immigration Canada, 1992).

Simmons points out that the points selection system, affecting independent and nominated class immigrants [The nominated class was eliminated in 1978 (Pigler Christensen, 1986, p.83).], has meant that the gender, age and educational characteristics of Third World origin immigrants compared to European immigrants show less variation. He adds that, despite this, there are important differences between the immigrant groups arriving from particular countries and regions in the Third World (1990, p.141). Below is a summary of some of the characteristics of selected immigrant groups from the Third World as enumerated by Simmons:

> 1) The small stream coming from Africa is rather distinctive. It is disproportionately composed of well-educated young-adult males. Relatively few adult females come and, similarly, relatively few children.... There are very few elderly African immigrants (ibid, p.153).

> 2) The immigrant stream from Latin America includes a slightly larger proportion of children; virtually no older people; and

relatively few with a university education. ...a high proportion (40 percent) of those coming from Latin America originate in Chile and El Salvador; these streams started with refugee flows and now include other Family Class immigrants from similar social backgrounds. Many of the Salvadorian refugees are from rural areas; the Chilean refugees include both industrial workers and skilled professionals (ibid).

3) The stream from Asia has the highest proportion of adults over age 44 and particularly over age 64. Educational levels are extremely high, with more than 22 percent of young adults having university education (ibid, p.154).

Thus, immigration from Asia and especially from Africa seems to be dominated by Independent Class immigrants, while immigration from Latin America is more characterized by Refugee and Family Class arrivals. As mentioned earlier, the changes in the Immigration Act in 1976 reduced the overall socio-economic status of immigrants by increasing the number of Family Class immigrants, who are not evaluated by a points system, and who less likely intend to enter the labour force.

B. Ethnic and Immigrant Groups in Ottawa-Hull

1. Comparisons with Other Census Metropolitan Areas (CMAs)

Balakrishnan and Selvanathan measured the ethnic residential segregation of ten single origin groups (including Third World origin groups within "Other Single" origins) in the 14 largest metropolitan areas in Canada. They report that the greatest mean index of segregation[1] in 1981 existed in Montreal, followed by

[1] "Index 1 is the simple arithmetic mean of indices of dissimilarity among all possible pairs of ethnic groups of single origin. ...Thus if there are "n" ethnic groups, Index 1 is the mean of n(n-1)/2 indices of dissimilarity. In the present case it

Toronto and Ottawa-Hull (1990, TABLE 1, p.402). The authors explain that: "[a]part from the ethnic factor, language probably plays a large part in the high segregation in Montreal and to a lesser degree for the high segregation in Ottawa-Hull" (ibid). Their investigation of segregation by ethnicity revealed that the mean index of segregation for the "Other Single" ethnic group (including Third World origin groups) was greatest in Montreal, followed by Toronto, Winnipeg and then Ottawa-Hull. The higher index for this group in Ottawa-Hull (.363) than in Canada's metropolitan areas combined (.341) (TABLE 4, p.405) indicates that the study of the residential concentrations of non-traditional immigrant groups should perhaps be more of a priority in the Nation's Capital than in most other CMAs.

Driedger cites Ram, Norris and Skof (1989, p.25), who reported that in 1961, the foreign-born population in twelve metropolitan areas in Canada constituted 27% of the total inner city population, and 21% of the total outer areas population. By 1986, there was a slight increase of this group in the inner cities (to 30%). There were differences among the twelve CMAs, however: the foreign-born increased during the 25 years in the inner cities of Montreal and Ottawa-Hull; decreased in Vancouver, Edmonton, Calgary, Saskatoon, and Regina; and remained fairly stable in the other five CMAs

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is the mean of 9x10/2 or 45 indices" (pp.401-02). For an explanation of the derivation of the index of dissimilarity, see part IV.A.2.

(1991, pp.241; 245). In all twelve Canadian cities, inner city incomes were substantially lower than in the suburban areas (ibid, p.245). While the thought of the inner city in Canada does not as often conjure up the image of the ghetto as does the thought of the American inner city, the implications of this economic disparity between the populations in the inner and outer city in Canada should not be ignored. Lam and Richmond point out that,

> ...although Canada does not have the large stock of sub-standard housing, in the public or private sector, which bedevils urban and social planning in the UK, there is a growing shortage of affordable housing in the cities. More people are resorting to temporary shelters and food kitchens as the gap between the rich and the poor gets wider.

Coupled with high youth unemployment, this development increases "[t]he possibility of serious social unrest in the future..." (1987, p.239).

2. Immigrants in Ottawa-Hull: Some Characteristics and Ecological Aspects

Information about demographic and socio-economic characteristics of individual ethnic and immigrant groups is useful in informing the analysis regarding the differential residential concentrations of these groups. Unfortunately, while cross-tabulated information about the population by ethnic origin and sex, by place of birth and sex, and about the immigrant population by period of immigration, sex and age at immigration is available on census tapes at the enumeration area level for CMAs, cross-tabulated information about the population by ethnic origin, by place of birth, or by period of immigration and socio-economic characteristics is only available through requests to Statistics

Canada for customized tabulations. Thus, some of the information which follows has been gleaned from previous studies of Ottawa-Hull, although ideally, only tabulations for 1986 would be appropriate.

The information in Figure 1, showing the percentage of immigrants by place of birth, has been calculated from totals for the 192 census tracts comprising Ottawa-Hull in 1986 (20% Sample of 1986 Census data available on CD-ROM). Immigrants represent 13.6% of the non-institutional population of Ottawa-Hull. Approximately 34% of these immigrants were born in the Third World (Asia, Africa, Other Americas), representing the non-traditional or "new" immigration.

Figure 1
Percentage of Immigrants by Place of Birth:
Ottawa-Hull, 1986

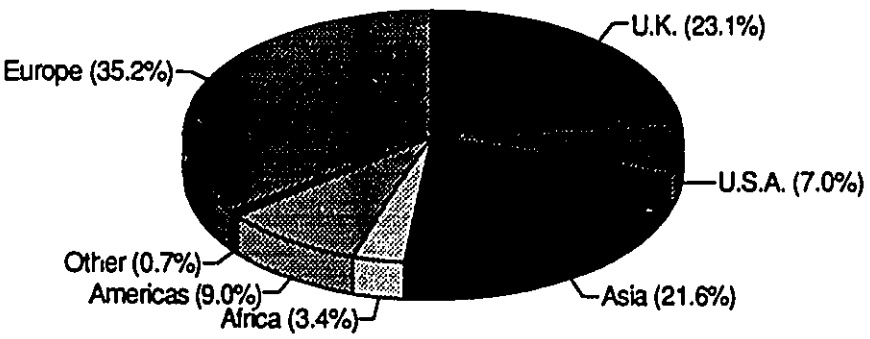
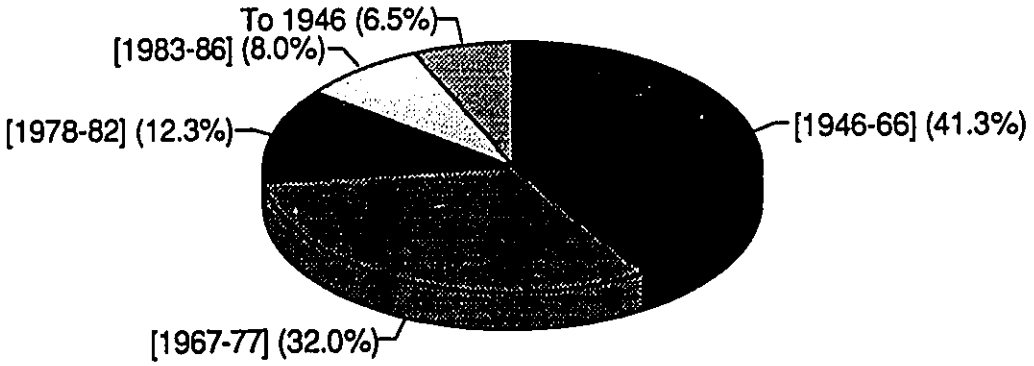


Figure 2 shows the percentage of immigrants in the region by period of immigration, indicating that immigrants who arrived after 1966 represent just over half (52.3%) of all immigrants.

Figure 2
Percentage of Immigrants by Period of Immigration:
Ottawa-Hull, 1986



In terms of representation of immigrants destined for Ottawa-Carleton in 1986 by category of immigration, 37% are Family Class immigrants, 27% are refugees, 21% are Independent Class immigrants, and 12% are in the Assisted category (Learoyd and Robitaille, 1991, p.5).

As stated above, information by socio-economic characteristics and ethnic origin or place of birth is not readily available. Hill had Statistics Canada prepare a special tabulation by family income and ethnic origin[2] in Canada's CMAs in 1971 (1976, p.127, Table 6.4). Below are the results for six of the selected ethnic groups in Ottawa-Hull and Metropolitan Canada as a whole (see TABLE 1). It should be noted that Ottawa-Hull had the highest total family income of all 22 CMAs in 1971.

[2]"Average total family income is expressed as a percent of the average for Metropolitan Canada (i.e., $10,788). Families are classified according to the ethnic origin of the family head, i.e., the husband in a husband-wife family, or the parent in a one-parent family" (p.127).

TABLE 1
ETHNIC ORIGIN AND FAMILY INCOME, 1971

Ethnic group	Ottawa -Hull	Metropolitan Canada
Jewish	175	149
British	124	107
Other and Unknown	104	85
Asian	100	90
French	95	91
Italian	91	88
Total	111	100

Learoyd and Robitaille present additional and more up-to-date information about the relationship between income and ethnicity in Ottawa-Carleton:

> The average income level of all ethnic origin groups (20) in 1986 was $22,500 in Ottawa-Carleton; significantly higher for males ($28,798) than for females ($16,149). While ethnic groups of British, North European and East European [sic] were among the groups at the higher income scale, those at the lowest end included those of Caribbean, African and Portuguese origin. The disparity between the income levels of men and women persists [in every ethnic origin group] (1991, pp.45-46).

Hawkins and Stinson present some findings on where visible minorities have located in the region, an area of study which they feel has, until fairly recently, received scant attention, except by those organizations working directly with newcomers. Hawkins and Stinson report that, according to a study conducted in 1982 by the Ottawa-Carleton Immigrant Services Organization (OCISO/OSIOC), visible minorities were located in all cities and townships in the

region (the study excluded Hull). However, it was in the central wards of Ottawa, specifically in Dalhousie and Centretown [Wellington] (see Appendix A for a map of wards), where visible minorities were most concentrated. The study explained that newcomers seeking out the most affordable housing usually found their first accommodations in these central areas (1986, p.11).

Hawkins and Stinson also report that, in 1985, the Social Service Department of the Regional Municipality of Ottawa-Carleton began to more carefully study the distribution of immigrants, and made these interesting discoveries among others: 1) In Dalhousie ward, the relative frequency of the population using a language other than French or English had increased from 24.9% in 1971 to 28.4% in 1981, mainly because of an increase in the incidence of Chinese (from 1 to 4 percent), as well as in Arabic. 2) In 1971, only 2% of the inhabitants of the central wards of Ottawa reported originating from Asia. In 1981, immigrants from Asia represented 10% of the population in this area. 3) In 1971, 24% of all immigrants had arrived in the last five years. In central Ottawa, the figure was 30%. 4) In 1981, 7.6% of all immigrants had arrived in the last two years. In central Ottawa, the figure was 25%. This study indicated that a growing shortage of affordable housing in central Ottawa could, in the years ahead, cause serious problems and contribute to a very different distribution of the population (ibid). Recall that, according to Lam and Richmond, the possibility of social unrest cannot be precluded when problems of

housing exist along with barriers to participation in the labour force (refer to the quotes on pages 3 and 12 of this thesis).

The Ontario Ministry of Citizenship and Culture's Ethnocultural Data Base Materials Series II (1986) provides maps and demographic and socio-economic statistics for selected mother tongue groups in selected metropolitan areas in 1981. The information in the volume dealing with Ottawa-Hull (Ontario Part) and the information in the Ottawa Citizen's "Ottawa's Many Cultures" series of the summer of 1986 is not presented here, but is referred to where appropriate in the description and analysis of the results of the present study.

III. THEORETICAL CONSIDERATIONS, CONCEPTUAL FRAMEWORK AND IDENTIFICATION OF RESEARCHABLE HYPOTHESES

A. Theories of Residential Concentration: A Review of the Literature

T.R. Balakrishnan is perhaps the most important contributor to the study of ethnic residential segregation in Canada's urban areas. Thus, his theoretical considerations and empirical investigations (--and Jarvis, 1976; --and Jarvis, 1979; 1982; --and Kralt, 1987; --and Selvanathan, 1990) are the main references in the review of the literature as well as in the analysis. Briefly, Balakrishnan tells us that residential segregation or concentration of an ethnic group may be the result of choice or of involuntary causes: voluntary concentration of an ethnic group affords its members maximum opportunities for social interaction, and ensures that group norms and values are maintained. As well, the establishment and viability of specialized ethnic institutions often requires a "threshold" population. Involuntary residential concentration results mainly from discrimination or from lack of resources, both of which restrict the group concerned to a limited number of areas in the city (1982, p.94). Of course, as Johnston points out, the attitudes of the host population and the immigrants may be mutually reinforcing, as when labelling of immigrant groups as "strong negative externalities" stimulates a desire among the immigrant groups to keep a separate identity (1984, p.172).

1. Ethnic Association and Structural Constraints

Robinson cites Peach (1975a), who has suggested that residential and activity segregation is the product of two sets of forces,

namely, positive forces of association and negative forces or structural constraints, although one set is generally dominant (1984, p.231). In his study, Robinson contrasts the immigrant experience of South Asians with that of East African Asians in one town in Britain, focusing in part on group motivations and aspirations. The author reports that among the South Asians, the desire for association was strengthened by the existence of a "'myth of return'": the motivation behind migration was to remit capital to the villages of origin, and the South Asians aspired to an eventual return to a "new found status" in these same villages. Thus, the life-style of the South Asians in Britain was characterized by "...frugality and saving, and the overriding need to maintain both cultural purity and boundaries in an effort to ensure ready readoption by fellow villagers" (p.235). On the other hand, the East African Asians did not voluntarily migrate, but were compelled to leave because of Africanisation programmes in their countries of origin: thus, most of them did not intend to return to their regions of origin, and were "...keen to compete and succeed both economically and socially" in Britain, or alternatively, in the U.S.A. or Canada (p.236). The author points out that the differences in motivations and aspirations of the two groups had to be considered in the context of the negative forces or structural constraints which also determine residential and activity segregation (ibid). The author reports that, despite a weakening of structural constraints upon housing choice, the residential segregation of the Asians did not decrease as much as

might have been expected (p.238). He concludes that the dominant forces affecting the experience of the South Asians were positive in nature, while they were negative in the case of the East African Asians.

2. Balakrishnan's Three Hypotheses

Balakrishnan describes three "different though not necessarily unrelated hypotheses" purporting to explain the existence of and changes in ethnic residential segregation (1982, p.94). The first, the social class hypothesis, states that ethnic residential segregation is largely explained by social class differences among ethnic groups:

> Whatever are the causes, historical circumstances, recency of immigration, or problems of language or cultural assimilation, it is a fact that ethnic groups vary in social class. To the extent that social class segregation exists it is likely to be seen also as ethnic segregation. If this hypothesis is true, then as ethnic groups become more socially mobile and resemble each other in social class composition, ethnic residential segregation should decrease (ibid).

Socio-economic status, or more specifically wealth, and the associated process of competition, as a factor influencing the social structure of North American cities was identified by the classical ecologists in Chicago in their "sub-social" theory of residential differentiation (Timms, 1971, p.86). Mackenzie wrote:

> "Economic segregation is the most primary and general form. It results from economic competition and determines the basic units of the ecological distribution. Other attributes of segregation, such as language, race, or culture, function within the spheres of appropriate economic levels" (ibid).

The neo-classical ecologists' "trade-off approach" to understanding urban structure was an extension of the emphasis on the process of

competition for land (Clark, 1982, p.141). Hawley wrote:

"Rent, operating through income, is a most important factor in the distribution and segregation of familial units. Those with comparable incomes seek similar locations and consequently cluster together in one or two selected areas within the community" (Timms, 1971, p.90)

Balakrishnan presents an abridged review of the major and divergent findings of empirical studies undertaken in the 1960s and 1970s of metropolitan areas in the U.S. (Park, 1967; Lieberson,1961, 1963; Taeuber and Taeuber, 1964, 1965; Kantrowitz, 1973; Guest and Weed, 1976) plus Toronto (Darroch and Marston, 1971), and concludes: "What all these studies show is that while the social class hypothesis is partly valid and explains a portion of segregation, a considerable residual variance is probably due to other factors" (1982, pp.94-5).

Balakrishnan describes two other hypotheses in his independent study of the changing patterns of ethnic residential segregation in the metropolitan areas of Canada: the second hypothesis postulates that ethnic residential segregation is largely explained by <u>social distance</u> (affiliation/non-affiliation; social standing; social prestige) among ethnic groups. The third hypothesis states that ethnic residential segregation is a function of <u>self-identity</u> (common beliefs and rituals, kinship networks, etc.), in other words, it involves choice. At the same time, ethnic pluralism, or multiculturalism, lends societal support to the efforts of ethnic groups to preserve their cultural identities (p.95).

Johnston, in a discussion of distancing and externalities, expresses the view that positive and negative externalities in the physical environment (a park, a view of mountains, location on a slope versus air pollution, noise, location in a valley) are not as relevant for the understanding of residential location patterns as externalities in the social environment, "...with their implications for the maintenance and improvement of one's societal position,..." (1984, p.165). Timms discusses the process of distancing according to social rank and ethnic status:

> Although social rank and ethnic status are distinct in both substantive and analytical senses their relationship to residential location is believed to be mediated through a common process. ...The basic proposition of the present argument is that residential location and relocation may be seen as strategies for minimizing the social distance between the individual and populations which he desires to emulate and for maximizing that from groups which he wishes to leave behind. ...[I]t is not only families moving up the occupational ladder, or who are particularly 'status-conscious', who are likely to be sensitive to the prestige aspects of location. The same is likely to be true of any group which is or wishes to be vertically mobile in one or more of the various stratification hierarchies of society or which is concerned lest it become so. Amongst ethnic groups, residential segregation 'accentuates the differences between a group and the remainder of the population by heightening the visibility of the group, and it enables the population to keep its particular traits and group structure' (1971, pp.98-99, partially citing Lieberson, 1963).

An example of an ethnic "stratification hierarchy" is the "'ranking of races and nationalities with respect to their beneficial effect upon land values'" reported by Hoyt (ibid, pp.49-50). Porter's study of immigrant groups in The Vertical Mosaic (Pigler Christensen, 1986, p.85) and Pineo's survey of how English- and French-speaking Canadians rank ethnic groups (Goldberg and Mercer, 1986, p.39) are well known studies of ethnic stratification

hierarchies in Canada, although the first study had socio-economic stratification as its main focus. In this thesis, social distance based on a stratification of groups according to ethnic status or visibility is considered as opposed to distance based on occupation or other economic variables.

The "social values approach" to understanding the problem of residential differentiation was a reaction to the classical and neo-classical ecologists' theory, which "involves an essentially atomistic economic determinism" (Timms, 1971, p.90). Firey argued that: "'locational activities are not only economizing agents but may also bear sentiments which can significantly influence the locational process'" (ibid, p.92). Timms adds: "The residential patterning of any ethnic minority involves a host of non-economic values relating to such characteristics as preferred family forms, religious and political allegiances, and degree of acceptance by the host community" (p.93). "Social values" or "sentiment" thus explain how neighbourhoods such as Beacon Hill or Boston Common in Boston have become "sacred" and have been able to resist more profitable land uses (p.92). The self-identity hypothesis can be considered part of this social values approach.

3. Balakrishnan's Test of the Three Hypotheses

The results of Balakrishnan's study, the contention of which was that "...social distance goes well beyond socioeconomic status differences" (1982, p.93), showed that, indeed, residential segregation between ethnic groups closely followed patterns of

social distance between them (p.101). Residential segregation between ethnic groups in 1971 was examined in greater detail for Montreal, Toronto, and Calgary. Montreal was selected because it is predominantly French, Toronto because it is the largest metropolitan area with high ethnic diversity, and Calgary because it has (still?) the lowest levels of segregation. In the three metropolitan areas, Western European groups were least segregated among themselves, with Eastern Europeans more segregated, and Italians and Asiatics most segregated. Balakrishnan concluded that the striking similarity in the relative positions of the groups in the three cities suggested that the relationship between social distance and residential segregation was independent of city type (p.104).

The results of Balakrishnan's study also showed that, overall, segregation decreased as socio-economic status increased (p.106), lending support to the social class hypothesis. The author argued, however, that his study confirmed the earlier research by Darroch and Marston (1971) for Toronto, since he also found that considerable segregation of ethnic groups existed even in high socio-economic status areas of Canadian cities (ibid).

4. Recent Studies Focusing on Visible Minorities

More recent studies of ethnic residential segregation in Canadian cities seem to suggest that social distance, at least as it has traditionally ranked ethnic groups with respect to each other, is declining in its importance as a determinant of residential

segregation or concentration. Indeed, commenting on the findings of his study of new immigrant groups and residential status in Winnipeg, Thraves writes:

> ...the rank ordering of both the inter-ethnic and ethnic-non-ethnic contrasts produces a hierachy [sic: hierarchy] of segregation statuses which resembles those observed for the same or related groups in other Canadian cities (Kralt, 1986a, 1986b, 1986c; Balakrishnan and Kralt, 1987). More specifically, the observed indices [of the Winnipeg study] confirm Balakrishnan and Kralt's view that greatest segregation is not necessarily associated with visible minorities and, consequently, the social distance hypothesis of segregation may need to be revised for Canadian cities (1991, p.101). [My underlining]

The main objectives of Balakrishnan and Kralt's joint investigation (referred to above by Thraves) of the segregation of visible minorities in Montreal, Toronto and Vancouver were to:

> a) identify and describe the extent and patterns of residential concentration of visible minority groups in the census metropolitan areas of Montreal, Toronto and Vancouver;
>
> b) examine the similarities and dissimilarities among the visible minority and selected other ethnic groups in their residential concentrations; and
>
> c) investigate the possible causes for the existence and differences in the residential concentrations of various ethnic groups by examining such correlated data as period of immigration and language facility (1987, p.139).

It appears that the formulation of the third objective listed above was in part a result of unexpected findings, given the outline of the theoretical considerations and hypotheses about residential concentration of ethnic groups presented by the authors: Balakrishnan and Kralt hypothesized that, over time, ethnic groups would assimilate, and consequently residential segregation would

decrease. At the same time, the authors recognized that, while the voluntary segregation and assimilation hypotheses may be true for some European immigrants, some researchers (for example Kalbach, 1981) hypothesize that these may not apply to the visible minority immigrants. Instead, involuntary residential concentration, largely as a result of discrimination, the social class hypothesis, and especially the social distance (social standing) hypotheses were more likely to explain segregation of visible minorities. The authors proposed to indirectly test the social class and social distance hypotheses using 1981 census data, but also intended to consider the influences of ethnic group size, recency of immigration and official language facility on residential concentration (pp.140-41).

5. Residential Concentration of Visible Minorities in Montreal, Toronto and Vancouver

Balakrishnan and Kralt were surprised to find that the visible minority groups in Montreal, Toronto and Vancouver were far less concentrated than the Jewish and Southern European groups (1987, p.145). While admitting that this finding "calls the social distance hypothesis into serious question" (ibid), they point out that:

> This is not to deny the existence of social distance among the ethnic groups, which is well documented (Pineo, 1977). The social distance between the Northwestern European groups and the visible minorities is much greater than between Southern European and Northwestern European groups or between Jews and British or French. What is more likely is that, voluntary segregation among the ethnic groups which increases the advantages of cultural proximity clearly operates more in the case of Jews, Greeks, Portuguese, and Italians" (p.154).

The authors suggest that the more homogeneous cultural backgrounds of the persons belonging to the individual Southern European groups and the Jewish group compared to the Indo-Pakistanis and the Blacks, may be a possible explanation for the greater residential concentrations among the Greeks, Portuguese, Italians and Jews (p.156). With respect to official language facility, the authors point out that Black-Caribbeans, Indo-Pakistanis, and Chinese, especially those from Hong Kong and Taiwan, are often more fluent in English than the recent Portuguese, Greek or Italian immigrants. Blacks, depending on their place of origin, are instead often more proficient in French (ibid). With respect to the social class hypothesis, the authors report that the extent of ethnic concentration had little relationship to the socio-economic status level of the areas of concentration: for example, Jews, who were highly concentrated had high socio-economic status, while the Portuguese, who were also highly concentrated had low socio-economic status (p.155). In concluding, the authors caution against assuming that the influence of race or visibility on residential concentration is no longer an important factor:

> We hypothesize that in the long run, segregation that can be attributed to factors such as official language facility, recency of immigration, and cultural background will decrease as integration into the host society increases and class differences by ethnicity decrease. It will be interesting to see whether social distance, based especially on race and visible minorities, will continue. If it does, visible minorities will have a harder time integrating into Canadian society and will hence be more residentially segregated than other groups (p.157).

6. Residential Concentration of New Immigrant Groups in Winnipeg

The most recent study of residential concentration of new immigrant groups was undertaken by Thraves, for the city of Winnipeg (1991). Thraves appears to have taken into consideration the findings reported by Balakrishnan and Kralt (1987) in his own search for explanations of the differences he found.

In addressing the question "What explanations can be offered to account for such differences in residential status?", that is, the moderate to high levels of segregation of the Chilean, East Indian, Filipino, Portuguese, Vietnamese, and West Indian ethnic groups in Winnipeg from each other, from all other residents of the city, and from the majority (British) group, Thraves discusses differences in timing of arrivals (Ecological succession theory), cultural affinity, and inter-group variation in socio-economic and cultural status. The first alternative (late arrival) coupled with the probability of greater cultural affinity (when compared to other groups) with the Chinese community in downtown Winnipeg, is suggested as an explanation for the central location of the Vietnamese immigrants (p.101). The latter two alternatives are analyzed using data on average income (of residents 15 years of age and older) and a measure of linguistic (English Language) assimilation (p.102). Thraves reports that the high income, English-speaking West Indian group was more widely dispersed than all other groups, and was concentrated in three medium to high status suburbs. On the other hand, the low income Vietnamese group

was largely confined to the low status housing markets of the downtown area and environs. Only 10.8% of Vietnamese were linguistically assimilated (ibid). Rank correlation analysis of segregation with income and with linguistic assimilation, and retests to control for the influence of the other variable, revealed that segregation was inversely and significantly related to both average income and linguistic assimilation in the first case and inversely and modestly related to each variable in the second case (ibid).

B. Social Area Analysis and Factorial Ecology: Ottawa-Hull, 1971

Social Area Analysis typically examines social differentiation of urban populations according to three constructs, namely: socio-economic status (Social Rank, Economic Status), family life-cycle (Urbanization, Family Status), and ethnicity (Segregation, Ethnic Status) (Berry and Horton, 1970, p.314). Hill maintains that analyses of data at the level of census tracts in a number of Canadian cities have confirmed the relative independence of these three dimensions (1976, p.124). Factorial Ecology, which has its roots in Social Area Analysis, involves factor analysis of a larger set of variables than that which is defined by the Shevky-Bell (Social Area Analysis) indices, but includes it as well (Berry and Horton, 1970, p.315).

The study by Larmarche and Perron of the social structure and spatial differentiation of Ottawa-Hull reported the existence of

five "essential" dimensions of the region's social structure (1978, p.75). Principal Components analysis of a set of 52 variables selected from 1971 Census data at the level of enumeration areas [it appears that enumeration areas were aggregated to the census tract level], reduced the set of input variables to the following key components or dimensions: socio-economic status; family structure; stability and recent development; ethnic differences; and, female labour force participation (pp.75-9).

Age or family structure/status was not considered as a factor explaining the differential concentrations of ethnic or immigrant groups in the literature which was reviewed in the previous section dealing with theories of residential concentration. However, in the context of the social values approach, "preferred family forms" was listed as one non-economic value that could influence the residential patterning of ethnic minorities (Timms, 1971, p.93); and, Hill has discussed the relationship between the family life-cycle and ethnicity in Canadian CMAs (1976, p.125). The findings of Lamarche and Perron for Ottawa-Hull, and the many empirical studies in the Social Area Analysis-Factorial Ecology tradition which have also shown that age or family structure/status explains a significant proportion of the variation in census data, justifies consideration of its relationship to ethnic and immigrant segregation.

C. Identification of Researchable Hypotheses

Group motivations and aspirations, discrimination, social class, social distance, self-identity, period of immigration, language facility and age or family structure/status may all be considered when attempting to explain the differential residential concentrations of ethnic and immigrant groups. The testing of hypotheses relating to the relationship between group motivations and aspirations, discrimination or self-identity and residential concentration would require an indepth interview survey strategy, not attempted here, but certainly advocated for the purpose of doing further analysis. Ideally, a similar strategy would be required to directly test the social distance and social class hypotheses (Balakrishnan, 1982, p.96). Instead, this thesis proposes to use several indices of segregation and a set of multivariate statistical techniques to indirectly test the social distance and the social class and family status hypotheses. Since period of immigration and language facility were also identified in the literature as factors influencing the distribution of different ethnic and immigrant groups in urban areas, variables standing for these factors will also be included among the variables to be analyzed.

In chapter IV, the social distance hypothesis is indirectly tested. Section A provides details about the selection and calculation of the Index of Residential Concentration, which is used to map the spatial distributions of the selected ethnic and immigrant groups

in the Ottawa-Hull Census Metropolitan Area. It also provides details about the two indices used to index the spatial distributions in order to see how visibility affects the concentrations of the non-traditional ethnic and immigrant groups with respect to the rest of the population. The results are presented, including figures (maps) and a table, in section B. An attempt is made to relate back to the literature review and former studies in the discussion of results. In chapter V, the socio-economic and family status hypotheses are indirectly tested. Section A provides details about the methodology, as well as about the selection of variables used in the statistical analyses. Section B presents the results of the Principal Components and regression analyses. Again, an attempt is made to link the empirical results with the theoretical review and former studies.

In chapter VI, an attempt is made to pull together the results of the three tests. As well, the influences of recency of immigration and the language factor are explored. Finally, in chapter VII, an attempt is made to generalize on the results and to identify issues for future research.

In terms of methodology, the innovation of the approach to the study of ethnic and immigrant groups taken in this thesis is the application of regression from Principal Components analysis, which, when compared to simply applying Principal Components analysis to a set of variables, keeps the dependent variable, in

this case residential concentration, "in the forefront" of analysis (Herbert, 1977, p.92).

In terms of theory, the innovation of the approach taken here is the attempt to empirically evaluate the patterns of residential concentration of ethnic and immigrant groups in the context of the broader social geography of the city. In this respect, the type/class/category (Independent, Family, Refugee) of immigration and associated characteristics likely representing the majority of members in each group is expected to be linked to a particular spatial pattern. Thus, groups with a majority of Independent immigrants are expected to exhibit a sectoral distribution typical of the spatial patterning of socio-economic status. Groups with a majority of Family Class immigrants are expected to be concentrically distributed, although the generally lower socio-economic status of family class immigrants (who are not selected according to a points system) will also influence their distribution. Groups with a large proportion of refugees are expected to show a central distribution. The influence of social distance, involving visibility (among other aspects of social standing) is expected to modify these patterns, as members of different ethnic groups have different degrees of affiliation with respect to one another, and their residential clusters tend to locate accordingly.

IV. TESTING THE SOCIAL DISTANCE HYPOTHESIS

Social distance, in other words, the degree to which an ethnic group has or does not have "social prestige" (Driedger, 1989, pp.278-83) when judged by another ethnic group, usually the majority group, may be reflected in residential distance. Recall that, according to Timms, the process linking social distance and residential segregation involves locational "...strategies for minimizing the social distance between the individual and populations which he desires to emulate and for maximizing that from groups he wishes to leave behind (1971, p.98). Thus, groups which are 'socially close' to the majority group, for example, would be expected to have lower values on the various indices of segregation (eg. the D Index) than groups which are more 'socially distant' from the reference group. Below, the calculations and the purposes of the three indices used in this thesis are outlined, followed by the presentation of the results of their application to Ottawa-Hull Census data.

A. Methodology

1. Calculation of the Index of Residential Concentration

For this study, the Index of Residential Concentration used by John Kralt is employed in order to map the distributions of the selected ethnic and immigrant groups among the census tracts and to identify where the residences of each of the groups are clustered in the metropolitan area (1986b, pp.27-28;a;c). This index was chosen because of the familiarity of location quotients, especially in

economic geography (Barber, 1988, p.87), and because of the comparability of its application to the study of residential concentration in Toronto, Montreal and Vancouver (Kralt, 1986a,b,c) and to the previous factorial ecology of Ottawa-Hull (Lamarche and Perron, 1978).

The Index is the ratio of the ethnic group (or other social group) in the census tract to the total census tract population compared with the ratio of the ethnic group (or other social group) in the Census Metropolitan Area to the total CMA population:

$$\frac{\frac{\text{ethnic population in census tract}}{\text{total population in census tract}}}{\frac{\text{ethnic population in CMA}}{\text{total population in CMA}}}$$

If the Index of Residential Concentration for a given census tract has a value of "1", then there is no residential concentration of the ethnic group in question in the census tract. If, for example, the Index of Residential Concentration for a given census tract has a value of "14", then 14 times as many persons belonging to the ethnic group in question live in the census tract, and the group is over-represented there. If the Index has a value of "0" for a given census tract, then no members of the ethnic group in question are found in the census tract, and the group is under-represented there. Thus the index value indicates the extent of over- or under-representation, based on "...what would be expected if the members of the ethnocultural community were spread out in proportion to the distribution of the population as a whole"

(Kralt, 1986b, pp.27-28;a;c).

The distributions of the residential concentrations of each ethnic and immigrant group were mapped using 1.7 as a cut-off value and three classes since 1.7 was the highest cut-off value used by Kralt (1986a,b,c), and since the main interest here is in over-representation. The maps were produced using the PC version of ARC/INFO, and were finalized using CorelDRAW!

Because the Index of Residential Concentration provides a value for each census tract for each group in question, it can be used as a substitute for the total or proportion of each group in each census tract for the purpose of statistical analyses of census tract data. For example, Lamarche and Perron used indices of residential concentration, or "...location quotients, which capture the relative spatial concentrations for a particular trait,..." (1978, p.75) as ethnic variables for their Principal Components analysis of 1971 Census data for Ottawa-Hull. In Part V of the thesis, the Index of Residential Concentration values for the ethnic and immigrant groups are used as dependent variables in a regression analysis to indirectly test the socio-economic and family status hypotheses.

2. Calculation of the Index of Dissimilarity

Numerous indices of residential segregation measuring different dimensions of the phenomenon, such as evenness, exposure, concentration, centralization and clustering (Massey and Denton,

1988), have been used by sociologists, geographers and others to measure the spatial differentiation of social groups, usually as defined by racial or ethnic origin, in the urban area as a whole. Massey and Denton elaborate on the distinctions between these five axes of measurement:

> Evenness is the degree to which groups are distributed proportionately across areal units in a city. Exposure is the extent to which members of different groups share common residential areas within a city. Concentration refers to the degree of a group's agglomeration in urban space. Centralization is the extent to which group members reside toward the centre of an urban area; and clustering measures the degree to which minority areas are located adjacent to one another (pp. 309-10).

The Index of Dissimilarity (or D Index) is the most widely used measure of residential evenness (ibid, p.284), and it is also the most widely used measure of overall residential segregation (Frisbie, 1984, p.136). Frisbie, citing Taeuber and Taeuber (1965:30), explains that the Index of Dissimilarity "'...gives the proportion of one group or the other which would have to move from present area of residence (tract, block) to another in order to achieve a perfectly even distribution, under the assumption that the "movers" are not replaced by members of the other group" (p.138).

Taeuber and Taeuber provide a description of relatively simple computational procedures for obtaining the index of dissimilarity between the distribution of white and non-white households among city blocks (1965, pp.235-38). Their procedures are used here to calculate indices of dissimilarity between the distribution of each

ethnic group and the rest of the population among the census tracts (ethnic/non-ethnic contrasts), and between the distribution of each immigrant group and the rest of the population among census tracts (immigrant/non-immigrant contrasts).

The following steps were taken in obtaining the results presented in TABLE 2, section B.2 (in the column D INDEX), using immigrants born in Africa as an example:

1. Using the UNIVARIATE procedure in SAS, the totals for the variables "total population (non-institutional)" and "immigrants born in Africa" for the sum of all census tracts in the CMA were obtained. These totals were T=811325 and N=3710 respectively.

2. The ratio of immigrants born in Africa in each census tract to the total population in each census tract was compared to the ratio of immigrants born in Africa in the CMA to the total population in the CMA (see calculation of the Index of Residential Concentration above), and where the ratio in the census tract was larger than the ratio for the CMA, two sums were computed. The first was the sum of the immigrants born in Africa in those census tracts only (Ni=2735). The second was the sum of the population in those census tracts only (Ti=294345).

3. The sum of the "rest" of the population in those census tracts identified above was obtained by subtracting the sum of immigrants born in Africa in those census tracts from the sum of the total population in those census tracts (Wi=Ti-Ni=291610).

4. The sum of the "rest" of the population in the CMA as a whole was obtained by subtracting the sum of immigrants born in Africa in the CMA from the sum of the total population (non-institutional) in the CMA (W=T-N=807615).

5. The above values were substituted into the equation:

$$D=Ni/N-Wi/W$$

The substitution gave a result of 0.38 for the Index of Dissimilarity of immigrants born in Africa.

The Index of Dissimilarity has been used to measure social distance (Balakrishnan, 1982; Balakrishnan and Kralt, 1987; Balakrishnan and Selvanathan, 1990; Traves, 1991) and has been selected here for that purpose. One could calculate indices of dissimilarity between the majority ethnic group and each of the other ethnic groups or between all pairs of ethnic groups (inter-ethnic contrasts) or between all pairs of immigrant groups (inter-immigrant contrasts). However, it was decided to only look at ethnic/non-ethnic and immigrant/non-immigrant contrasts since it can be argued that the location of all other ethnic or immigrant groups to some degree affects the location of the ethnic or immigrant group in question.

3. Calculation of the Index of Replacement

Frisbie provides the equation for the calculation of the Index of Replacement (or R Index), which measures "'...the proportion of minority population which would have to be exchanged while keeping the number of households constant,...'" (1984, p.138, citing Cortese et al., 1976:633, 635, emphasis in the original). The equation is:

$$(1-q)D,$$

where q is the proportion of the minority (ethnic or immigrant group) in a population, and D is the Index of Dissimilarity for the minority (ibid). The result of substituting the values from the example above into this equation is a value of 0.37, which is almost the same as the D Index value for the immigrants born in Africa (see column R INDEX in TABLE 2, section B.2). This measure of evenness is not often used, but is included here as an

alternative which addresses the rather unrealistic assumption of no replacement in the Index of Dissimilarity.

B. Results

1. Residential Concentrations of Selected Ethnic and Immigrant Groups: Spatial Distributions in Ottawa-Hull, 1986

Note About the Maps and their Descriptions

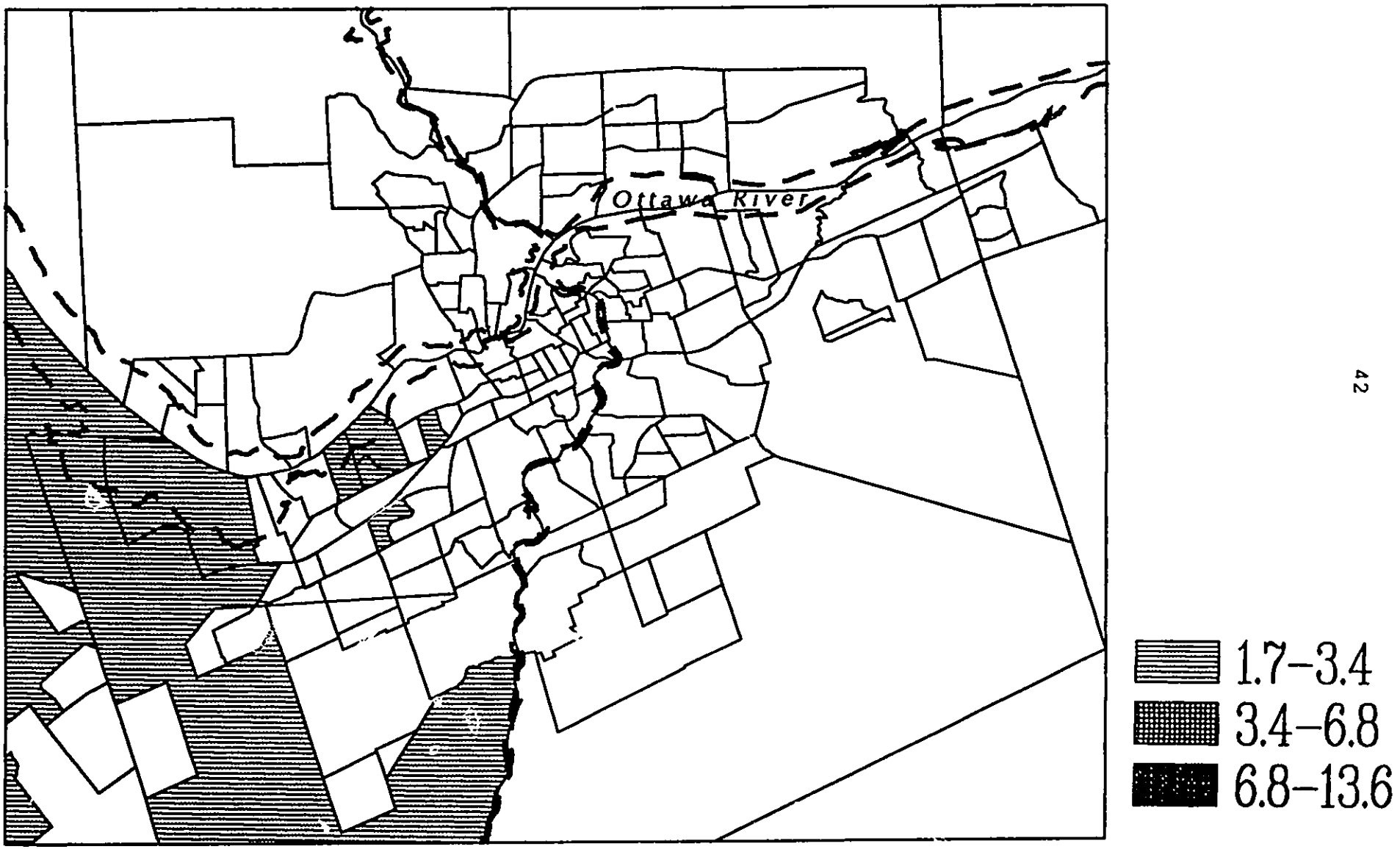
As stated in the methodology, the distributions of the residential concentrations of the selected ethnic and immigrant groups are mapped using 1.7 as the cut-off value and three classes. The left endpoint is included in the class interval, the right endpoint is not. The larger size of census tracts in the peripheral areas of the region should not mislead the reader as to their importance. In the descriptions of the distributions which follow, the locations of the census tracts in the Municipality of Ottawa are referenced with respect to the wards to which they belong (see APPENDIX A for a map of the wards). Figures 3-9 illustrate the spatial distributions of the census tracts with index values of 1.7 or greater for the concentrations of each of the selected ethnic groups. Figures 10-17 illustrate the spatial distributions of the census tracts with index values of 1.7 or greater for the concentrations of each of the selected immigrant groups. Figures 18-22 illustrate the spatial distributions of the census tracts with index values of 1.7 or greater for the concentrations of each of the selected periods of immigration.

Figure 3 It was expected that, since the British are one of the two majority groups to which the other ethnic groups become assimilated, there would not be much residential concentration of this group. Indeed, this is the case; none of the tracts which do have concentrations of this "charter" ethnic group, all located in the west of the region, have an index of 3.4 or greater.

Figure 4 Not surprisingly, the Ottawa River, separating the Quebec side of the CMA from the Ontario side, represents the divide between areas of French concentration and those without such concentrations. A cluster of three tracts in Vanier City, the historic area of French settlement on the Ontario side of the CMA, represents one of the few exceptions to this pattern. As with the British ethnics, none of the tracts identified on this map has an index of 3.4 or greater.

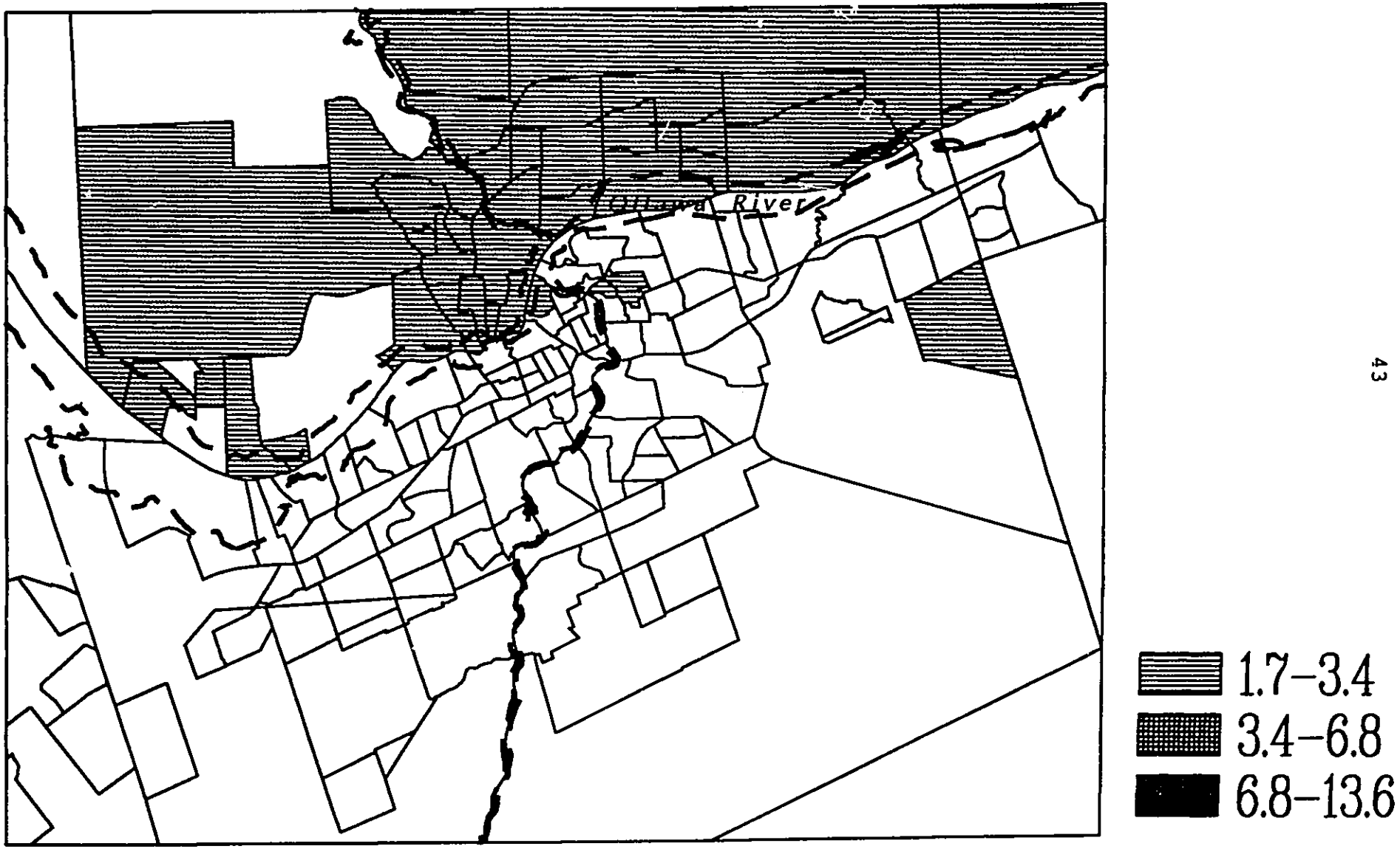
Figure 5 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for residents of Italian origin. These tracts are generally located in a sector west of O'Connor (in the CBD) and Bank streets and the Rideau River. Dalhousie ward, site of Ottawa's Little Italy, can still be identified as an especially important area of Italian concentration. In the peripheral areas of the CMA, the north-east of the Municipality of Nepean also has a couple of tracts with higher (3.4 or over) residential concentrations of Italian ethnics. May reports that in the 1960s, much of Little Italy's core was

Figure 3
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): British



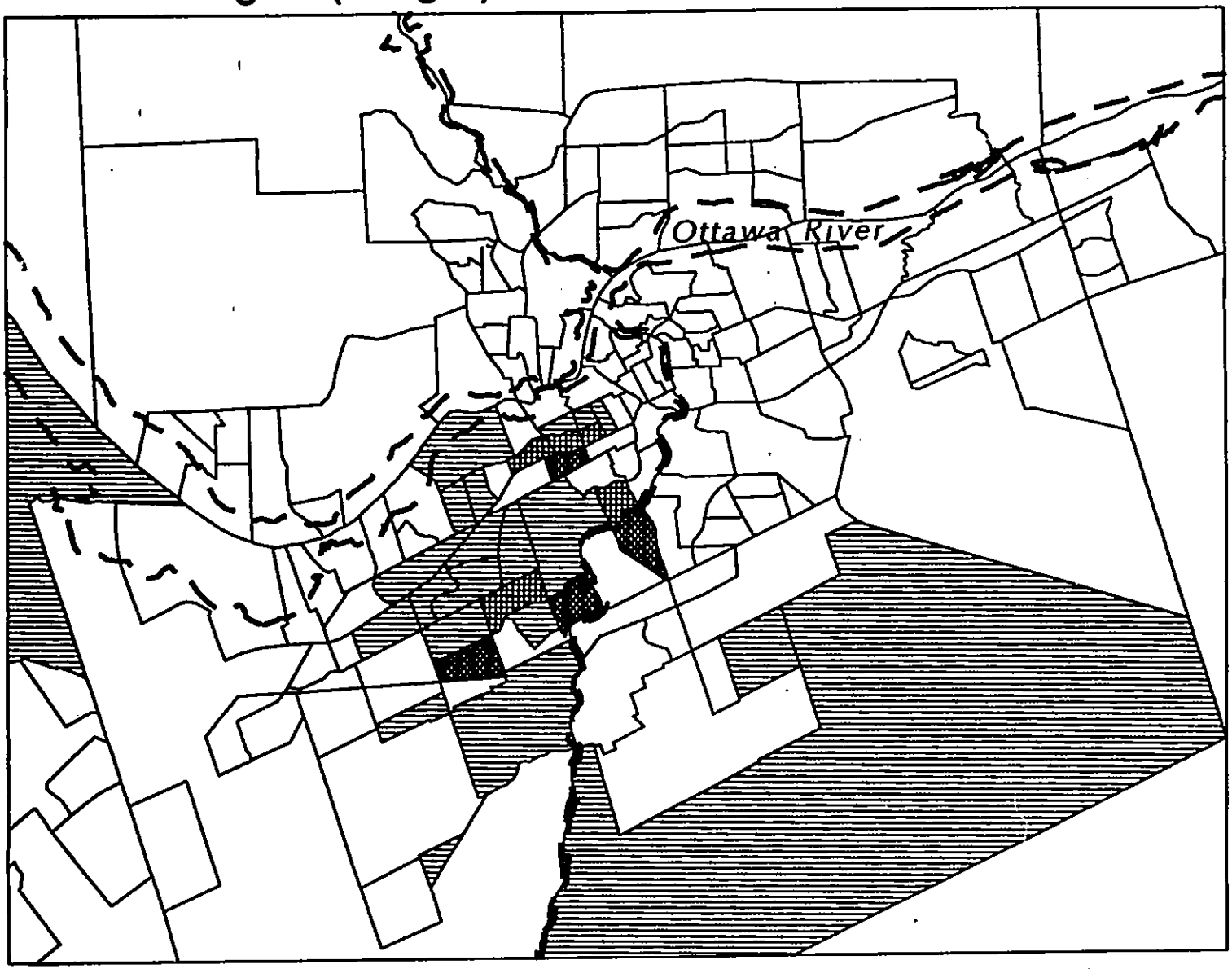
Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989

Figure 4
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): French



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

Figure 5
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): Italian



1.7–3.4
3.4–6.8
6.8–13.6

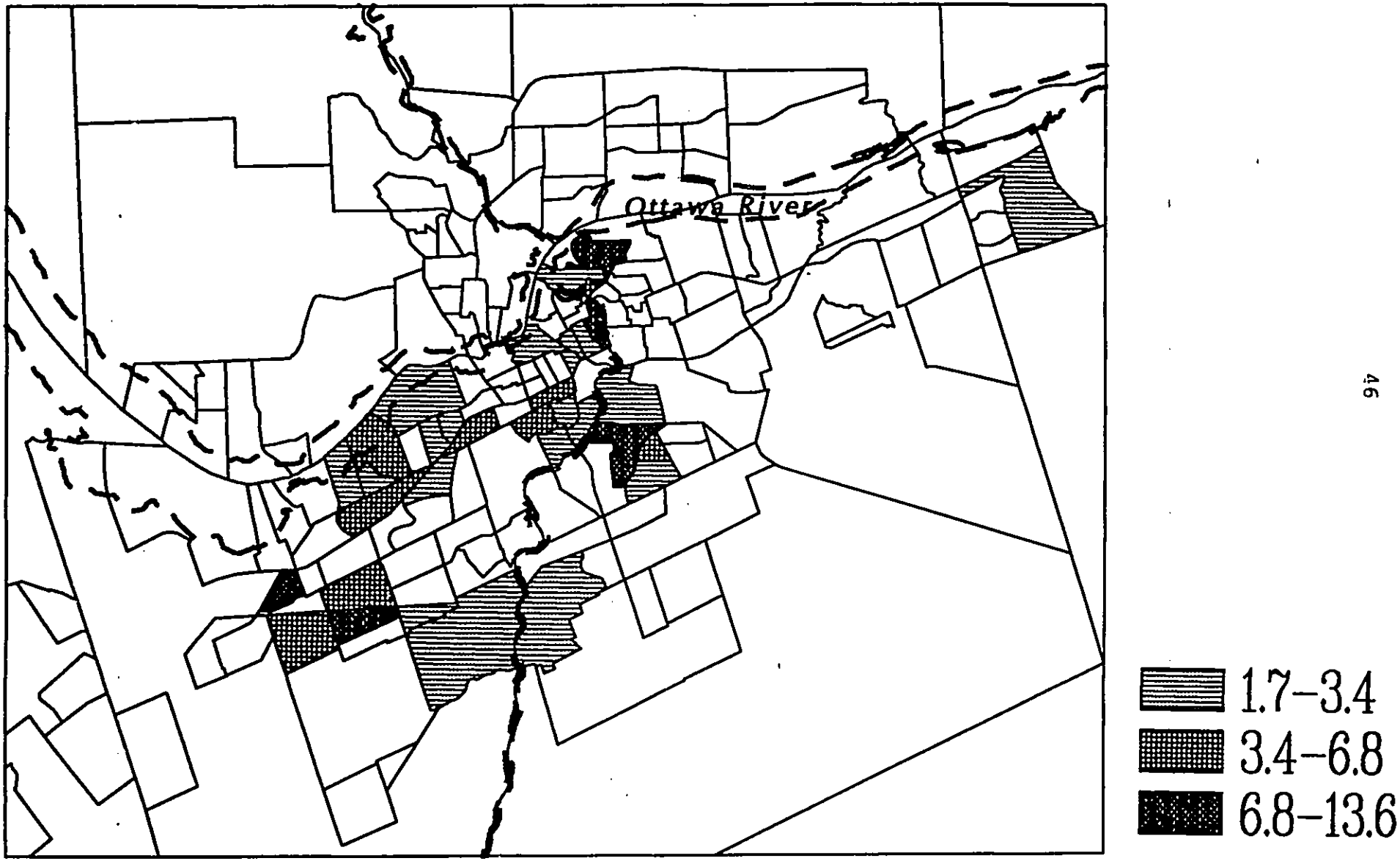
Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105. Ottawa: Minister of Supply and Services Canada, 1989.

expropriated for housing projects, the Queensway and the High School of Commerce. May also reports that from 1971 to 1981, Dalhousie ward and Centre-town (Wellington ward) each lost about half of their Italian-speaking populations, and that new, smaller "little Italies" formed in Nepean, Alta Vista (this study would argue Billings ward) and Prince of Wales (Riverside ward) areas. May concludes that, along with prosperity, "...this migration to the suburbs symbolizes the coming of age of Ottawa's Italian community, a new unity born after decades of struggle" (1986a, p.D1).

This expansion of the ethnic cluster along sectoral lines due to economic advancement of the community or due to pressure from the expansion of other communities or land uses close to the city centre has been described in spatial process models of minority residential patterning (Johnston, 1971, pp.242-44). The higher residential concentrations in several census tracts peripheral to the original core area of Italian concentration indicates that this process is in an advanced stage for this ethnic group in Ottawa.

Figure 6 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for residents of Jewish origin. These tracts are found in numerous clusters on both sides of the Rideau River. The Jewish Community Centre and one of the city's synagogues are located close to the By-Rideau ward-St. George's ward border which runs along Rideau St.

Figure 6
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): Jewish



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989

Atherton reports that, "...[i]n 1934 when the Vaad [Ottawa's Jewish Community Council] was formed, the exodus away from the hub of Jewish population in Lower Town [By-Rideau ward south of the Rideau River] was just beginning. But by then the tradition of co-operation was already firmly established" (1986, p.D1). Thus, even before the Italian community, the Jewish community had come of age, and in fact, there are no longer any census tracts in Lower Town with concentrations of Jews.

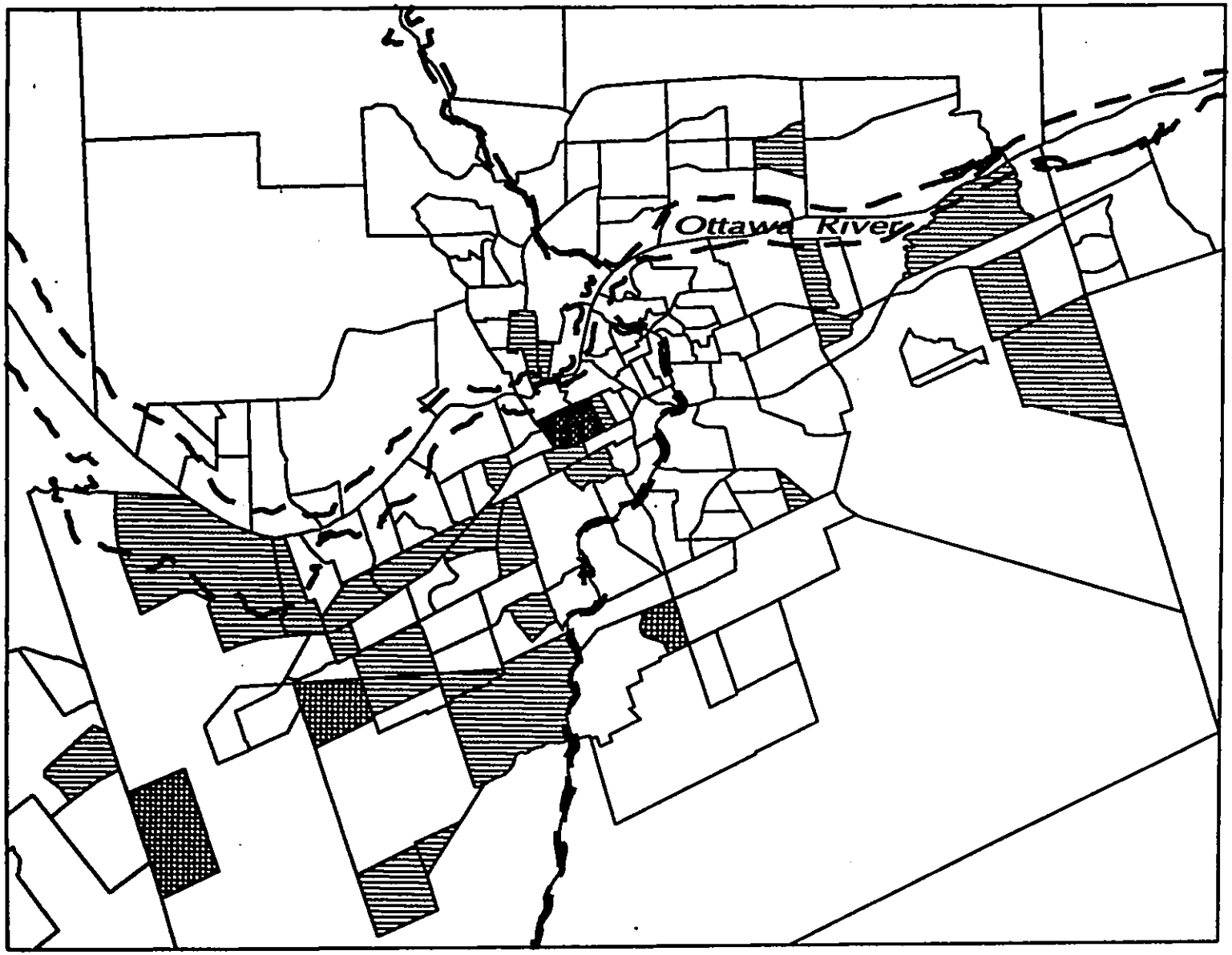
The dispersal of the Jewish community into new, smaller pockets of concentration is not unique to the community in Ottawa, as Etzioni reports that "'...Jews cluster together in several suburbs'" (Wallace, 1980, p.150). However, the high level of self-identity of Ottawa's Jewish community distinguishes it from Jewish communities in other cities on the continent. Atherton states: "Just less than 10,000 members are scattered throughout the Ottawa area, but observers say it is one of the most cohesive, highly structured, and successful Jewish communities in North America" (1986, p.D1). Thus, self-identity is not necessary synonymous with residential concentration in one area, since "...with higher average standards of living, and greater personal mobility, communities could exist without propinquity: Goldstein and Goldscheider, 1968; Webber, 1964" (Johnston, 1971, p.52).

The census tracts in each of the clusters are not clustered according to the degree of residential concentration.

Figure 7 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for Chinese ethnics. This distribution appears more scattered than the distributions for the four ethnic groups already dealt with above. There is, however, some indication of clustered and sectoral characteristics. In Centre Ottawa, two tracts in each of Dalhousie and Wellington wards have the highest concentrations of Chinese residents. Ottawa's Chinatown is located along Somerset Street West, which runs through both of these wards. Miller reports that, "[t]he Somerset area has traditionally been home to new immigrants because of the cheap housing and services in the Chinese language (1986, p.F1). Hawkins and Stinson report that a large number of the refugee group of Chinese are located in Dalhousie ward (1986, p.20).

A sector just south of Carling Ave. and another bordering on the east-west-running CN railway in Nepean can be identified. These concentrations and others in the peripheral areas may represent the ability of more assimilated members of the group to move away from the original area of settlement, where they were gradually initiated to a new way of life, or the location of second or third generation Chinese ethnics. These latter concentrations may also represent the settlement of the Chinese residents from Hong Kong, Taiwan and South East Asia, who were highly educated when they arrived, found jobs in government service, and initiated a process of chain migration (ibid, p.19). Chinese ethnics, unlike the

Figure 7
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): Chinese

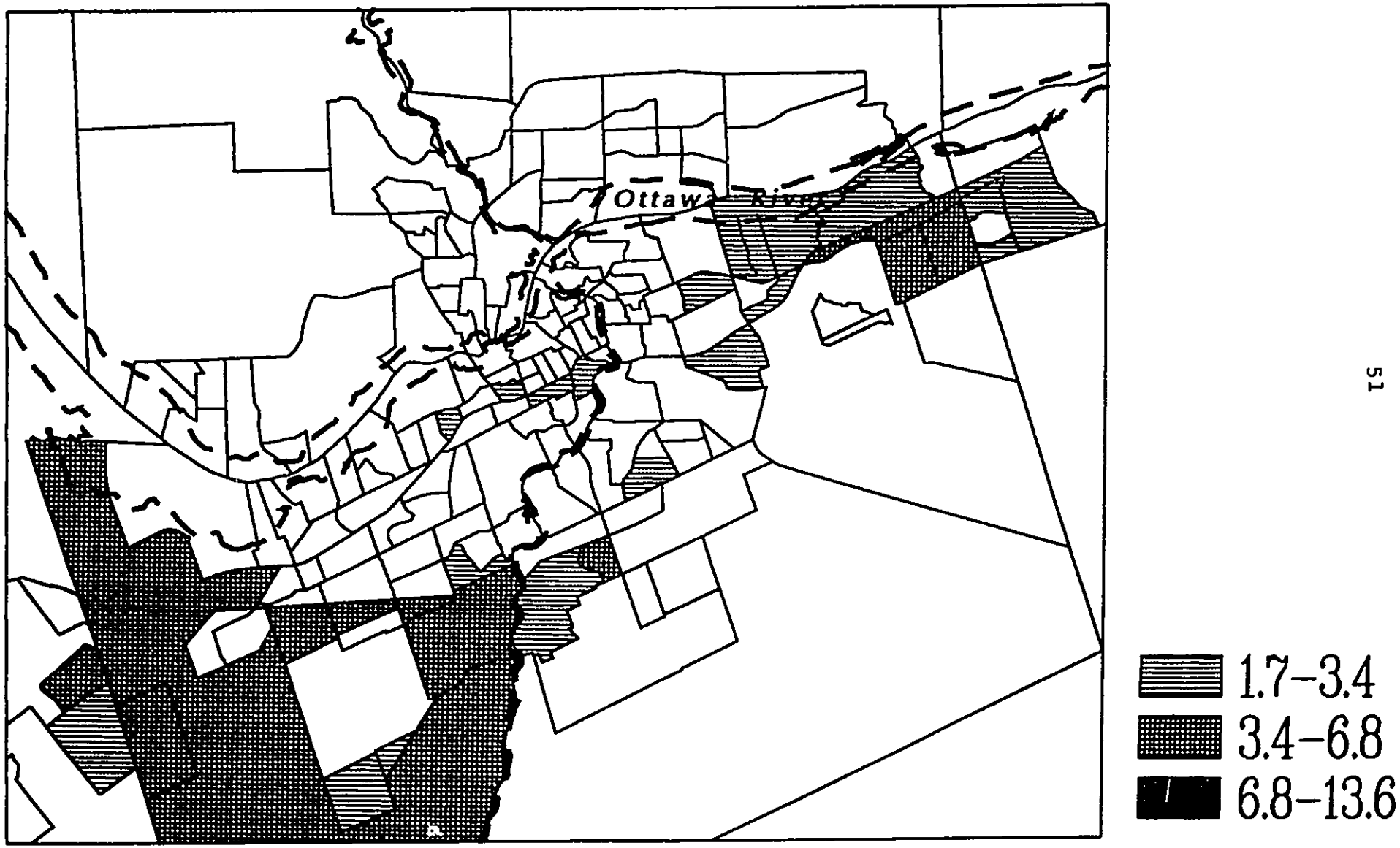


Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

British, Italian and Jewish groups are residentially concentrated on the Quebec side of the CMA, in two tracts in Hull's Cental Business District and one in Gatineau. This may reflect the location of members of the group with more limited resources taking advantage of cheaper rents in Hull-Gatineau.

Figure 8 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for residents of South Asian origin. The distribution of these tracts appears slightly less scattered and more sectoral than the distribution for Chinese ethnics. South Asian ethnics are especially concentrated in census tracts in Nepean, as well as in the Municipality of Gloucester. Crosby reports that most immigrants from the Indian subcontinent were highly-trained professionals when they arrived, and thus are significantly more educated as a group than Ottawa-Carleton's population as a whole, have a significantly higher participation rate in the work force, and have a significantly larger proportion concentrated in managerial, administrative, professional and technical occupations (1986, p.20 from statistics compiled from Ontario Ministry of Citizenship and Culture data). Some have come to Canada from Britain, East Africa or elsewhere to which their families migrated in previous generations (Hawkins and Stinson, 1986, p.32). Thus, socio-economic status may explain the largely peripheral suburban distribution of this group, although familism is usually associated with such a distribution. As well, familiarity with or acquisition

Figure 8
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): South Asian



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989

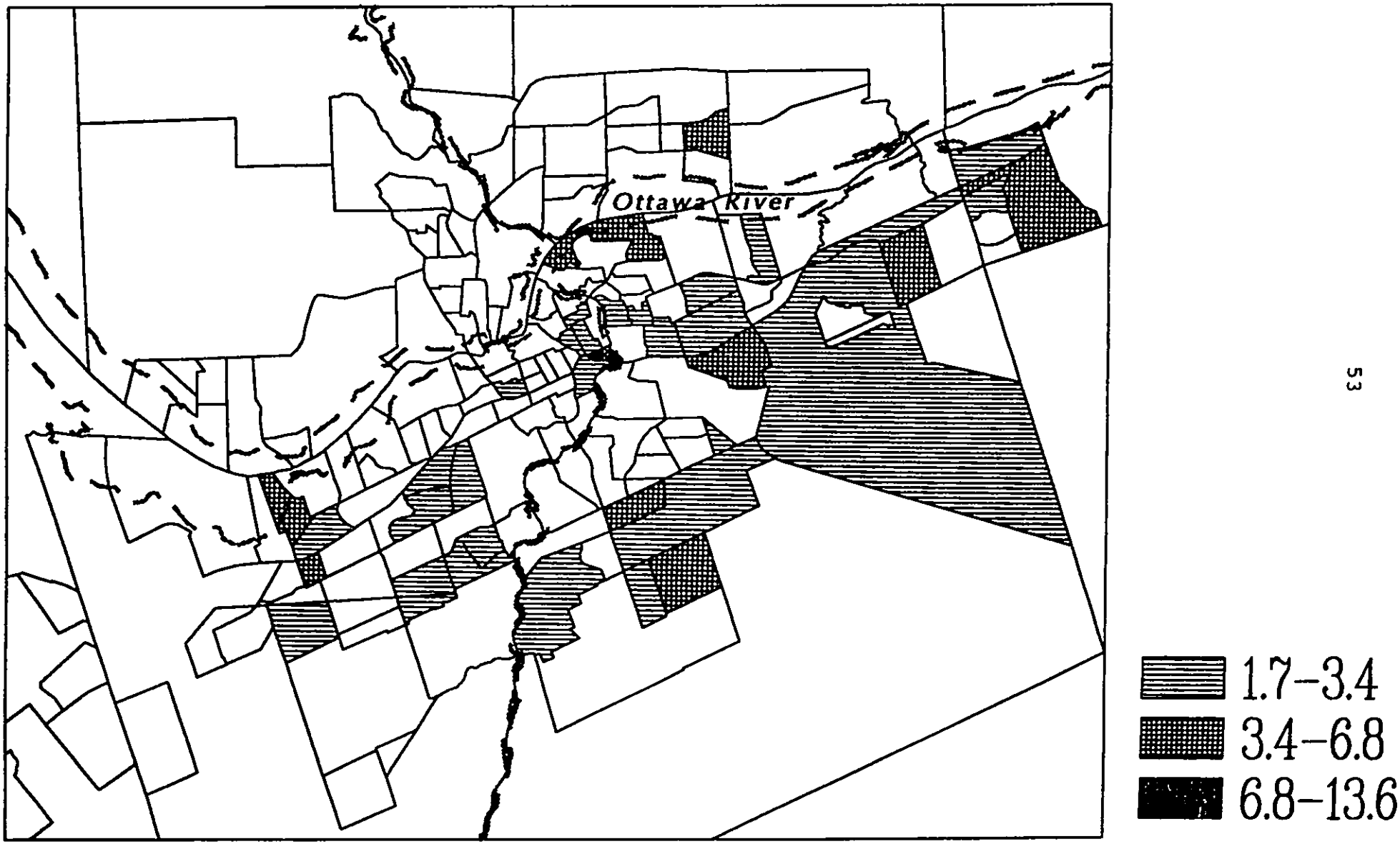
of some European cultural habits before arrival in Canada may also influence the distribution of those immigrants who came from other areas than the Indian sub-continent (McGahan, 1982, p.161).

Figure 9 illustrates the distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for residents of Black origin. Again, the distribution of these tracts is quite scattered, although there is some indication of clustered characteristics. Ward states that: "[t]he blacks who live in the Ottawa area could have stepped straight out of the Cosby show, so the statistics say" (1986, p.14). Many from the second groups of immigrants from Barbados, Ghana, Guyana, and Jamaica are professionals or semi-professionals (Hawkins and Stinson, 1986, pp. 15; 27; 28; 35). But while socio-economic status may partly explain the distribution of the blacks in Ottawa, Ward emphasizes lack of self-identity as a factor which explains why the group isn't more concentrated:

> Some blacks tend to bridle at the tendency of mainstream Canadians to lump them together under the generic term "blacks." They say that label ignores their varying cultural backgrounds, their particular customs, and their distinctive ancestries. Because of these marked differences, these is no single black community in Ottawa, not in the sense that there is, say, a Jewish or Chinese community (1986, p.14).

The census tract in St. George's ward south of Mann Ave. to the Queensway has the highest value in the CMA with respect to the concentration of Blacks. This may identify the concentration of Blacks with more limited resources in low-rent high-rise

Figure 9
Residential Concentration in Ottawa-Hull, 1986
Ethnic Origin (Single): Black



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

apartments. Two tracts in Vanier city also have index values of 1.7 or greater. Hawkins and Stinson report that:

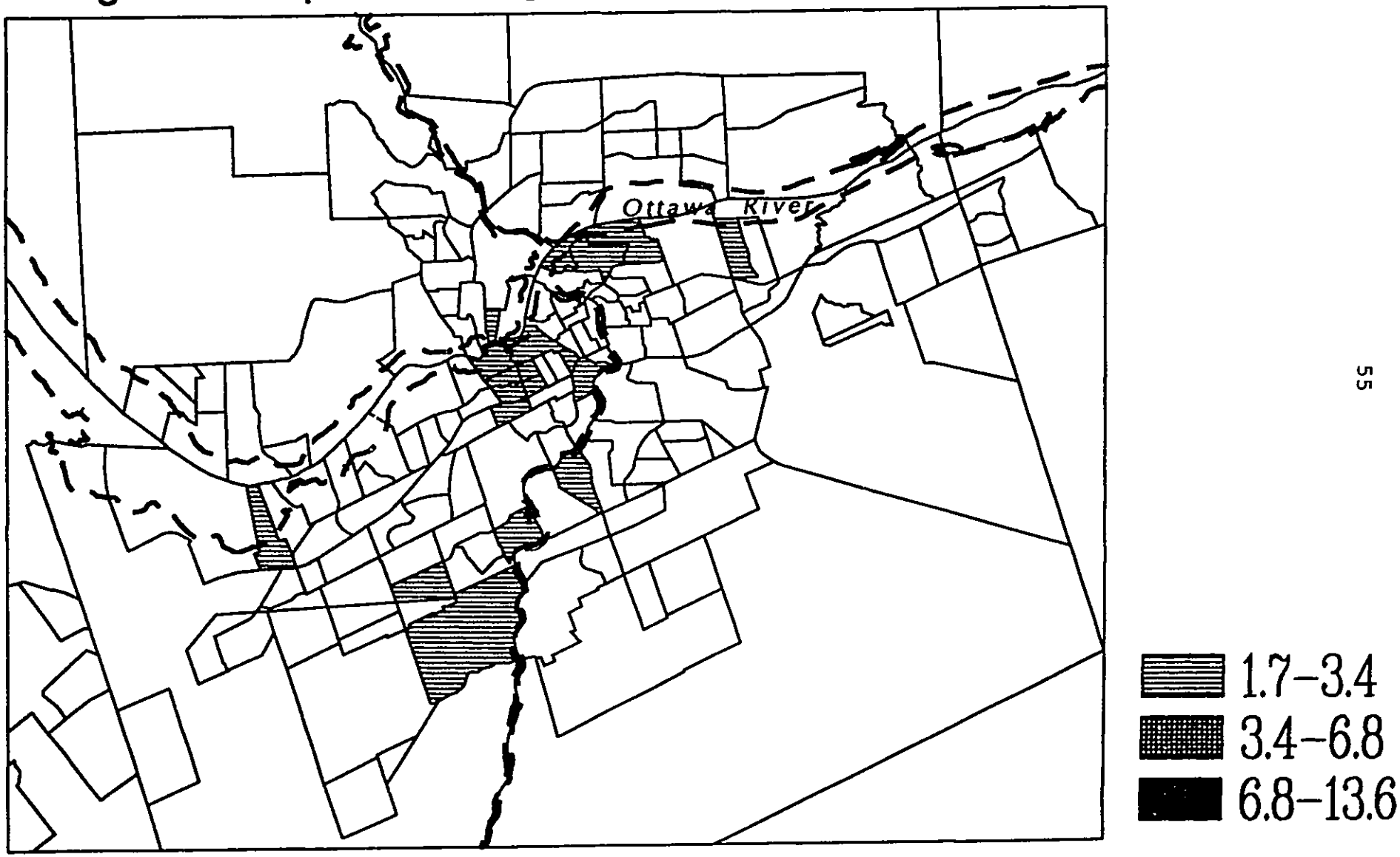
> Although they have not sought deliberately to live in the same area most Haitian Canadians are to be found in the lower-rent neighbourhoods of Vanier, and Beacon Hill. Those buying their own homes have tended to move to Orleans (1986, p.30).

[The French language may also explain this distribution of Blacks from Haiti]. Finally, one census tract in Gatineau on the Quebec side of the CMA has a concentration of Black ethnics.

Figure 10 illustrates the distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for the group of all immigrants. In Centre Ottawa, most of the census tracts in Wellington ward and all of those in Dalhousie ward identify the classic inner-city "'...ethnic corridor, a stopping-over place for immigrants,...a stepping stone to a more stable life'" (May citing Aasen, 1986b, p.2). The distribution of the remaining tracts seems to be due to the influence of certain individual immigrant groups more than others (see Figures 11-17 and the descriptions below). On the Quebec side of the CMA, one tract in Hull's Central Business District identifies the region's northern immigrant reception area. Overall, the distribution of these tracts is somewhat clustered.

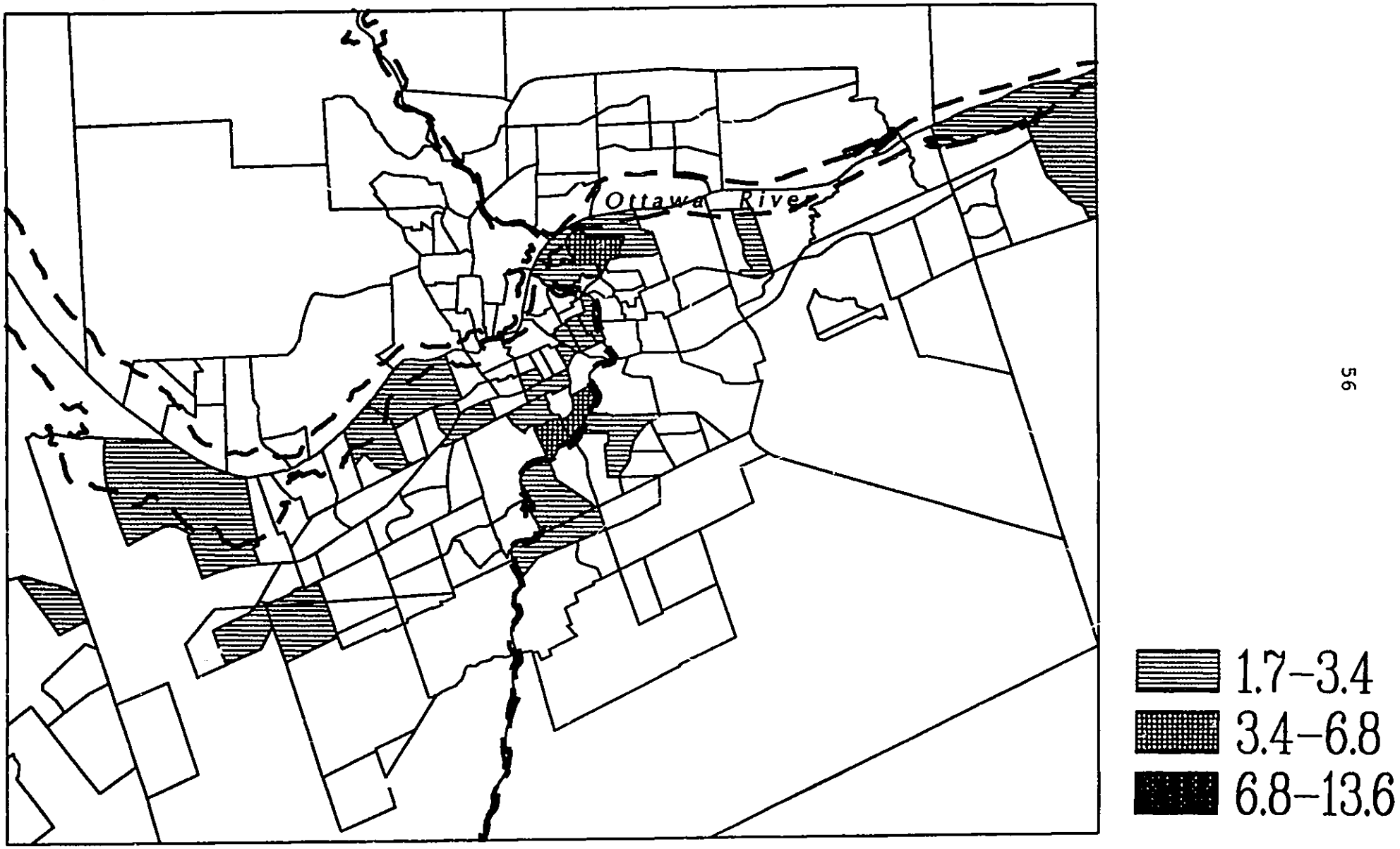
Figure 11 illustrates the distribution of census tracts with index values of 1.7 or greater for the residential concentration of immigrants born in the United States of America. This distribution somewhat resembles the distribution of Jewish ethnics described earlier (refer to Figure 6), suggesting that some of these

Figure 10
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: All Immigrants



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supplyand Services Canada, 1989.

Figure 11
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: United States of America



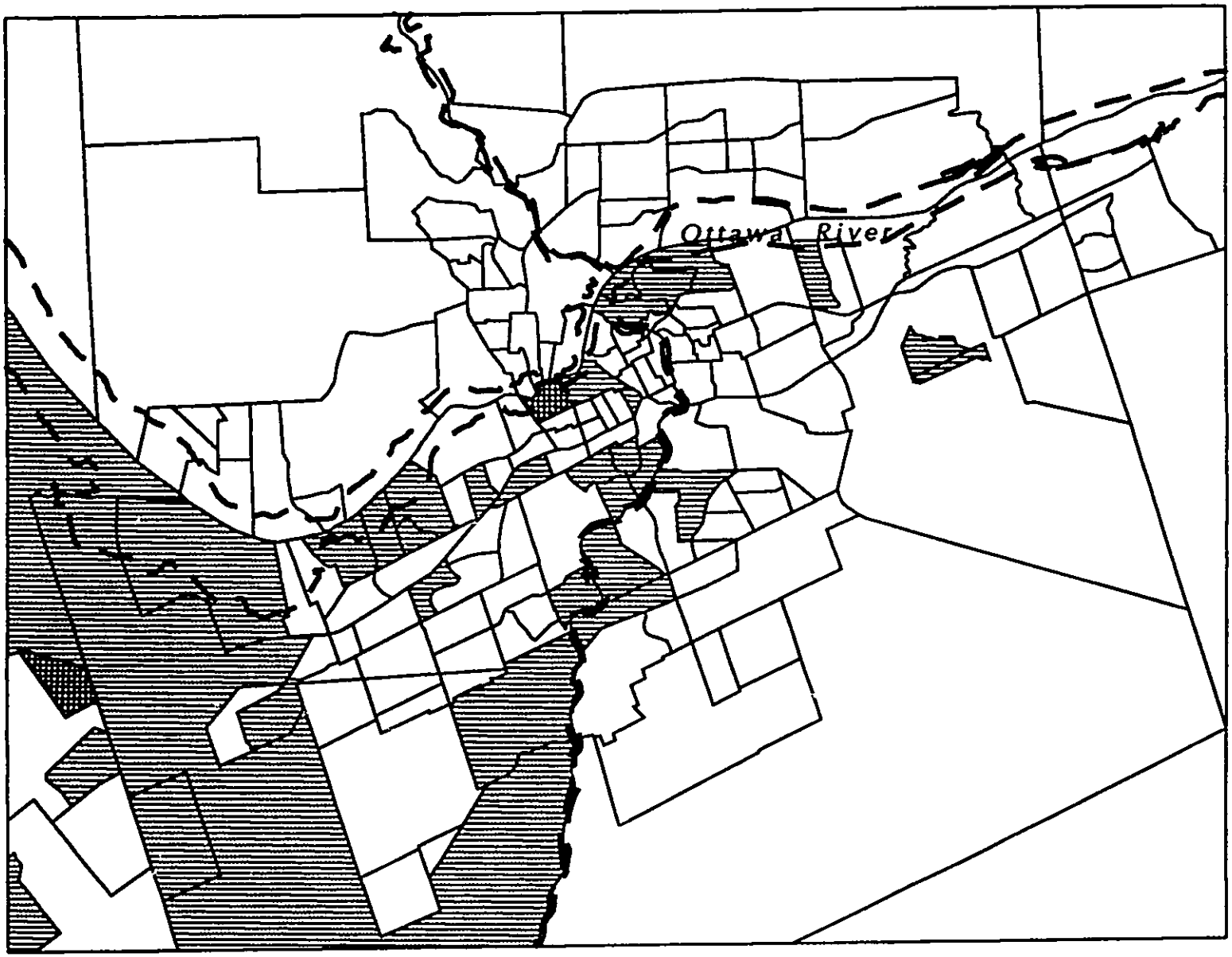
Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services

immigrants are of Jewish-American origin. It seems amenity is an important factor in this distribution, as most of the tracts with concentrations of this group border the Ottawa River, the Rideau River or the Rideau Canal. The ability to locate in areas which have a minimum of negative externalities and a maximum of positive externalities in the physical environment is largely related to socio-economic status.

Figure 12 illustrates the spatial distribution of census tracts with index values of 1.7 or greater for the residential concentration of immigrants born in the United Kingdom. Not surprisingly, this pattern is similar to the pattern for the distribution of British ethnics, except that it also includes some areas in the centre and east of the region. These latter areas of concentration may represent the location of immigrants of ethnic origins other that British. Again, the amenity factor seems to be important in the distribution of this group.

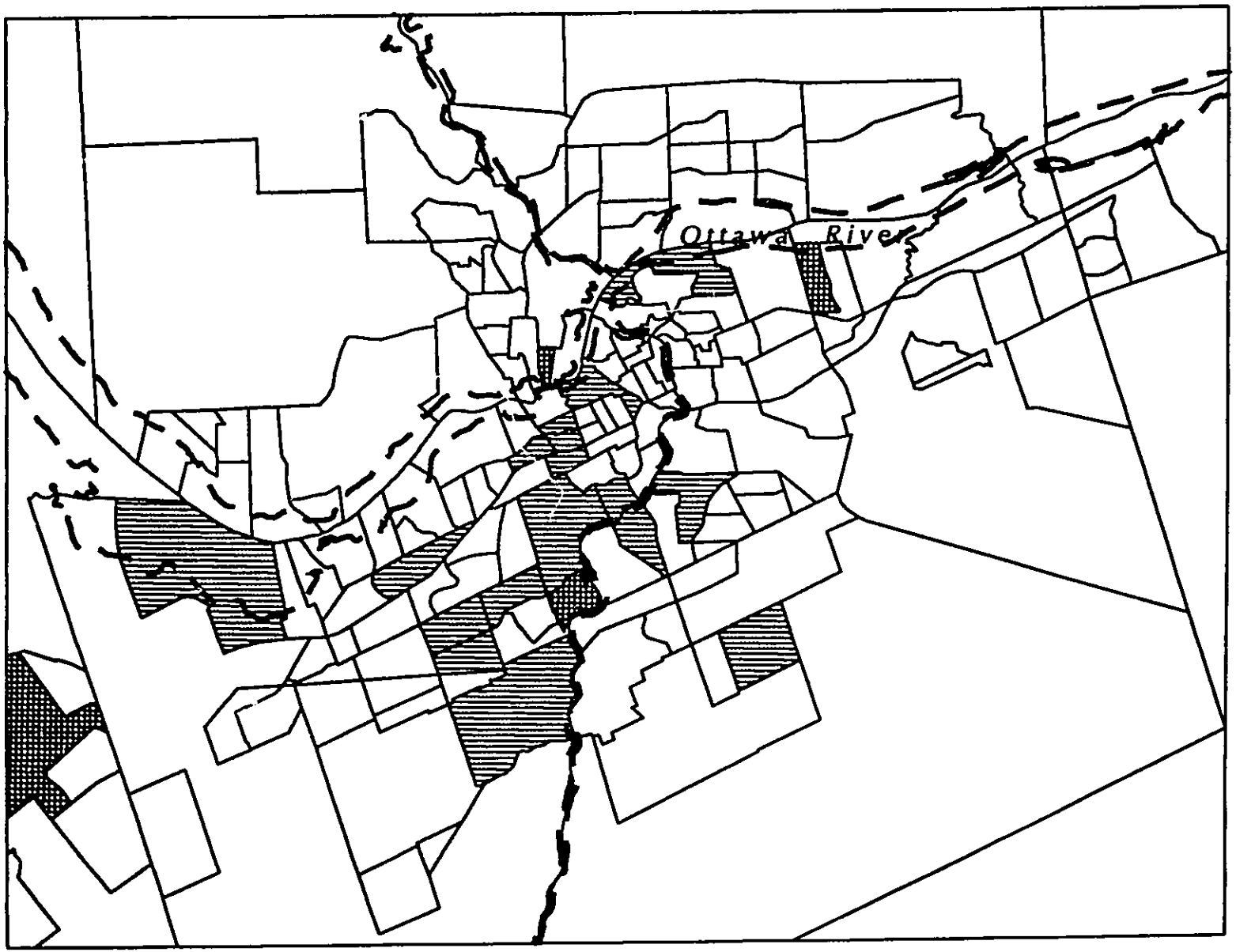
Figure 13 illustrates the spatial distribution of census tracts with index values of 1.7 or greater for the residential concentration of immigrants born in Europe (excluding the U.K.). The distribution combines some of the elements of the Jewish, and especially, the Italian distributions. On the Quebec side of the CMA, Hull contains one tract in its CBD with a concentration of this "traditional" immigrant group: this may identify a concentration of French-speaking Portuguese immigrants, who

Figure 12
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: United Kingdom



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989

Figure 13
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Europe

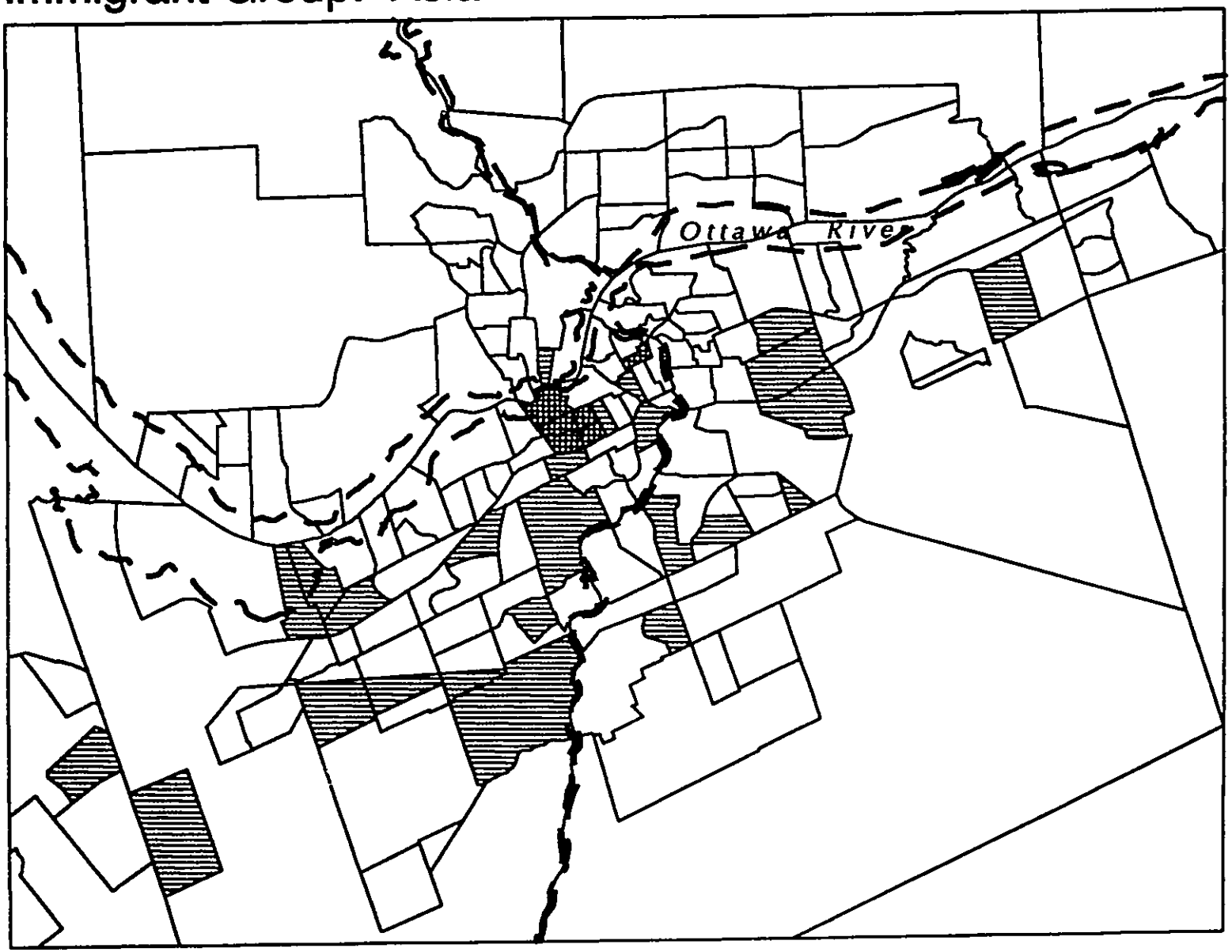


Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

"...settled first in Hull where rents were lower and French easier to learn" (Barron, 1986, p.11). Overall, the distribution is somewhat scattered.

Figure 14 illustrates the spatial distribution of census tracts with index values of 1.7 or greater for the residential concentration of immigrants born in Asia. Three census tracts in Dalhousie ward and two in Wellington ward contain higher (3.4 or over) concentrations of this diverse "new" immigrant group. These findings are not surprising given the location of Ottawa's Chinatown. Hawkins and Stinson report that Cambodians, especially, find it difficult to learn one of the official languages, and that wives and mothers, who cannot benefit from the official language training course because they are not potential members of the labourforce, were "...forced to live within the confines of the enclave that had formed largely in the Dalhousie ward" (1986, p.17). Likewise, language has been a major settlement difficulty for Vietnamese refugees (ibid, p.49). On the other hand, Koreans have few language difficulties, as English is taught early in Korean schools (ibid, p.39). The Chinese more than the South Asian distribution seems to influence the overall distribution pattern of the concentration of immigrants born in Asia. This is likely partly due to the attraction the Chinese community has with respect to newer groups from South East Asia. On the Quebec side of the CMA, one census tract in Hull's CBD, the immigrant reception area, has a concentration of Asian immigrants. Again, the distribution

Figure 14
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Asia



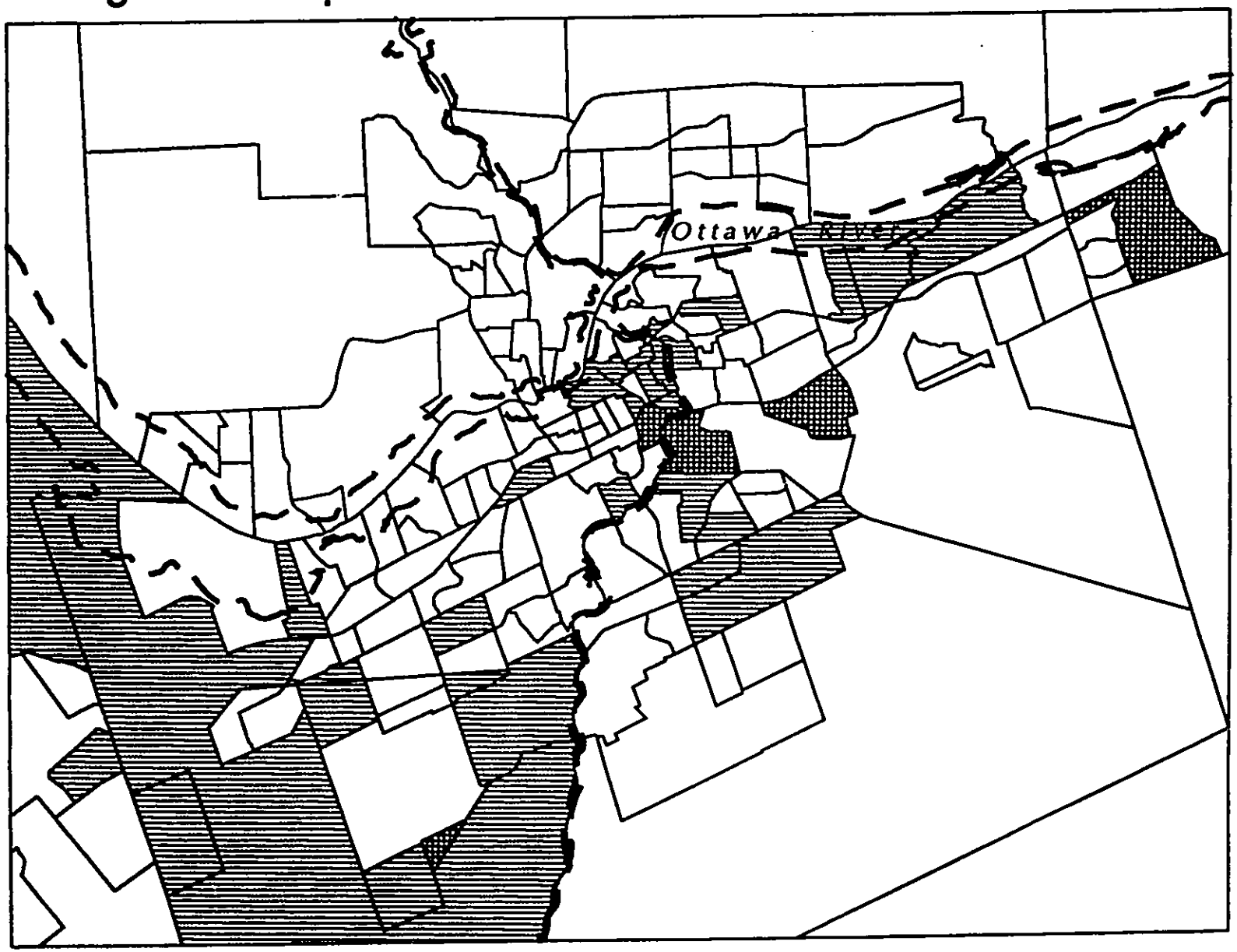
Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

is somewhat clustered.

Figure 15 illustrates the spatial distribution of census tracts with index values of 1.7 or greater for the residential concentration of immigrants born in Africa. Overall, this distribution is somewhat clustered and seems to be tending toward a sectoral pattern along the rivers and canal. There is not as much similarity between this distribution and the distribution for Black ethnics as one might have expected. This may be because some immigrants born in Africa are of other ethnic origins than Black, such as of South Asian ethnic origin.

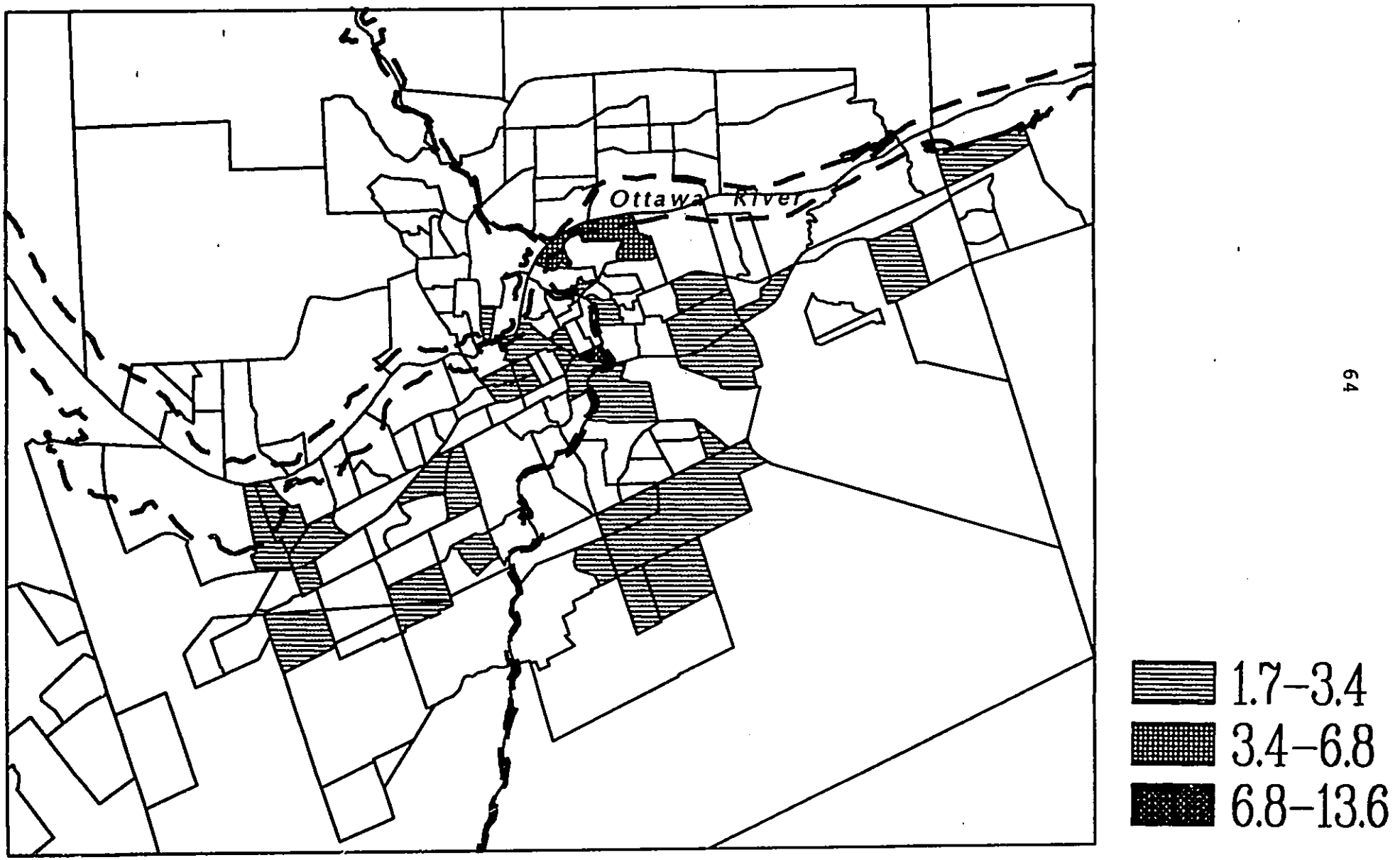
Figure 16 illustrates the spatial distribution of census tracts with index values of 1.7 or over for the residential concentration of immigrants born in the Americas (excluding the U.S.A.). The pattern is again scattered with some tendency toward a clustered characteristic. Like the generic term "Blacks", the term "Other Americas", or "Latin Americans" also tends to ignore the differences in the communities from Central and South America. Neal wrote: "Most of the Latin American countries, from the Rio Grande to Tierra del Fuego, are represented by some among 1,700 immigrants in Ottawa [in 1981], but the sense of community among them is inchoate at best" (1986, p.C3). Thus, the rather scattered distribution of this group may be influenced by lack of self-identity when compared to other groups.

Figure 15
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Africa



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989

Figure 16
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Other Americas



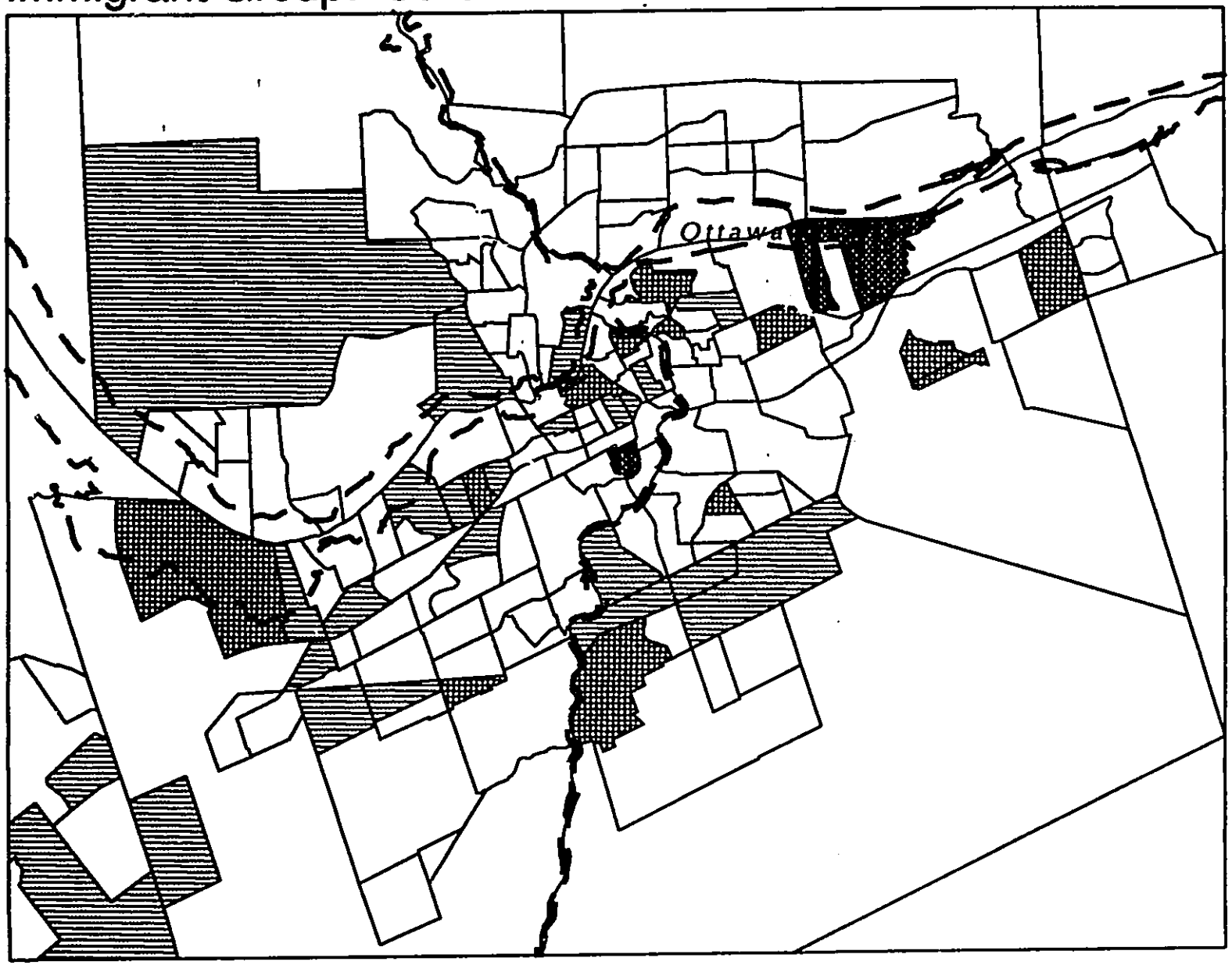
Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105. Ottawa: Minister of Supply and Services.

Figure 17 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for immigrants born in "Other" places . All wards in the City of Ottawa, except Canterbury ward, contain at least one census tract with a concentration of these immigrants. These concentrations may largely be due to the fact that this group is so small. Overall, the distribution of tracts is again largely scattered throughout the census metropolitan area. This is not surprising since one can assume that the characteristics of the individuals and households in this group are quite diverse.

Figure 18 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for residents who immigrated before 1946. Compared to the distributions of census tracts for residents of the region who immigrated in the other four periods to be described, this pattern is central. The census tract north of Albert Street in Dalhousie ward has an outstanding index value of 22.6. Age structure (mature; elderly) and associated housing needs likely explain the relatively central distribution of this earliest group.

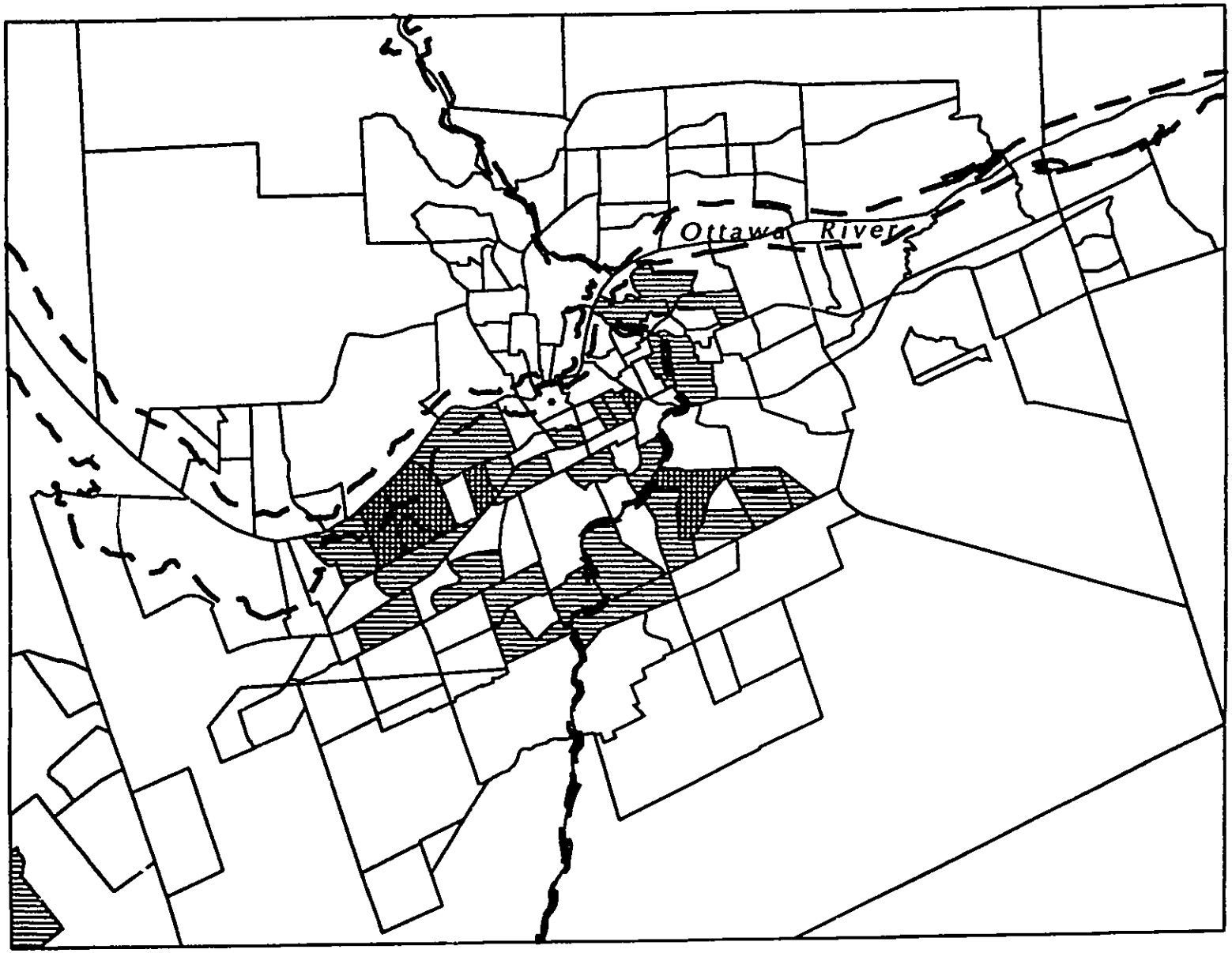
Figure 19 illustrates the spatial distribution of census tracts with Index of Residential Concentration values of 1.7 or greater for residents who immigrated in the period from 1946 to 1966 (inclusive). Most tracts with concentrations of this group of immigrants are located west of the Rideau River. Not surprisingly,

Figure 17
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Other



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

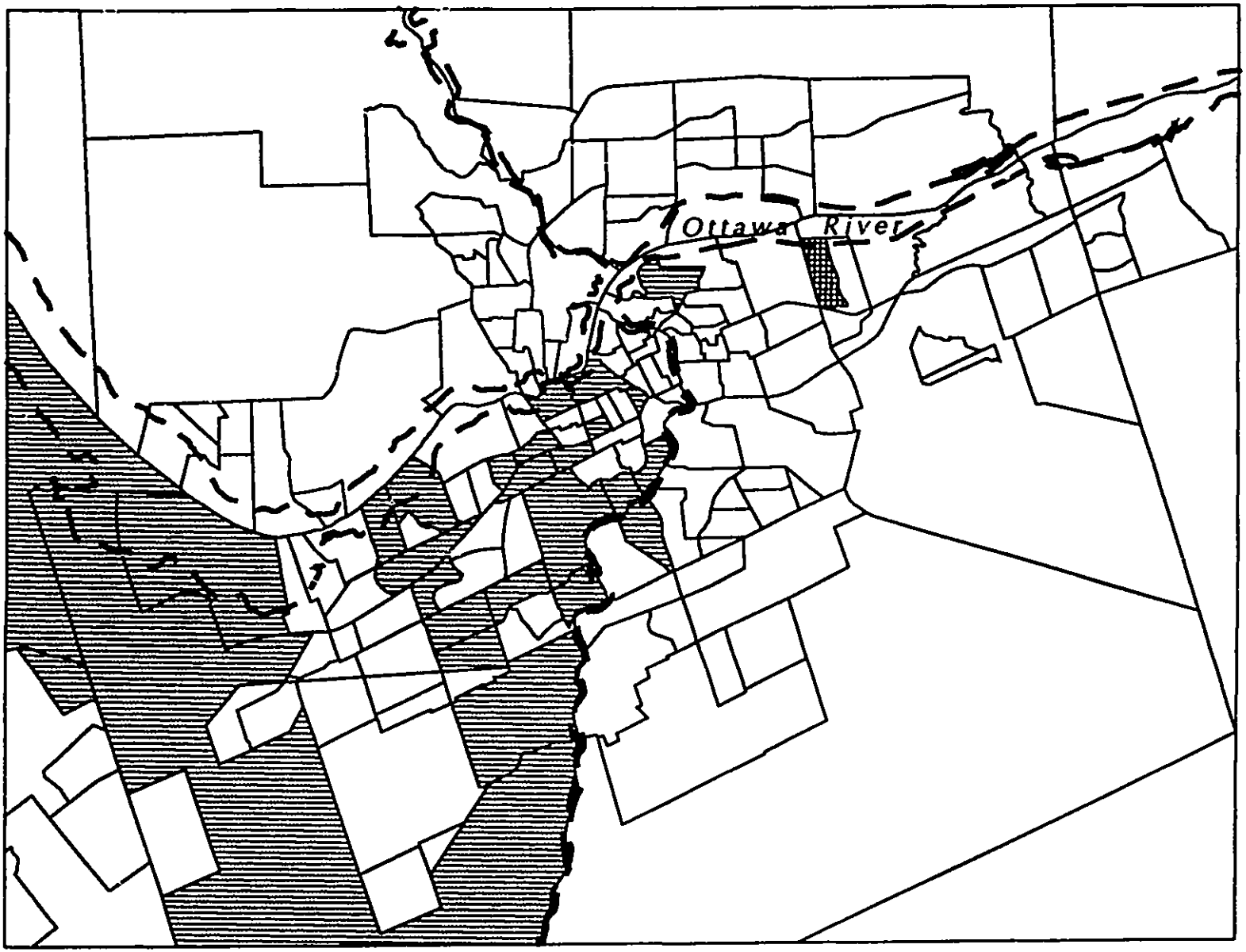
Figure 18
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Immigrated Before 1946



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 96-105 Ottawa: Minister of Supply and Services Canada, 1989.

* This census tract has an outstanding score on the index.

Figure 19
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Immigrated between 1946 and 1966



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

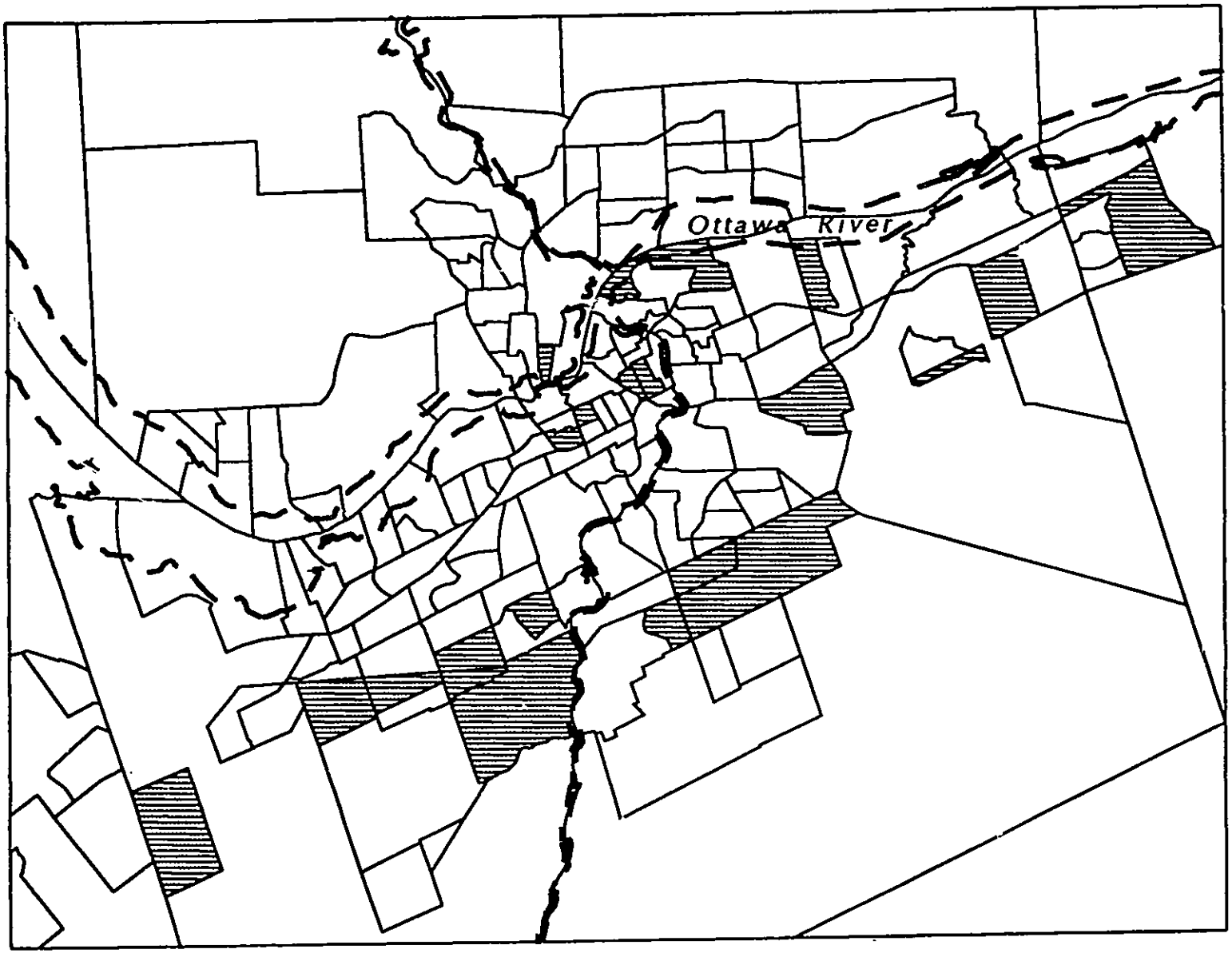
since this is the period of immigration from "traditional" source areas, this distribution pattern somewhat resembles the distribution pattern in Figure 13 for European immigrants.

Figure 20 illustrates the spatial distribution of census tracts with index values of 1.7 or over for the residential concentration of residents in the region who immigrated between 1967 and 1977 (inclusive). The pattern combines central and peripheral locations, and may be explained by the varying socio-economic and demographic characteristics of the "new" immigrants representing different classes (independent/family/refugee) of immigration.

Figure 21 illustrates the spatial distribution of census tracts with index values of 1.7 or over for residents who immigrated between 1978 and 1982 (inclusive). Again, the pattern combines central and peripheral locations. The higher concentrations in the two Central Business District areas likely reflect the location of those relatively recent immigrants who have not had the time or the opportunity to become upwardly mobile.

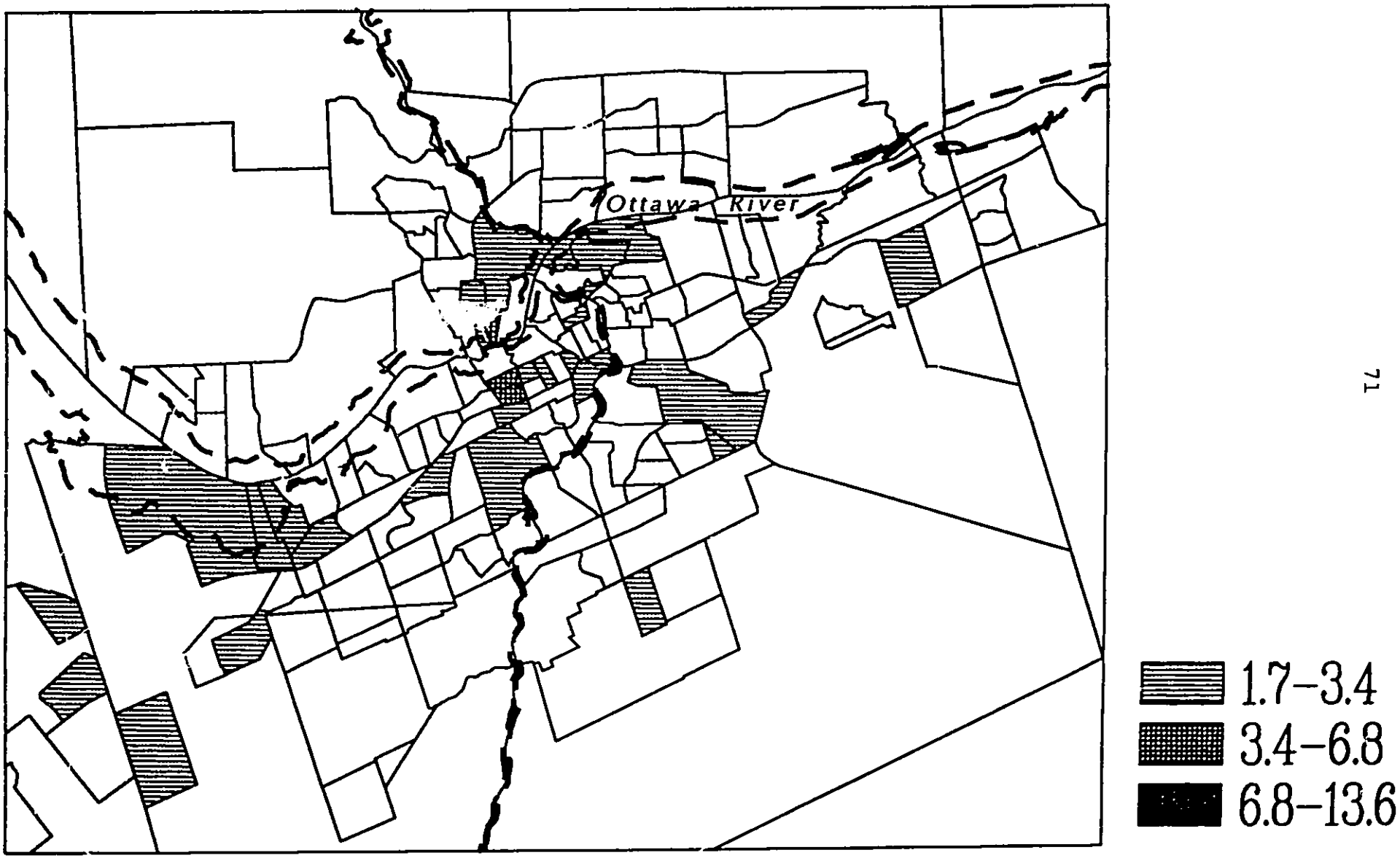
Figure 22 illustrates the spatial distribution of census tracts with index values of 1.7 or greater for the residential concentration of residents who immigrated between 1983 and 1986 (inclusive). Not surprisingly, the CMA's two immigrant reception areas are again identified here, although other areas to the west, east and north of the central area of Ottawa are also identified.

Figure 20
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Immigrated Between 1967 and 1977



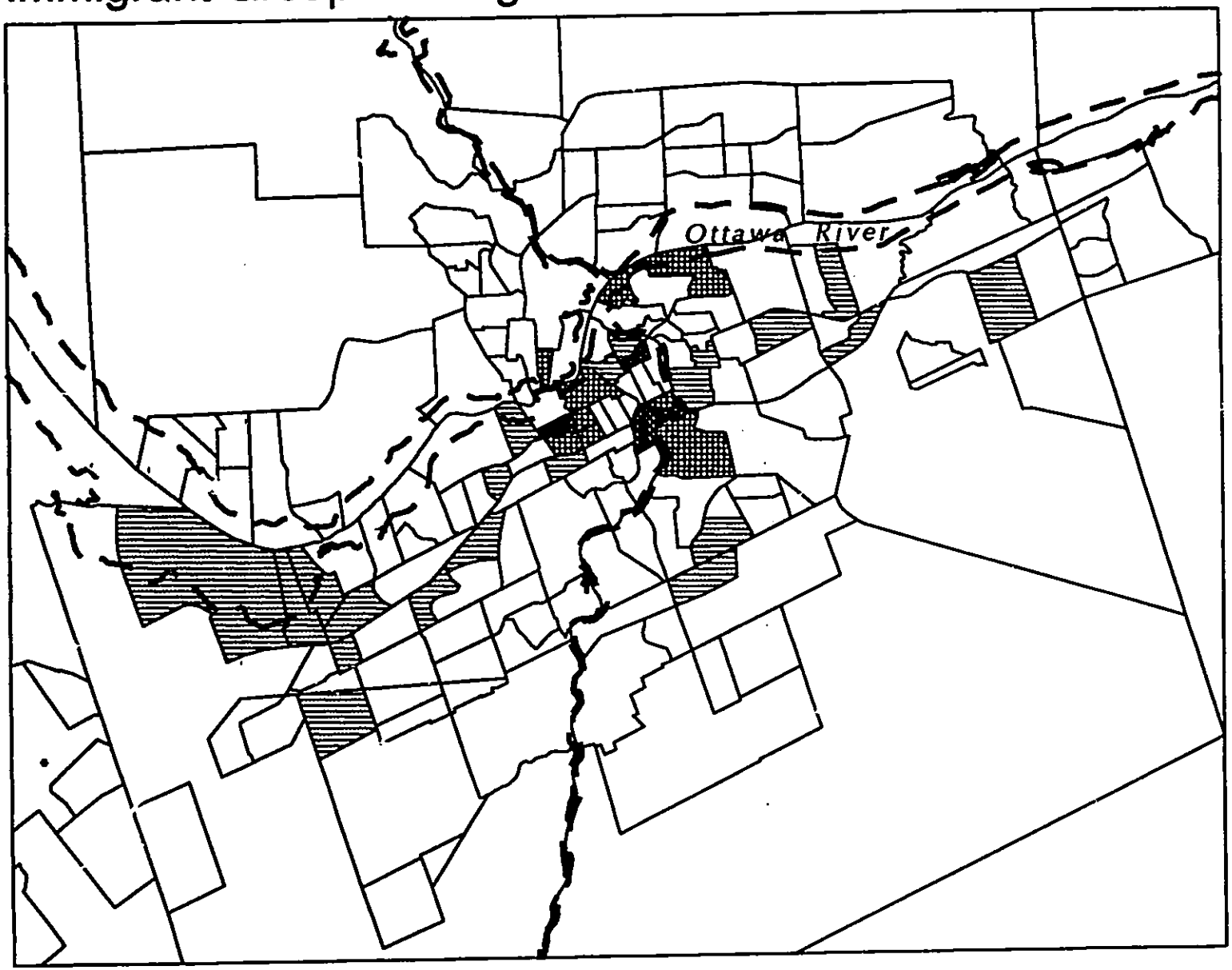
Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

Figure 21
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Immigrated Between 1978 and 1982



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Minister of Supply and Services Canada, 1989.

Figure 22
Residential Concentration in Ottawa-Hull, 1986
Immigrant Group: Immigrated Between 1983 and 1986



Souce of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

* This census tract has an outstanding score on the index

The only tract in Kanata which has an index value of 1.7 or over actually has an outstanding index value of 24.4, the highest index value for the concentrations of any of the groups.

2. Segregation of Selected Ethnic and Immigrant Groups from the Rest of the Population: Indexing the Spatial Distributions in Ottawa-Hull, 1986

Balakrishnan shows the mean index of segregation (see footnote 1) for each selected ethnic group in selected metropolitan areas, including Ottawa-Hull, for the years 1961 and 1971 (1982, p.100, Table IV). He uses the actual 1971 boundaries of the CMAs as well as the 1961 boundaries for the analysis of 1971 data in order to allow comparisons over time (p.96). The British, French and Italian groups are common to Balakrishnan's study and to this one. The former study also includes the Asiatic group, while here the group is divided into the Chinese and South Asian groups. The Asiatic group is the only visible minority group included in Balakrishnan's study. What follows is not a group-by-group comparison of Balakrishnan's findings for Ottawa-Hull for 1961 and 1971 and the findings of this study for 1986 (see TABLE 2) since such a comparison would require that the 1986 boundaries also be standardized. Instead, the relative rankings of the groups on the index in the earlier study and this one is the focus.

For British ethnics, Balakrishnan reported D Index values of .261 and .286 in 1961 and 1971 respectively (p.100, Table IV). In 1986, the D Index for British ethnics is .280. For French ethnics, Balakrishnan reported index values of .585 and .593 in 1961 and 1971 respectively (ibid), while for 1986, a value of .577 was determined. Balakrishnan points out that, outside of Montreal and Ottawa-Hull, French ethnics in general were no more segregated

TABLE 2

SEGREGATION INDICES OF SELECTED ETHNIC AND IMMIGRANT GROUPS FROM THE REST OF THE POPULATION: OTTAWA-HULL, 1986

ETHNIC ORIGIN (SINGLE ORIGINS)	D INDEX	R INDEX	PERCENT OF POPULATION (NON-INSTITUTIONAL)
BRITISH	0.280	0.218	22.02
BLACK	0.446	0.443	0.73
CHINESE	0.452	0.446	1.19
ITALIAN	0.471	0.462	1.96
SOUTH ASIAN	0.493	0.489	0.98
JEWISH	0.538	0.533	0.93
FRENCH	0.577	0.392*	32.11
IMMIGRANT GROUP			
OTHER EUROPE	0.230	0.219	4.79
ALL IMMIGRANTS	0.258	0.223	13.57
USA	0.275	0.273	0.95
UK	0.320	0.310	3.13
ASIA	0.358	0.348	2.94
OTHER AMERICAS	0.360	0.356	1.22
AFRICA	0.376	0.374	0.46
OTHER	0.583	0.582	0.09

* Note that this value places the French ethnics between the British and the Black groups.

than the other selected ethnic groups in the ten largest metropolitan areas in Canada (p.101). For Italians, Balakrishnan reported D Index values of .491 and .489 for 1961 and 1971 respectively (p.100, Table IV). In 1986, the D Index for Italians is .471. For Asiatics Balakrishnan reported index values of .422 and .381 in 1961 and 1971 respectively (ibid). In 1986, the index value for Chinese ethnics is .452, while for South Asians it is .493. Thus, the relative positions of the groups are almost the same in 1986 as in 1961 and 1971 except that one of the Asian groups, the South Asian group, is less evenly distributed than the Italian group in 1986.

Balakrishnan and Kralt show the indices of dissimilarity of each selected ethnic group from all other groups combined (the rest of the population) for Montreal, Toronto and Vancouver for the year 1981 (1987, p.151, Table 4). For the three metropolitan areas, Balakrishnan and Kralt report that the highest indices of concentration were found among the Jews (p.152). In 1986, the French in Ottawa-Hull have the highest Index of Dissimilarity, at .577. In the same year, Jewish ethnics in Ottawa-Hull are second only to the French in terms of residential unevenness, with an Index of Dissimilarity of .538. In Montreal, Greeks were the next most segregated group, while Italians, Portuguese and two of the three visible minorities (Indo-Pakistani and Chinese) had about the same levels of segregation. The Black and Caribbean group had a D Index of only .463 (ibid). Likewise in Ottawa-Hull, Blacks are the

least segregated visible minority, at .446. This is in spite of the small size of this group (0.73% of the total population). Italians (.471) rank between the Chinese (.452) and South Asian (.493) groups. The values for the Index of Replacement (see column R INDEX in TABLE 2) for the ethnic groups from the rest of the population are generally slightly lower than the corresponding values for the D Index, with the exception of the R Index value for the French. In the case of the French, the index value drops to .392, placing the French between the British and Black groups in terms of this second measure of segregation. Thus, Jewish ethnics have the highest Index of Replacement value, at .533.

TABLE 2 also shows the indices of dissimilarity and replacement for the eight immigrant groups. While the values on the D and R indices for the immigrant groups have approximately the same ranges as the values on the two indices for the ethnic groups, 7 out of 8 values on both indices for the immigrant groups are below .400. With respect to the D Index, immigrants born in Asia, the Americas (excluding the U.S.A.) and Africa have slightly higher indices (.358, .360, .376 respectively) than immigrants born in Europe (excluding the U.K.), the United States of America and the United Kingdom (.230, .275, .320 respectively). Again, the R Index value for each group is slightly lower than the corresponding D Index value. Immigrants born in "Other" places of origin are the most highly segregated, with a D Index of .583 and an R Index of .582. These high values for this last group are probably mostly due to

the extremely small size of this group, being only 0.09% of the total population. The results reported above and presented in the table will be referred to in Chapter VI dealing with empirical relationships.

V. TESTING THE SOCIO-ECONOMIC AND FAMILY STATUS HYPOTHESES

Lamarche and Perron claimed that their Principal Components analysis "...revealed the existence of five essential dimensions of the Ottawa-Hull structure,..." (1978, p.75, my underlining), and indeed, factor analysis is perhaps most often used independently as a technique for the identification of the basic dimensions underlying the social structure of urban areas. Here, as in other studies (for example: Ley, 1986; Herbert, 1977), Principal Components analysis is mainly used to reduce a set of variables to a smaller set of vectors, so that the scores can be used as independent variables in a subsequent regression analysis. For this reason, the set of input variables (refer to TABLE 3), while including demographic/family, socio-economic and housing variables typical of factorial ecology studies, does not include ethnic origin variables, since here these are considered as dependent variables, along with the immigrant group variables.

Ley provides two reasons for selecting a research strategy involving regression from Principal Components analysis:

> Principal components analysis isolates the underlying structures in a correlation matrix and allows independent components to replace the original intercorrelated variables in a correlation-regression analysis (Hauser 1974). This strategy not only eliminates multicollinearity but might also provide a more theoretically relevant integration of the original variables by allowing an alternative grouping of them that might vary from the...initial hypotheses" (1986, p.530).

A. Methodology

1. Principal Components Analysis of Ottawa-Hull, 1986

Davies provides a justification for the use of the Principal Components solution followed by Varimax rotation in light of the availability of alternative factoring and rotation procedures: for one, results obtained by the most commonly used technical procedure are easier to integrate with existing literature in human ecology (1984, p.128). Davies explicitly adds: "...on practical grounds the familiarity of the approach and the fact it makes fewer assumptions [than common factor], means that initial investigations are less prone to error"(p.135).

Before going on to provide more details about the methodology, a few words about the choice of variables are in order. Variables in each of the three groups, namely: demographic/family, socio-economic and housing, were chosen so that those measuring the same construct but opposite characteristics would form a status scale, which is easier to label than a factor which is not a scale: for example, 'pairs' of variables such as non-family household and average number of children, or less than grade 9 and university with degree, or owned and rented were deliberately included in the data set.

Thraves argues that it is the income dimension of socio-economic status which largely determines access to housing in the context of a free or mixed market economy, and thus he measures socio-economic

status of immigrant groups in Winnipeg by average income of the population 15 years of age and older in each group (1991, p.102). But is income alone an adequate measure of socio-economic status in a study such as this one? Herberg analyses the direction and degree of differentiation between Canadian ethno-racial groups with respect to formal education and compares the patterns to those for occupation and income in order to ascertain the ethno-racial socio-economic hierarchy in Canada since 1921 (1990). The 1980-81 rankings for Educational (% with post-secondary education), occupational (% with Profes-Admin jobs) and income ($ income in 1980) indices revealed "similarity-consonance" between the three rankings for the following five ethnic groups: Indochinese, Greek, and Portuguese (low SES), British (intermediate SES), and Jewish (high SES) (p.217). Two patterns of "dissonance" between rankings were revealed. Five of the seven visible minorities had educational, or both educational and occupational rankings that were "conspicuously" better than their income rankings. These groups were: the Chinese, East Indians, Japanese, and especially the Blacks and Filipinos. Herberg attributes this pattern to systematic discrimination (p.218). The second pattern of dissonance accounted for the German, Italian, Polish, Scandinavian, and Ukrainian groups - "White ethnicities all, and most of them also close to being culturally assimilated" (ibid). These groups had income rankings much higher than educational or both educational and occupational resources could explain. Herberg attributes this pattern largely to ethnic entrepreneurship as

opposed to blatant discrimination (ibid). The Dutch, French and "perhaps also" the Native Peoples groups showed no systematic pattern. On the other hand, Herberg points out that the last group could also be assigned to the visible minorities group (ibid).

These results suggest that socio-economic status should be measure by all three aspects, namely: education, occupation and income. For example, using income only would preclude the possibility that individuals choose to locate with other individuals based on employment sector or occupation, regardless of income.

Housing variables were chosen because they provide additional information about life-style preferences and the family-life cycle as well as additional information about socio-economic status. Percentage of movers was included in the variable set since Migration Status or Mobility has been identified as an additional factor in factorial ecologies of Western cities (Davies, 1984, p.322). Finally, the percentage of the total population speaking non-official home languages was included because of the interest in the influence of linguistic facility on residential concentration.

The following steps were taken in obtaining the results of the Principal Components analysis presented in TABLE 4:

1. The percentages for the 30 demographic/family, socio-economic and housing variables were calculated in order to eliminate the effect of population-size differences among the census tracts. The totals used as denominators for calculating the percentages (see TABLE3) were obtained using the UNIVARIATE procedure in SAS. There is a slight discrepancy between these totals, which are the sums

TABLE 3

DERIVATION OF VARIABLES USED IN PRINCIPAL COMPONENTS ANALYSIS

Variable	Numerator	Denominator	Sample Size
DEMOGRAPHIC/ FAMILY			
PMOVERS	Movers	Total population 5 years and over	20% sample
FPARTR	Participation rate (females >=15 years)	Not applicable	20% sample
PGT65YE	65-74 + >=75 years (for male and female)	Total population	100% sample
PNONFAM	Non-family household	Total number of private hhlds	100% sample
PLONE	Number of lone-parent families	Total number of census families in private hhlds	100% sample
PUNDER6	Under 6 years of age (for total number of children at home)	Total population	100% sample
PCTO14	6-14 years (for total number of children at home)	Total population	100% sample
AVCHILD	Average number of children per census family	Not applicable	100% sample
SOCIO-ECONOMIC			
PNONOFF	Non-official languages (home language-single)	Total population (non-institutional)	20% sample
PLESSG9	Less than grade 9	Total population >=15 years	20% sample
PDEG	University with degree	Total population >=15 years	20% sample
PFIRE	Finance, insurance & real estate	Total labour force >=15 years	20% sample

TABLE 3 CONTINUED

DERIVATION OF VARIABLES USED IN PRINCIPAL COMPONENTS ANALYSIS

Variable	Numerator	Denominator	Sample Size
SOCIO-ECONOMIC			
PMMANAG	Managerial, administrative & related	Males-all occupations	20% sample
PFMANAG	Managerial, administrative & related	Females-all occupations	20% sample
TRANSF	Government transfer payments (% composition of income)	Not applicable	20% sample
PLESS5	Under $5,000	Family income-all census families	20% sample
POVER50	$50,000 and over	Family income-all census families	20% sample
AVINC	Average income (for family income-all census families)	Not applicable	20% sample
MEDINC	Median income (for family income-all census families)	Not applicable	20% sample
ILOWINCF	Incidence of low income (for all economic families)	Not applicable	20% sample
ILOWINCI	Incidence of low income (for low income unattached individuals)	Not applicable	20% sample
HOUSING			
POWNED	Owned	Total number of occupied private dwellings	100% sample

TABLE 3 CONTINUED

DERIVATION OF VARIABLES USED IN PRINCIPAL COMPONENTS ANALYSIS

Variable	Numerator	Denominator	Sample Size
HOUSING			
PRENTED	Rented	Total number of occupied private dwellings	100% sample
PDETACH	Single-detached house	Total number of occupied private dwellings	100% sample
PAPART	Apartment, 5 or more storeys	Total number of occupied private dwellings	100% sample
VALDWELL	Average value of dwelling (for total occupied private dwellings)	Not applicable	20% sample
AVPROOM	Average number of persons per room (for total number of private households)	Not applicable	20% sample
RENT	Average gross rent (monthly) (for tenant one-family hhlds without add. persons)	Not applicable	20% sample
PRENT30	Gross rent>=30% of household income	Tenant one-family hhlds without add. persons	20% sample
AVPAYM	Average major payments for owner (monthly) (for owner one-family hhlds without add. persons)	Not applicable	20% sample

DEMOGRAPHIC/FAMILY=8 variables
SOCIO-ECONOMIC=13 variables
HOUSING=9 variables
TOTAL=30 variables

for all census tracts in the CMA, and the totals for Ottawa-Hull as a whole available directly from the CD-ROM data base. For example, the total population (non-institutional) according to the data for all of Ottawa-Hull is 811320, while the same total for the sum of all census tracts according to UNIVARIATE is 811325. Kralt (1986b, p.28;a;c) also chose to use the sums for all census tracts in calculating percentages.

2. Four factors were retained for factor analysis and rotation. A scree plot of eigenvalues revealed that the slope levelled off after the fourth factor. Davies recommends Cattell's Scree Test as one 'rule of thumb' for making the decision about the number of factors to retain for analysis and interpretation. He states: "The logic of the procedure is that the factor variance should level off when the factors simply measure random errors." (1984, pp.174-75).

3. The loadings were multiplied by 100 and rounded to the nearest integer using the FLAG= option in SAS.

4. Initial factor loadings were rotated using the VARIMAX rotation option.

5. The distributions of the factor scores for the four components were mapped using the PC version of ARC/INFO and CorelDRAW!

Since the main interest of this paper is in over-representation of ethnic and immigrant groups in census tracts as opposed to under-representation, two additional factor analyses were done, using only those tracts with Index of Residential Concentration values of greater than 1.7 for the group of all ethnics excluding the British and the French in the first case and for the group of all immigrants in the second case. These additional analyses were done in order to test the stability of the factors found in the original factor analysis involving all of the census tracts with their varying degrees of over- and under-representation of all of the selected ethnic and immigrant groups. The 1.7 cut-off value reduced the number of observations in the first case to 34 and in

the second case to only 18. Thus, the original group of 30 variables was too large for these other analyses since there should be at least one observation for every variable, and ideally, four observations for every variable (ibid p.108, citing Cattell, 1978). Ten of the twelve variables with loadings of 80 or greater on any of the four original factors (see TABLE 4) were selected. The two out of the twelve which were not included in the smaller variable set were considered redundant. The results of these additional analyses are presented in TABLE 5 and TABLE 6.

2. Regression from Principal Components Analysis

Ley regressed the scores from three independent components against a gentrification index in his paper on "Alternative Explanations for Inner-City Gentrification: A Canadian Assessment" (1986). Here, the scores for the four factors resulting from the original Principal Components analysis were used as independent variables in a regression analysis. These scores were regressed against the indices of residential concentration for the selected single ethnic origin (see TABLE 7) and immigrant (see TABLES 8 and 9) groups, using the STEPWISE procedure (with STEPWISE option) in SAS. The 0.1500 default significance levels for entry into and for staying in the models were retained.

A second regression analysis (see TABLES 10 and 11) was done using the variable "residential concentration greater than 1.7 for the group of immigrants who arrived after 1966" as a dummy, in addition to the four factors. A third regression analysis (see TABLES 12

and 13) was done using the variable "percent of the population speaking non-official home languages" as an independent variable, along with the four factors. The results of these additional regression analyses are discussed in chapter VI section B.

Information about the residuals was obtained using the R and PLOT procedure options within the REG procedure in SAS. Residuals were plotted against the dominant independent variable, and against the full model where one independent variable did not dominate. Maps of residuals can be used to search for other possible explanatory variables (than those which are explicitly included in a regression model) which can subsequently be added to a new regression analysis, by looking for patterns in the location of positive versus negative residuals (Taylor, 1980, p.209). Here, positive and negative residuals of more than 2 standard deviations were mapped, not to improve the selected models, but simply to gain additional information as to possible factors influencing residential concentration. One map of residuals (Figure 27) is included in this thesis as a case.

B. Results

1. Interpretation of Principal Components Analysis

TABLE 4 presents the results of the first Principal Components analysis after rotation by the VARIMAX procedure. The four factors retained for analysis and interpretation together account for 73.6% of the overall variation in the input data set of 30 variables. In

TABLE 4

LOADINGS OF VARIABLES ON THE 4 COMPONENTS SOLUTION WITH VARIMAX ROTATION: OTTAWA-HULL, 1986

FAMILY STATUS	**FACTOR1 26.4%***	**SOCIO-ECONOMIC STATUS**	**FACTOR2 24.0%**
Variables	**Loadings**	**Variables**	**Loadings**
PCTO14	**+90****	AVINC	**+87**
AVCHILD	**+88**	VALDWELL	**+87**
POWNED	**+88**	PDEG	**+87**
PDETACH	**+79**	PMMANAG	**+81**
PUNDER6	**+72**	POVER50	**+81**
POVER50	+34	RENT	**+74**
		PFMANAG	**+61**
		AVPAYM	**+51**
		PFIRE	+34
PLESS5	-31	ILOWINCI	-33
PNONOFF	-39	PLONE	-43
TRANSF	-41	PLESS5	-47
ILOWINCF	-43	TRANSF	**-54**
PGT65YE	**-62**	INLOWINCF	**-55**
PLONE	**-63**	AVPROOM	**-62**
PAPART	**-83**	PLESSG9	**-65**
PRENTED	**-88**		
PNONFAM	**-95**		

Notes:

*The variance explained by each factor (the eigenvalue) was divided by the total number of variables to obtain the proportion explanation value for each factor (Boice, 1969, p.11).

**Values have been multiplied by 100 and rounded to the nearest integer. Values >=50 have been highlighted.

TABLE 4 CONTINUED

LOADINGS OF VARIABLES ON THE 4 COMPONENTS SOLUTION WITH VARIMAX ROTATION: OTTAWA-HULL, 1986

POVERTY VERSUS AFFLUENCE	FACTOR3 13.2%*	MOBILITY/ MODERNITY VERSUS RETIRED	FACTOR4 10.0%
Variables	**Loadings**	**Variables**	**Loadings**
ILOWINCI	**+71****	PMOVERS	**+86**
ILOWINCF	**+64**	FPARTR	**+73**
PRENT30	**+63**	AVPAYM	**+54**
PLESS5	**+61**	PUNDER6	+47
TRANSF	**+56**	PFIRE	+32
PLESSG9	**+55**		
PLONE	+42		
AVPROOM	+41		
PMMANAG	-31	TRANSF	-34
POVER50	-37	PDETACH	-35
FPARTR	-41	PLESSG9	-37
MEDINC	**-70**	PGT65YE	**-61**

Notes:

*The variance explained by each factor (the eigenvalue) was divided by the total number of variables to obtain the proportion explanation value for each factor (Boice, 1969, p.11)

**Values have been multiplied by 100 and rounded to the nearest integer. Values >=50 have been highlighted.

the description and interpretation which follow, the absolute variable loadings on the factors of 30 to 49 (inclusive) are considered weak loadings, while loadings of 50 to 69 are considered moderate loadings, and loadings of 70 or greater are considered strong loadings. Davies and Lewis (1973) called these three types of loadings low, medium and high (Davies, 1984, p.182). Davies explains that ±0.3 (or ±30) has become a generally accepted cut-off level since "...it is the closest whole number to the situation in which 10% of the variance in a variable is accounted for by the factor..."(ibid). Davies adds:

> Although this level represents the lower limit of loadings usually considered to be worth interpreting, it must be stressed that more emphasis should be placed on loadings above ±0.7 [or ±70]...since this means that 50% of the variance of the variables is accounted for by the factor (ibid).

The term "factor scale" is used to describe those factors in which the loadings on the positive side represent the opposite characteristics to the loadings on the negative side (ibid, p.194).

FACTOR1: FAMILY STATUS

The first component, the largest, accounts for 26.4% of the overall variation in the input data, and clearly represents an index of family status. The variables percentage of children at home between the ages of 6 and 14 (PCTO14, 90), average number of children (AVCHILD, 88), percentage of occupied private dwellings which are owned (POWNED, 88), percentage of single-detached houses (PDETACH, 79), and percentage of children at home under 6 years of age (PUNDER6, 72) all have strong positive loadings on this vector.

The first three of the above also have unique loadings on this vector. The variable percentage of families with incomes of $50,000 and over (POVER50) has a weak positive loading on this factor (34). This last loading is consonant with the above mentioned loadings given that ownership of large single-detached homes to accommodate relatively large families requires a certain level of affluence.

On the negative side of this factor scale, the variables percentage of non-family households (PNONFAM, -95), percentage of occupied private dwellings which are rented (PRENTED, -88), and percentage of apartments (PAPART, -83) have the strongest loadings. These variables also load uniquely on this factor. The variables percentage of lone-parent families (PLONE, -63), and percentage of persons 65 years and over (PGT65YE, -62) have moderately negative and primary loadings on this first factor. Clearly, this axis differentiates between those census tracts characterized by young, large, nuclear families living in their own homes, and those characterized by single people, lone-parent families, and the elderly living in rented accommodations. Four variables, the incidence of low income families (ILOWINCF, -43), the percentage of income in the form of government transfer payments (TRANSF, -41), the percentage of residents speaking non-official languages at home (PNONOFF, -39), and the percentage of families with incomes of under $5,000 (PLESS5, -31) load weakly on the negative side of this family status vector. While these income variables load weakly,

their association with the non-family, lone-parent and elderly variables nevertheless points to the marginality of these groups, as well as to the marginality of linguistically unassimilated groups of ethnics and immigrants.

Figure 23 illustrates the distribution of scores on the family status factor scale among the census tracts. The family status dimension clearly exhibits a concentric distribution pattern. This is in agreement with most of the findings for North American cities, which have shown that the "...map of household types and age structure is dominantly zonal,..." (Johnston, 1984, p.219). Census tracts most characterized by non-family households, lone-parent families, the elderly and persons speaking non-official languages at home, living in rented accommodations (scores of < -1.50) are centred on the areas of Ottawa's Central Business District (Wellingon ward) and the University of Ottawa (St. George's ward), as well as on Lower Town. In Ottawa, government activities are a major CBD function (Sabourin, 1978, p.61). Another very low family status area, comprising three tracts, exists in Britannia and Richmond wards along Carling Ave.

Census tracts with scores between -1.50 and -0.50, still indicating a majority of non-family households, lone-parent families and persons 65 years and over, form an inner ring around Ottawa's Central Business District and other areas identified above, a ring which also includes an area on the Quebec side of the Census

Metropolitan Area. Four out of five tracts in the City of Vanier form part of this inner low family status ring, as do three out of four tracts in Dalhousie ward.

Census tracts with scores on the family status dimension between 0.50 and 1.50 are characterized by a majority of young families. Census tracts on the periphery of the Ontario side of the CMA, in Kanata, Goulbourn, Nepean, Gloucester and Cumberland are included in this group. On the Quebec side of the CMA, census tracts in the municipalities of Aylmer and Gatineau are part of this high family status ring.

Finally, one census tract in Cumberland Township, and one tract in Gatineau have scores of over 1.50 on this family status dimension, indicating their very high family status.

Timms describes the relationship between family-life cycle or life style preferences and residential location:

> The 'flight to the suburbs' and the search for a good environment in which to enact a familistic style of life appear to be essentially synonymous in the Western city. With the spread of automobile ownership and the construction of suburban estates on a mass scale, suburban residence and its associated spaciousness has been brought within the reaches of a majority of the population. Both rich and poor, native born and migrant can aspire to a new house in a new suburb. Differences in socio-economic status or in ethnicity appear to introduce only minor variation in the suburban theme.
>
> If the appeal of the suburb seems explicable in terms of a single, over-riding set of life-style preferences, that of the inner city appears to rest on a much more complex set of considerations. Some impression of these considerations may be gleaned from a description by Gans of the various types of residents to be found

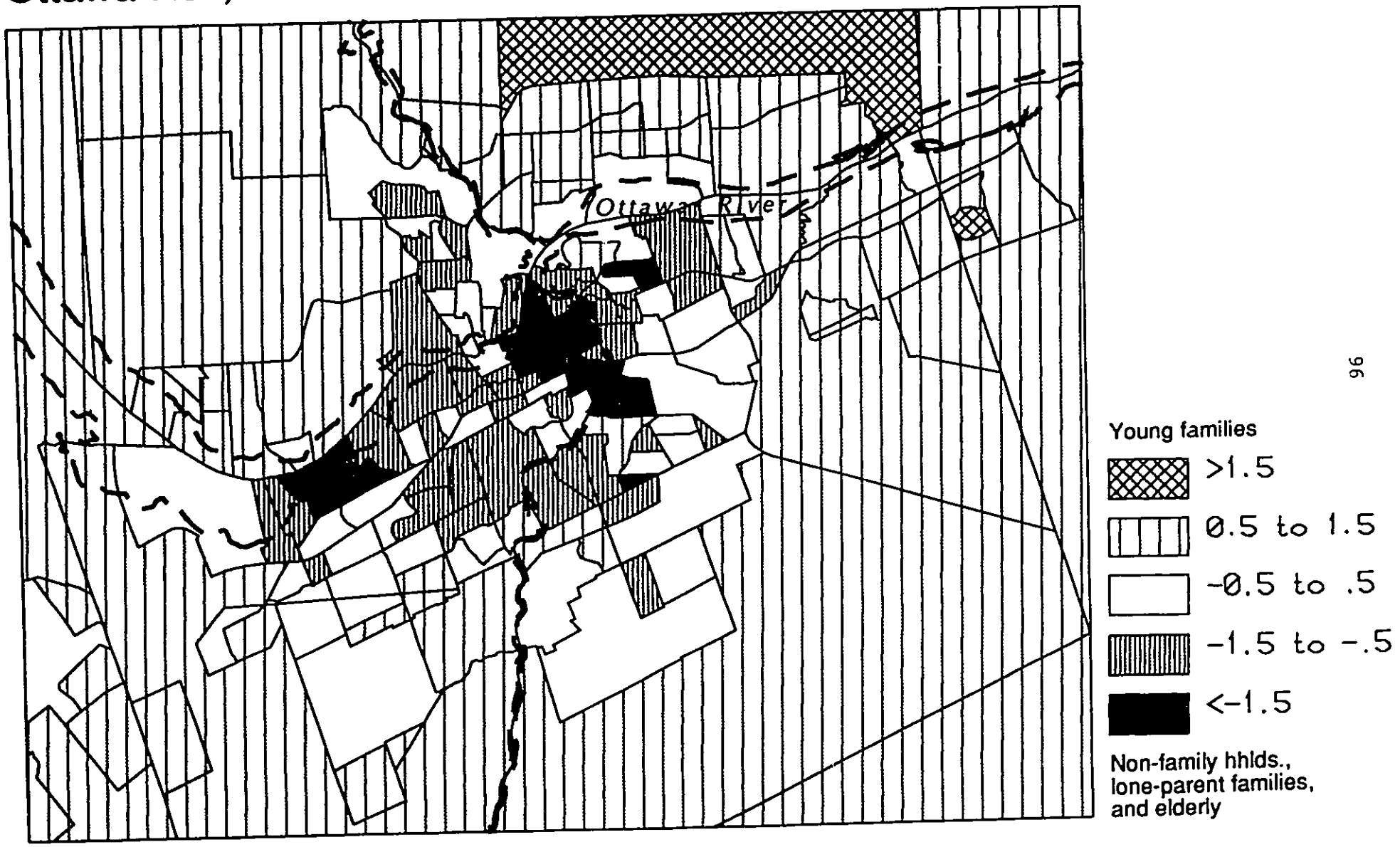
in the inner city. Five main categories are described: the 'cosmopolites', the 'unmarried or childless', the 'deprived', the 'trapped' and the 'ethnic villagers' (1971, p.107).

The ethnic villagers are described by Timms as being "...in the central city, but not of it", while the other four categories are said to "...provide the main basis for the mobility dimension of residential differentiation and contribute to the association between mobility and urbanism as a way of life" (pp.107-108). A comparison of Timms' description and the findings of this study for Ottawa-Hull indicates that Ottawa-Hull is quite typical with respect to the family status dimension of urban differentiation. The mobility dimension is discussed later in the section.

FACTOR2: SOCIO-ECONOMIC STATUS

The second component is clearly another factor scale, this time indexing socio-economic status, and accounting for 24.0% of the total variance in the input data. Three variables, the average family income (AVINC), the average value of dwelling (VALDWELL), and the percentage of the population 15 years and over with a university degree (PDEG) each have a loading of 87 on this vector. These three variables also load uniquely on this second vector. The other variables with strong positive loadings on this factor are the percentage of males in managerial, administrative and related occupations (PMMANAG, 81), the percentage of families with incomes of $50,000 or more (POVER50, 81), and average rent (RENT, 74). Two variables, the percentage of females in managerial, administrative and related occupations (PFMANAG, 61), and average

Figure 23
Distriburtion of Scores on Factor1: FAMILY STATUS
Ottawa-Hull, 1986



Souce of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

payments for home owners (AVPAYM, 51) have moderate positive loadings on this second factor. Finally, the variable percentage of the labour force in finance, insurance and real estate (PFIRE, 34) has a weak positive loading on this vector. It can be seen that variables typically used to index a socio-economic status construct, that is, education, occupation and income variables, are all represented here.

Variables loading on the negative side of this factor scale represent the opposite characteristics to those on the positive side, facilitating the naming and interpretation of this factor, despite the absence of any variables with strong negative loadings. The variables percentage of the population 15 years and over with less than grade 9 (PLESSG9, -65), average number of persons per room (AVPROOM, -62), incidence of low income families (INLOWINCF, -55), and percentage of income in the form of transfer payments (TRANSF, -54) all load moderately on the negative side of this socio-economic status vector. Three variables, the percentage of families with incomes of less than $5,000 (PLESS5, -47), the percentage of lone-parent families (PLONE, -43), and the incidence of low income individuals (ILOWINCI, -33) have weak negative loadings on this factor.

Figure 24 illustrates the distribution of the scores on the socio-economic status factor scale among the census tracts. The pattern of scores generally has sectoral and clustered characteristics,

with some isolated tracts. Two census tracts in the Ottawa-Hull Census Metropolitan Area have scores of less than -1.50 on this second dimension, indicating very low socio-economic status. One of these tracts is located in Hull, north of Hull's CBD, while the other is located in Gloucester in the area of the Ottawa International Airport.

Census tracts with scores between -1.50 and -0.50 rank low on the socio-economic status scale, and tend to be located in sectors or clusters. Four out of five tracts in the City of Vanier form a low socio-economic status cluster. In the east of Ottawa proper, Canterbury ward contains an isolated census tract with a low ranking on this dimension. This tract has both the CP and CN railways passing through it, which are likely considered negative physical externalities. A sector of low status tracts, also in the east, is identified north of the Queensway. On the Quebec side of the Ottawa-Hull CMA, a sector of census tracts east of Chemin De La Mine/Boul. Cite des Jeunes/Promenade du lac des Fees, including Hull's CBD, have low rankings on this dimension. Finally, most of Gatineau is identified here.

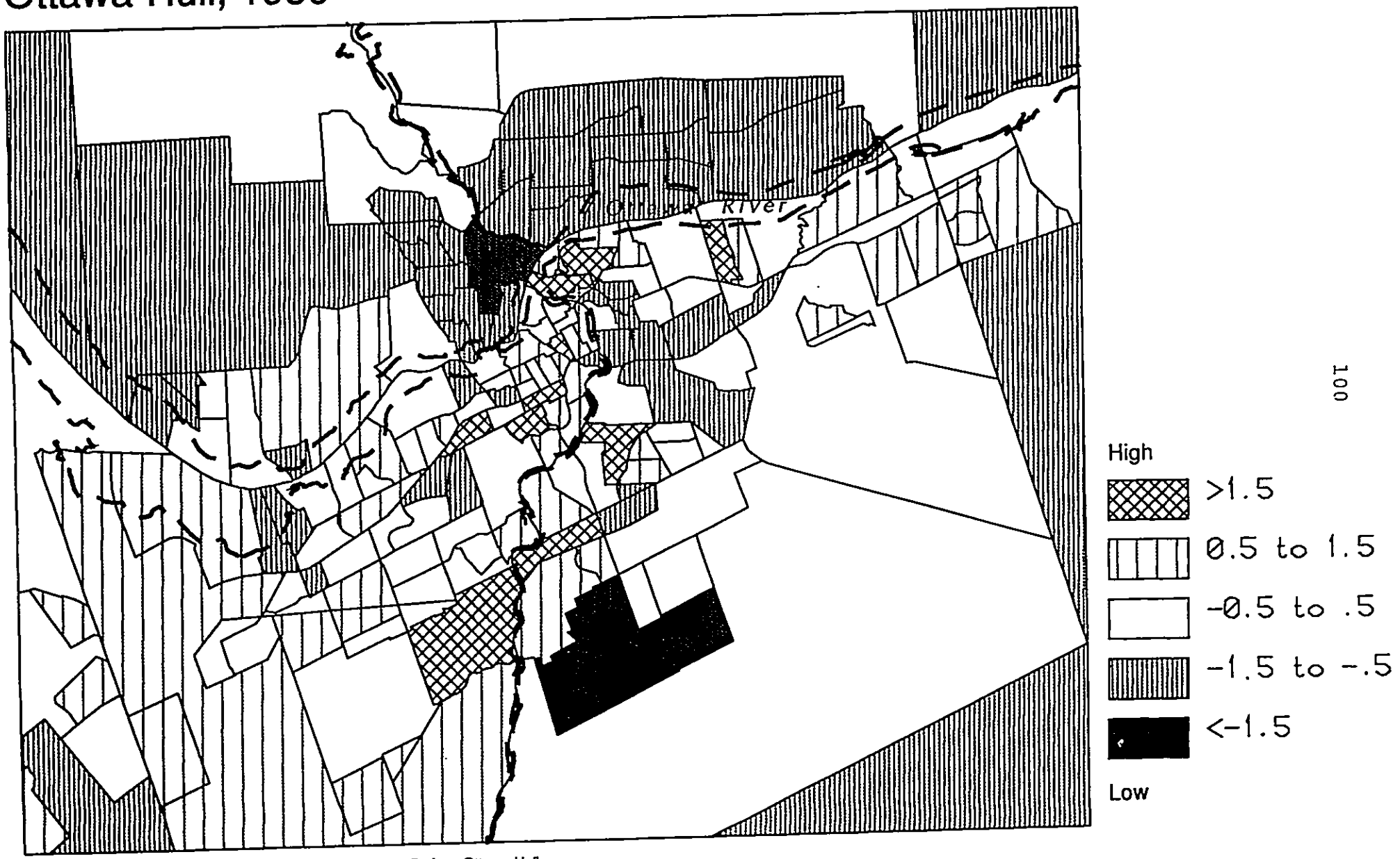
Census tracts with scores between 0.50 and 1.50 on this socio-economic status dimension have a majority of individuals and households with high socio-economic status, and are located in a broken 'sector' running diagonally from the south-west to the north-east of the Ontario side of the CMA. These tracts are

located in Nepean and Kanata. In Ottawa, high ranking tracts are located in Richmond and Wellington wards, as well as in Capital and St. George's wards. One high status tract is located north of Rockcliffe Park in By-Rideau ward. Other such tracts are located in the north-east of Gloucester.

Finally, census tracts with scores of greater than 1.50 on this second dimension are those with the highest socio-economic status in the CMA. These tracts include Rockcliffe Park, one tract in the area of By-Rideau ward north-east of the Rideau River, as well as one tract in the area of St. George's ward west from King Edward Ave. to the Rideau Canal (Sandy Hill). Two very high status census tracts are located in the Glebe and in the Dow's lake area, both in Capital ward. Outside of the City of Ottawa, one census tract in Nepean between the Ravine and Black Rapids Creek to the north and south and between Woodroffe Ave. and Prince of Wales Dr. to the west and east, ranks very high on this socio-economic status scale. Clearly, very high socio-economic status has allowed these residents to locate in the more pleasant environments of the region, as many of these tracts are located along one of the rivers, the canal and/or on high land.

Two census tracts have outstanding positive scores of 6.2 and 3.5 on this second factor: these are Rockcliffe Park and the census tract in Gloucester identified on the map.

Figure 24
Distribution of Scores on Factor2: SOCIO-ECONOMIC STATUS
Ottawa-Hull, 1986



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

FACTOR3: POVERTY VERSUS AFFLUENCE

The third component is a second socio-economic status scale, and accounts for 13.2% of the variance in the input data. This factor, more than FACTOR 2, emphasizes the opposition between the low-income and high-income (as opposed to between other aspects of socio-economic status) census tracts, since four of the variables on the positive side of the scale (the impoverished side) have their highest (primary) loadings on this factor. These variables are: the incidence of low income individuals (ILOWINCI, 71), the incidence of low income families (ILOWINCF, 64), the percentage of families with incomes of less than $5,000 (PLESS5, 61), and the percentage of income in the form of transfer payments (TRANSF, 56). The variable percentage of tenant one-family households with gross rent representing 30% or greater of household income loads uniquely on this vector (PRENT30, 63). Finally, the variables percentage of the population 15 years and over with less than grade 9 (PLESSG9, 55), percentage of lone-parent families (PLONE, 42), and average number of persons per room (AVPROOM, 41) also load on the impoverished side of this second socio-economic status scale, but have higher loadings on other vectors.

On the negative side of the scale, median income (MEDINC, -70) loads marginally highly and uniquely on this vector. The variables female participation rate (FPARTR, -41), percentage of families with incomes of over $50,000 (POVER50, -37), and percentage of males in managerial, administrative and related occupations

(PMMANAG, -31) have weak and only secondary loadings. Thus, this second socio-economic status scale more clearly highlights poverty.

Davies describes the possible emergence of many more axes of differentiation (than the four basic axes) in the factorial ecologies of post-industrial cities due to the increasing complexity of society (1984, p.311). More specifically, he describes the possibility of the emergence of Non-affluent Groups and Sub-Standard housing axes of differentiation, which would appear in addition to the economic base and economic status variations:

> ...the effects of automation, competition from the industrializing countries and the slow-down or reversal in the growth rate of the western economies in the last decade have led to the creation of new levels of long-term unemployment. ...Such disadvantaged groups...may be a growing entity if long-term structural unemployment persists (p.312).

The third factor identified in this study is, perhaps, the reflection of this development in Ottawa-Hull. A recent study of trends in the Ottawa-Carleton labour market lends support to this position; Sharpe (1992) makes the following points, among others:

1. Local labour market trends in the 1980s have in general been consistent with those at the provincial and national levels (p.3).

These trends included:

- large cyclical fluctuations in labour market conditions (p.11).
- the possible polarization of employment into "good" jobs and "bad" jobs (p.14).
- rapid growth in self-employment (p.11).
- increased part-time employment, especially due to involuntary part-time employment (ibid).
- increased skill requirements (ibid).

2. Current unemployment is largely due to a basic lack of jobs (p.3).

3. With respect to challenges for labour market policy, the most important development has been rapid growth of the General Welfare Assistance caseload (idid).

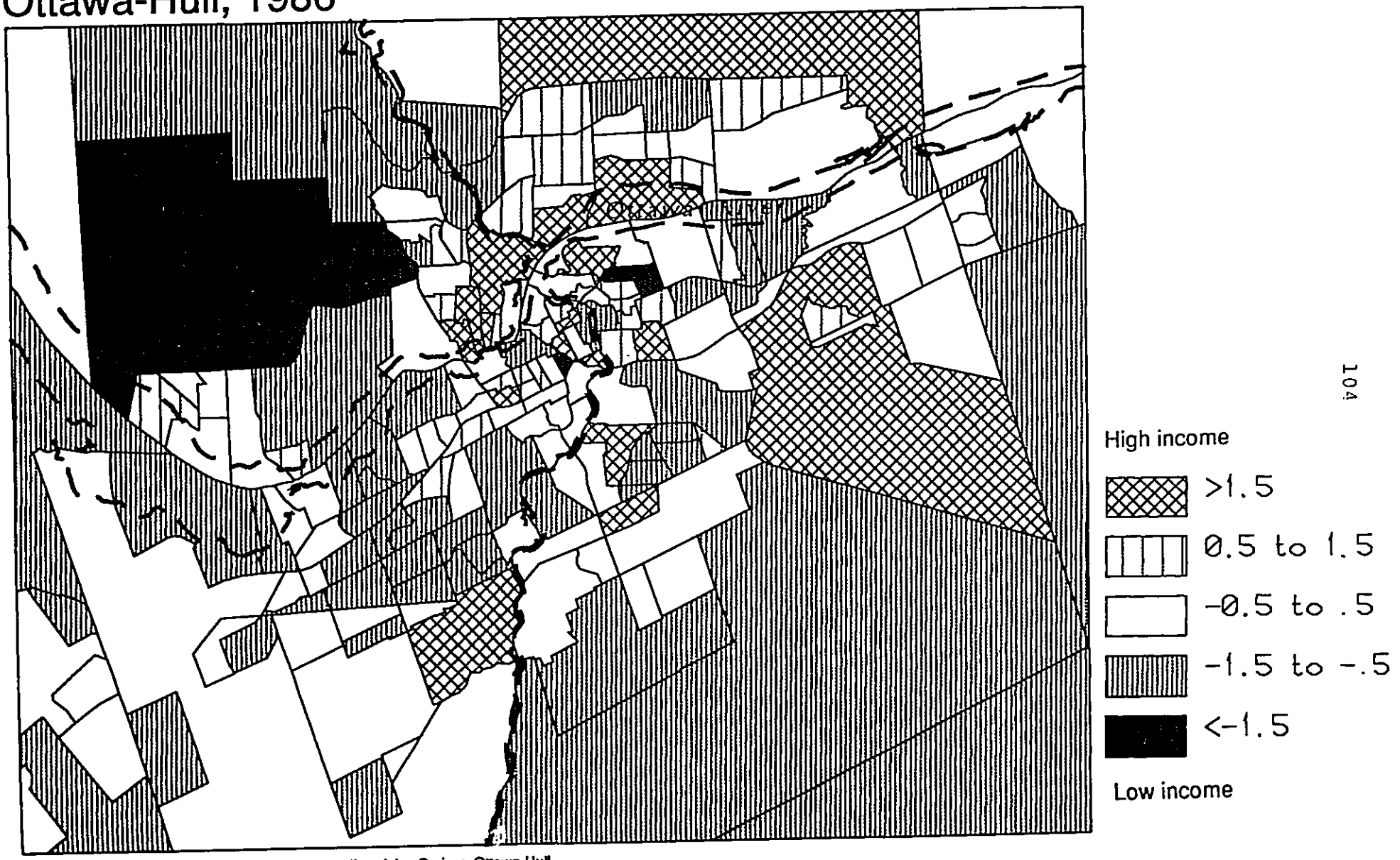
Independent immigrants, that is, those immigrants who have been admitted because they have obtained a sufficient number of "points" (based on education, intended occupation, etc.) are less likely to be affected by either structural or cyclical unemployment than Family Class immigrants, the majority of whom eventually become (or wish to become) economically active, despite the primary social goal of this class of immigration (Samuel, 1988, p.171), or refugees, who initially require permits to work (SPCOC, 1992, p.1). Thus, areas characterized by impoverishment may be expected to be associated with areas with concentrations of Family Class immigrants and especially with concentrations of refugees.

Figure 25 illustrates the spatial distribution of scores on this third factor scale among the census tracts. The distribution is somewhat similar to the distribution for FACTOR 2. However, it is clear that income and a broader socio-economic status scale have different influences on locational opportunities. Three tracts have outstanding scores on this factor; namely, Rockcliffe Park (4.0), the tract in St. George's ward south of Mann Ave. (3.3), and the tract in Hull south of St. Laurent (3.3).

FACTOR4: MOBILITY/MODERNITY VERSUS RETIRED

The last component, accounting for 10.0% of the total variation in the input data, is more difficult to name and interpret since it

Figure 25
Distribution of Scores on Factor3: POVERTY VERSUS AFFLUENCE
Ottawa-Hull, 1986

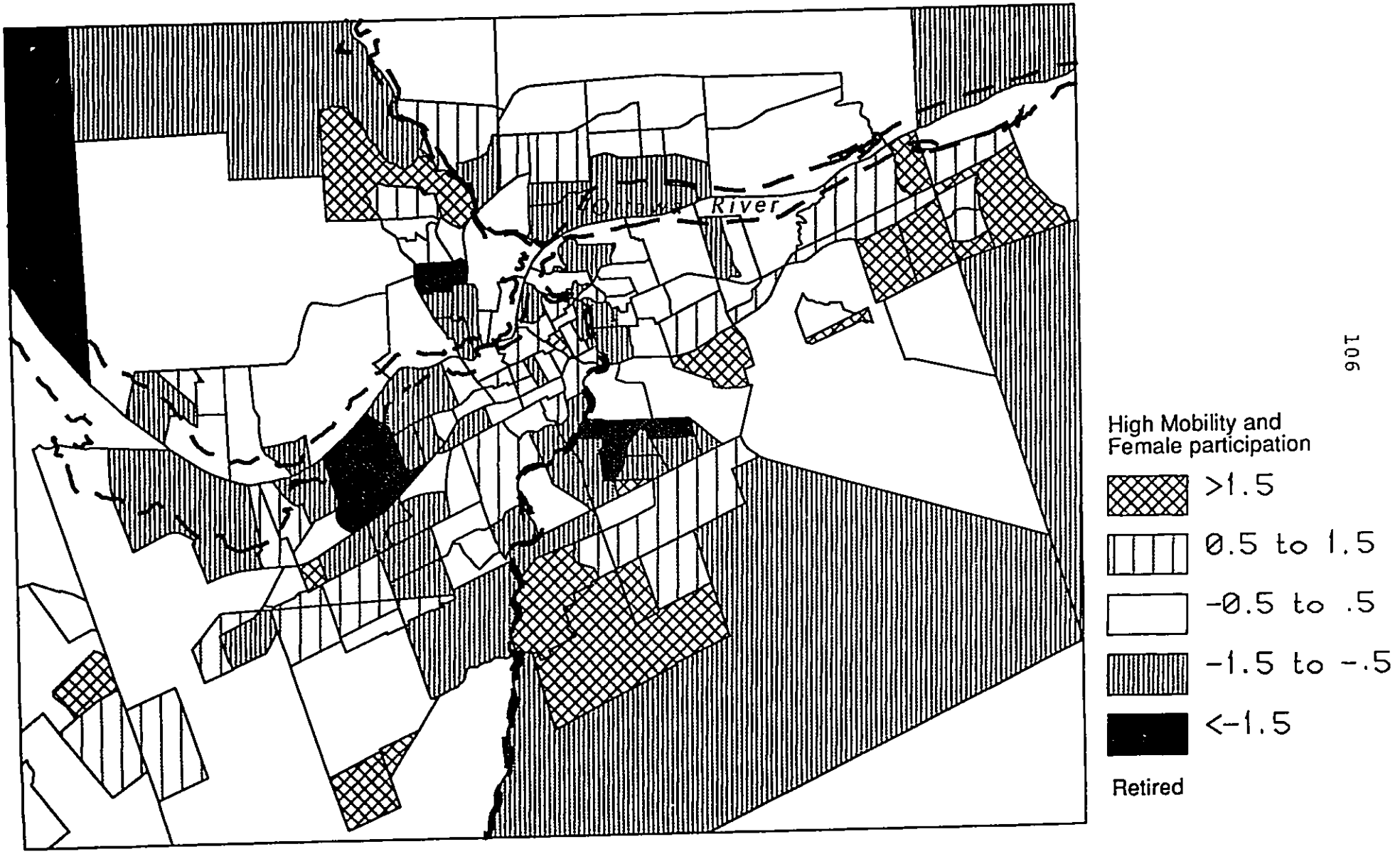


Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

involves a mix of demographic/family, socio-economic and housing variables, and does not clearly form a scale. However, given the strong and unique loading of the variable percentage of movers (PMOVERS, 86) along with the strong and primary loading of the variable female participation rate (FPARTR, 73) on the positive side of this vector, and their opposition to the variable percentage of the population 65 years and over (PGT65YE, -61), it seems appropriate to label this vector "mobility/modernity versus retired". The other variables with positive but only moderate or weak loadings on this vector are the average payments for home owners (AVPAYM, 54), the percentage of the population under 6 years of age (PUNDER6, 47), and the percentage of the labour force in finance, insurance and real estate (PFIRE, 32). Three variables load weakly on the negative side of the vector: namely, the percentage of the population with less than grade 9 (PLESSG9, -37), the percentage of single-detached dwellings (PDETACH, -35), and the percentage of income in the form of government transfer payments (TRANSF, -34), suggesting, again, the marginality of the elderly.

Davies reports that Migration Status or Mobility usually exhibits a "roundal" distribution pattern, "...with the low migration zone separating the central and suburban areas of high mobility" (1984, p.322). Figure 26 illustrates the spatial distribution of the scores on this last factor among the census tracts. It is hard to generalize on this pattern in Ottawa-Hull since this last component is not purely a mobility component.

Figure 26
Distribution of Scores on Factor4: MOBILITY/MODERNITY VERSUS RETIRED
Ottawa-Hull, 1986



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

TABLE 5 presents the results of the factor analysis involving only those census tracts (observations) with concentrations of ethnics (excluding the British and the French). The first factor once again represents a family status factor, with AVCHILD and POWNED loading strongly, POVER50 loading moderately and PMMANAG loading weakly, all on the positive side of the scale, and with PNONFAM and PRENTED loading strongly on the negative side of the scale. The second factor once again represents a socio-economic status factor, with VALDWELL and AVINC loading strongly, PMMANAG, PDEG and POVER50 loading moderately and POWNED loading weakly, all on the positive side of the scale, and PRENTED loading weakly on the negative side of the scale. Factor three is a second socio-economic status scale, but with no strong loadings on either the positive or negative side. It mainly identifies census tracts with high socio-economic status, thus suggesting the instability of the POVERTY VS. AFFLUENCE, or Davies' Non-affluent Groups axis. The fourth factor is clearly a mobility factor since PMOVERS, with a loading of 98, is the only variable with an important loading on this factor, and since it does not load on any of the other three factors. These results support the finding for most factorial ecologies that mobility is a more basic axis than additional economic axes. The first factor accounts for 35.8% of the variation in the input data, while the second accounts for 33.5%, the third for 14.1% and the fourth for 11.2%, for a total of 94.6%.

TABLE 5

LOADINGS OF 10 STRONGEST VARIABLES ON THE 4 COMPONENTS SOLUTION WITH VARIMAX ROTATION: OTTAWA-HULL, 1986 USING ONLY CENSUS TRACTS WITH CONCENTRATIONS OF ETHNICS

FAMILY STATUS	FACTOR1 35.8%	SOCIO-ECONOMIC STATUS	FACTOR2 33.5%
Variables	**Loadings**	**Variables**	**Loadings**
AVCHILD	**+92**	VALDWELL	**+97**
POWNED	**+81**	AVINC	**+91**
POVER50	**+52**	PMMANAG	**+72**
PMMANAG	+40	PDEG	**+68**
		POVER50	**+61**
		POWNED	+30
PRENTED	**-81**	PRENTED	-30
PNONFAM	**-95**		

SOCIO-ECONOMIC STATUS2	FACTOR3 14.1%	MOBILITY	FACTOR4 11.2%
Variables	**Loadings**	**Variables**	**Loadings**
PDEG	**+66**	PMOVERS	**+98**
POVER50	**+54**		
PMMANAG	**+51**		
POWNED	+42		
PRENTED	-42		

Note: values have been multiplied by 100 and rounded to the nearest integer. Values >=50 have been highlighted.

TABLE 6 presents the results of the factor analysis involving only those census tracts with concentrations of the immigrant group as a whole. This time, the socio-economic status factor emerged as the first factor, accounting for 46.7% of the variation in the data set. PMMANAG, AVINC, VALDWELL and PDEG all have positive loadings of over 90, while POVER50 has a loading of 86 and POWNED has a weak loading of 44. On the negative side of this first factor scale, PRENTED has a weak loading. The family status factor emerged as the second factor, accounting for 45.0% of the variation in the data, but this factor also involves PMOVERS, and is thus more appropriately labelled FAMILY STATUS AND MOBILITY. PMOVERS, PNONFAM, and PRENTED have strong positive loadings on the factor, while AVCHILD and POWNED have strong negative loadings, and POVER50 and AVINC have weak negative loadings on the factor. The third factor identifies those tracts with high average number of children, while the fourth factor identifies those tracts with a high percentage of university graduates. These last two factors only account for 3.2% and 2.3% respectively of the variation in the data, which is not surprising given that they both involve only a single weakly-loading variable.

The results of these additional factor analyses seem to indicate that the social structure of the group of all ethnics (excluding the British and the French) more closely resembles the social structure of the population as a whole than does the social structure of the group of all immigrants. This may be because the

TABLE 6

LOADINGS OF TEN STRONGEST VARIABLES ON THE 4 COMPONENTS SOLUTION WITH VARIMAX ROTATION: OTTAWA-HULL, 1986 USING ONLY CENSUS TRACTS WITH CONCENTRATIONS OF IMMIGRANTS

SOCIO-ECONOMIC STATUS	FACTOR1 46.7%	FAMILY STATUS AND MOBILITY	FACTOR2 45.0%
Variables	**Loadings**	**Variables**	**Loadings**
PMMANAG	**+95**	PMOVERS	**+94**
AVINC	**+93**	PNONFAM	**+94**
VALDWELL	**+93**	PRENTED	**+88**
PDEG	**+91**		
POVER50	**+86**		
POWNED	+44		
PRENTED	-44	AVINC	-30
		POVER50	-43
		POWNED	**-88**
		AVCHILD	**-90**

CHILDREN	FACTOR3 3.2%	UNIVERSITY	FACTOR4 2.3%
Variables	**Loadings**	**Variables**	**Loadings**
AVCHILD	+40	PDEG	+37

Note: Values have been multiplied by 100 and rounded to the nearest integer. Values >=50 have been highlighted.

group of all ethnics includes the native-born who, having been socialized in Canada, are less likely to differ in their characteristics (demographic, socio-economic, cultural) than the foreign born. Thus, it may be expected that socio-economic status is a more important explanatory variable than family status for the residential concentration of immigrant groups as defined by place of birth, given that it was the first factor to emerge in the third factor analysis (TABLE 6). If this is the case, it likely reflects the impact of immigrant selection.

For the regression analysis which follows, the scores from the original factor analysis are used as independent variables since this first factor analysis involved a larger number of observations (census tracts) even for the size of the variable set.

2. Regression of Factor Scores on the Index of Residential Concentration

In this section the family status and socio-economic status hypotheses of residential segregation are indirectly tested. More specifically, regression analysis is used in an attempt to identify to what extent the patterns of residential concentration of the individual ethnic and immigrant groups (Figures 3-22) are explained by the broader social geography of the region as identified in the Principal Components analysis (Figures 23-26). As stated in the conclusion to the previous section, it may be hypothesized that socio-economic status is a more important explanatory variable than

family status for the immigrant groups defined by place of birth than for the ethnic groups, which would reflect the impact of an immigration policy which is directed by labour market considerations as well as by demographic and humanitarian considerations.

The independent variables used in the first regression analysis are the four factors identified in the original Principal Components analysis as: FACTOR1: FAMILY STATUS, FACTOR2: SOCIO-ECONOMIC STATUS, FACTOR3: POVERTY VERSUS AFFLUENCE, and FACTOR4: MOBILITY/MODERNITY VERSUS RETIRED.

TABLE 7 presents the summary of the stepwise regression procedure for **residential concentration by ethnic origin** (dependent variable). The models involve various combinations of two, three (most common) or all four of the factors. The two-variable model for the residential concentration of Jewish ethnics (RCJEW) accounts for 41% of the variation in that dependent variable, while the three-factor models for the residential concentrations of the French (RCFREN) and the British (RCBRIT) charter groups account for 44% and 38% respectively of the variations in those dependent variables. The model with the poorest fit is the three-factor model for the residential concentration of Italians (RCITAL), which accounts for only 5% of the variation in that dependent variable. The models for the residential concentrations of the three visible minority ethnic groups do not fit as well as the models for the

TABLE 7

STEPWISE REGRESSION OF THE 4 FACTORS ON RESIDENTIAL CONCENTRATION BY ETHNIC ORIGIN

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCBRIT	FACTOR2	0.1859	0.1859	42.4628	0.0001
	FACTOR3	0.1842	0.3701	54.0917	0.0001
	FACTOR4	0.0079	0.3779	2.3264	0.1289
RCFREN	FACTOR2	0.3163	0.3163	86.0596	0.0001
	FACTOR3	0.0938	0.4101	29.4140	0.0001
	FACTOR1	0.0263	0.4364	8.5701	0.0038
RCITAL	FACTOR1	0.0211	0.0211	4.0032	0.0469
	FACTOR2	0.0173	0.0383	3.3205	0.0700
	FACTOR4	0.0140	0.0524	2.7249	0.1005
RCJEW	FACTOR2	0.3453	0.3453	98.1015	0.0001
	FACTOR1	0.0616	0.4069	19.2083	0.0001
RCCHIN	FACTOR2	0.0593	0.0593	11.7183	0.0008
	FACTOR1	0.0503	0.1096	10.4576	0.0014
	FACTOR4	0.0476	0.1572	10.3816	0.0015
	FACTOR3	0.0190	0.1762	4.2274	0.0412
RCSASIAN	FACTOR4	0.1614	0.1614	35.7999	0.0001
	FACTOR2	0.1572	0.3186	42.6795	0.0001
	FACTOR1	0.0142	0.3328	3.9149	0.0494
RCBLAC	FACTOR4	0.1390	0.1390	30.0183	0.0001
	FACTOR3	0.0384	0.1773	8.6308	0.0037
	FACTOR1	0.0337	0.2110	7.8550	0.0056

residential concentrations of Jews and the two charter groups, but they do fit better than the model for the residential concentration of Italian ethnics. The three-factor model for the residential concentration of South Asians (RCSASIAN) accounts for 33% of the variation in that dependent variable, while the three-factor model for the residential concentration of Blacks (RCBLAC) accounts for 21% of the variation in that dependent variable. The four-factor model for the residential concentration of Chinese ethnics (RCCHIN) accounts for 18% of the variation in that dependent variable.

For the concentrations of Jewish and French ethnics, the SOCIO-ECONOMIC STATUS vector dominates the models, while for the concentration of the British, the SOCIO-ECONOMIC STATUS and POVERTY VS. AFFLUENCE vectors each contribute about half the model's total R^2 value. For the concentration of the South Asian ethnic group, the MOBILITY/MODERNITY VS. RETIRED and SOCIO-ECONOMIC STATUS vectors each contribute about half the total R^2 value of the model, while for the concentration of the Black ethnic group, the MOBILITY/MODERNITY VS. RETIRED vector contributes about two-thirds of the total R^2 value of the model. Finally, for the concentration of Chinese ethnics, the SOCIO-ECONOMIC STATUS, FAMILY STATUS and MOBILITY/MODERNITY VS. RETIRED vectors each contribute about one-third (5%) of the model's total R^2 value.

TABLE 8 presents the summary of the stepwise regression procedure for **residential concentration of immigrants by place of birth.**

Except in the case of the dependent variable RCOTHER, the models involve various combinations of three or all four of the independent variables (the four factors). The three-variable model for the residential concentration of the group of all immigrants (RCIMMI) accounts for 48% of the variation in that dependent variable, while the three-variable model for the residential concentration of American immigrants (RCUSA) accounts for 53%, and the four-variable model for the residential concentration of immigrants born in the United Kingdom (RCUK) accounts for 58% of the variations in those dependent variables. The three-variable model for the residential concentration of immigrants born in the "traditional" source region, that is in Europe (RCEURO), accounts for just over a quarter of the variation in that dependent variable. The models for the residential concentrations of immigrants born in the three "non-traditional" regions of origin, that is in Asia (RCASIA), Africa (ACAFR) and the Americas, excluding the U.S.A. (RCOAMER), account for between slightly less than a quarter to slightly more than a third of the variation in those dependent variables (28%, 23%, 35% respectively). Finally, the model for RCOTHER, the residential concentration of immigrants born in "other" places of origin, involving only FACTOR2, accounts for only 14% of the variation in that dependent variable.

For RCIMMI, the SOCIO-ECONOMIC STATUS vector contributes about two times as much as the next factor, FAMILY STATUS, to the total R^2 value of the model. For RCUSA, the SOCIO-ECONOMIC STATUS vector

TABLE 8

STEPWISE REGRESSION OF THE 4 FACTORS ON RESIDENTIAL CONCENTRATION OF IMMIGRANTS BY PLACE OF BIRTH

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCIMMI	FACTOR2	0.3215	0.3215	88.1275	0.0001
	FACTOR1	0.1548	0.4763	54.6842	0.0001
	FACTOR4	0.0061	0.4824	2.1622	0.1432
RCUSA	FACTOR2	0.4709	0.4709	165.5561	0.0001
	FACTOR1	0.0464	0.5173	17.7701	0.0001
	FACTOR4	0.0099	0.5272	3.8625	0.0509
RCUK	FACTOR2	0.4316	0.4316	141.2453	0.0001
	FACTOR3	0.1192	0.5508	49.0815	0.0001
	FACTOR1	0.0177	0.5685	7.5495	0.0066
	FACTOR4	0.0096	0.5781	4.1516	0.0430
RCEURO	FACTOR2	0.1529	0.1529	33.5797	0.0001
	FACTOR1	0.0859	0.2388	20.8663	0.0001
	FACTOR4	0.0242	0.2630	6.0356	0.0149
RCASIA	FACTOR1	0.1307	0.1307	27.9769	0.0001
	FACTOR4	0.0767	0.2075	17.9137	0.0001
	FACTOR2	0.0470	0.2545	11.5959	0.0008
	FACTOR3	0.0266	0.2811	6.7670	0.0100
RCAFR	FACTOR2	0.1041	0.1041	21.6129	0.0001
	FACTOR4	0.0772	0.1813	17.4565	0.0001
	FACTOR1	0.0462	0.2275	10.9939	0.0011
RCOAMER	FACTOR4	0.1592	0.1592	35.2160	0.0001
	FACTOR1	0.1453	0.3045	38.6558	0.0001
	FACTOR3	0.0333	0.3378	9.2544	0.0027
	FACTOR2	0.0118	0.3496	3.3275	0.0698
RCOTHER	FACTOR2	0.1413	0.1413	30.6093	0.0001

has a partial R^2 value of 47% in a model that has a total R^2 value of 53%, clearly dominating it. For RCUK, the SOCIO-ECONOMIC STATUS vector contributes about four-fifths of the total R^2 value of the model, while the POVERTY VS. AFFLUENCE vector contributes about one-fifth. . For RCEURO, the SOCIO-ECONOMIC STATUS vector contributes about two-thirds and the FAMILY STATUS vector about one-third of the total R^2 value of the model. Of the concentrations for immigrants born in the four "non-traditional" regions of origin, the SOCIO-ECONOMIC STATUS vector is the primary contributor to the model for RCAFR, and the only factor in the model for RCOTHER. For RCASIA, the FAMILY STATUS vector contributes about two times as much to the model as the next factor, MOBILITY/MODERNITY VS. RETIRED, while for RCOAMER, MOBILITY/MODERNITY VS. RETIRED followed by FAMILY STATUS each contribute about half of the model's R^2 value.

TABLE 9 presents the summary of the stepwise regression procedure for **residential concentration of immigrants by period of immigration.** The models involve various combinations of three or all four of the independent variables (the factors), and fit the dependent variables better than the models for residential concentration by ethnic origin (TABLE 7), and better than the models for residential concentration of immigrants by place of birth (TABLE 8). The four-variable model for the residential concentration of residents who immigrated before 1946 (RC1946) accounts for 55% of the variation in that dependent variable, and

the four-variable model for the residential concentration of residents who immigrated between 1946 and 1966 (RCTO66) accounts for 52% of the variation in that dependent variable. The three-variable model for the residential concentration of residents who immigrated between 1967 and 1977 (RCTO77) accounts for 42% of the variation in that dependent variable. The model, involving all four factors, for the residential concentration of residents who immigrated between 1978 and 1982 (RCTO82) and the three-factor model for those who immigrated between 1983 and 1986 (RCTO86) account for 33% and 37% respectively of the variation in those dependent variables. The trend toward a poorer fit of the model seems to have been reversed in the case of the most recent immigrant group.

The model for RCTO66 followed by the model for RCTO86 are dominated by the first independent variable, being SOCIO-ECONOMIC STATUS in the former case and FAMILY STATUS in the latter. The FAMILY STATUS vector, the MOBILITY/MODERNITY VS. RETIRED vector and the SOCIO-ECONOMIC STATUS vector, in that order, each contribute almost equally to the total R^2 value of the model for RC1946. For RCTO77, the SOCIO-ECONOMIC STATUS, MOBILITY/MODERNITY VS. RETIRED and FAMILY STATUS vectors have partial R^2 values of 23%, 14% and 4% respectively. The primary factor (FAMILY STATUS) for RCTO82, contributes about three times as much to the total R^2 value of the model as each of the next two variables, that is MOBILITY/MODERNITY VS. RETIRED and POVERTY VS. AFFLUENCE.

TABLE 9

STEPWISE REGRESSION OF THE 4 FACTORS ON RESIDENTIAL CONCENTRATION BY PERIOD OF IMMIGRATION

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RC1946	FACTOR1	0.1929	0.1929	44.4528	0.0001
	FACTOR4	0.1716	0.3645	49.9642	0.0001
	FACTOR2	0.1585	0.5230	51.1468	0.0001
	FACTOR3	0.0300	0.5531	12.3024	0.0006
RCTO66	FACTOR2	0.3984	0.3984	123.1500	0.0001
	FACTOR3	0.0503	0.4487	16.8844	0.0001
	FACTOR4	0.0376	0.4863	13.4676	0.0003
	FACTOR1	0.0302	0.5164	11.4174	0.0009
RCTO77	FACTOR2	0.2337	0.2337	56.7308	0.0001
	FACTOR4	0.1445	0.3782	42.9803	0.0001
	FACTOR1	0.0399	0.4181	12.6140	0.0005
RCTO82	FACTOR1	0.1834	0.1834	41.7847	0.0001
	FACTOR4	0.0650	O.2484	15.9897	0.0001
	FACTOR3	0.0585	0.3069	15.5317	0.0001
	FACTOR2	0.0193	0.3262	5.2502	0.0231
RCTO86	FACTOR1	0.2458	0.2458	60.6220	0.0001
	FACTOR3	0.0664	0.3122	17.8473	0.0001
	FACTOR4	0.0562	0.3684	16.3743	0.0001

In general, Family Status (Factor1) is a more important explanatory variable in the models for the residential concentrations of the immigrant groups defined by place of birth and the earliest and two most recent immigrant cohorts than it is in the models for the residential concentrations of the ethnic groups. However, within the group of immigrants defined by place of birth, only in the models for the residential concentrations of immigrants born in Asia and Other Americas is Family Status a more important variable than socio-economic status. Thus, the first part of the hypothesis concerning the importance of socio-economic status and the impact of immigrant selection (see pages 111-12 of the thesis) cannot be rejected, although the patterns of residential concentrations of the immigrant groups as defined by place of birth as opposed to those for the ethnic groups seem to more closely resemble the spatial patterning of the broader social geography of the population as a whole. Perhaps the larger percentage of immigrants destined for Ottawa-Carleton in the Family Class as opposed to in the Independent Class is a more important difference influencing the residential concentrations of immigrants versus ethnics than the difference between the socio-economic statuses of the immigrants versus the ethnics, at least for some immigrant groups.

In general, socio-economic status is not as an important explanatory variable in the models for the residential concentrations of the non-traditional or new ethnic and immigrant groups and the 2 more recent immigrant cohorts as it is in the

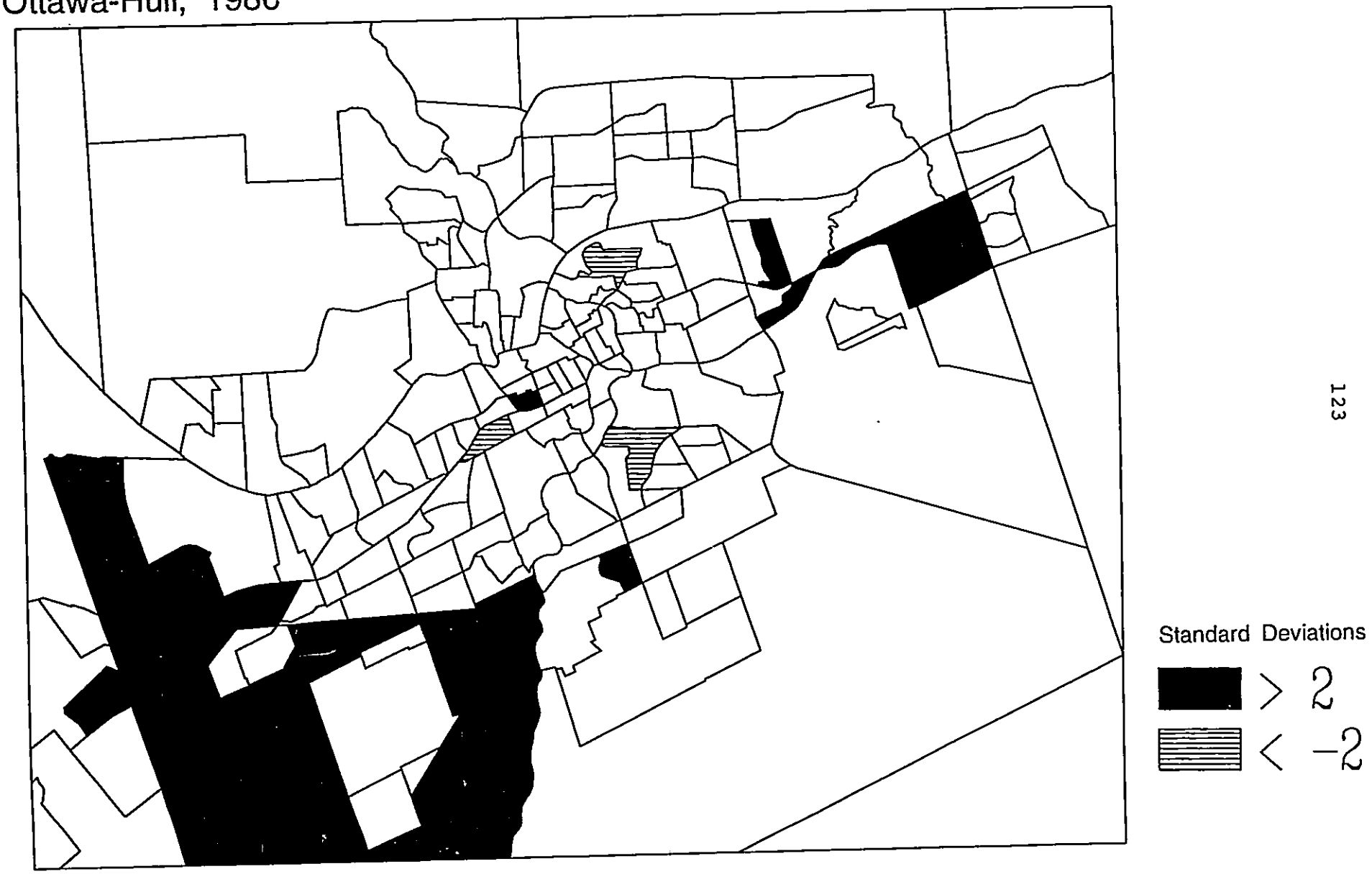
models for the residential concentrations of the charter and traditional ethnic and immigrant groups and the earlier immigrant cohorts.

The patterns of positive and negative residuals of more than 2 standard deviations were mapped for the Jewish group (for FACTOR2), for the South Asian group (separately for FACTOR4 and for FACTOR2, as well as for the full variable model) and for the group of immigrants born in Latin America (separately for FACTOR4 and FACTOR1, as well as for the full variable model). For the Jewish group, the negative residuals seem to identify those census tracts with very high socio-economic status but without Jewish concentrations, while the positive residuals seem to identify those census tracts with high or very high socio-economic status and with concentrations of Jewish residents. Likewise, for the South Asian group, the negative residuals for FACTOR 2 seem to identify those census tracts with very high socio-economic status but without concentrations of this ethnic group, while the positive residuals seem to identify those census tracts with generally high or very high socio-economic status and with concentrations of South Asians. This latter map of residuals is included in this thesis as Figure 27. The pattern of distribution seems to suggest that South Asians are 'attracted' to the newer suburban developments and are perhaps even 'repelled' by the city's more traditional high socio-economic status areas, which, however, may 'attract' other groups, such as the Jews. The reasons for such an attraction and repulsion from

these areas of the city likely involves factors such as family status, social distance, self-identity, and timing of arrivals (immigrant status). The other residual maps do not seem to identify any interesting patterns, mainly due to lack of or small numbers of negative residuals of greater than 2 standard deviations.

The next chapter of the thesis attempts to pull together the results from chapters IV and V and to evaluate the influence of other possible factors on the residential concentrations of the ethnic and immigrant groups.

Figure 27
Positive and Negative Residuals Plotted Against Socio-Economic Status
Ethnic Origin (Single): South Asian
Ottawa-Hull, 1986



Source of base map: Statistics Canada. Metropolitan Atlas Series: Ottawa-Hull
Catalogue 98-105 Ottawa: Minister of Supply and Services Canada, 1989.

VI. EMPIRICAL RELATIONSHIPS

A. Social Distance, Socio-economic and Family Statuses

The regression of the four original factors, namely FAMILY STATUS, SOCIO-ECONOMIC STATUS, POVERTY VERSUS AFFLUENCE AND MOBILITY/MODERNITY VERSUS RETIRED, against the indices of residential concentration for the selected ethnic groups is described in the previous part and presented in TABLE 7. The models for the residential concentrations of the three visible minority groups (Chinese, South Asian and Black) did not fit as well as the models for the residential concentrations of the two charter groups and the Jewish group. However, even for the latter three groups, less than half the variances in the indices was explained by the models involving the identified factors. Thus, a considerable residual variance in each case, but especially in the cases of the concentrations of the visible minorities and the Italians, is probably due to other factors. This finding is consistent with Balakrishnan's conclusion after a review of the findings of empirical studies undertaken in the 1960s and 1970s of cities in the U.S.A. plus Toronto, at least with respect to the social-class hypothesis (1982, p.94-95).

One of the "other" possible factors influencing residential concentration not explicitly in the models but involved in the residual variances may be Social Distance "...based especially on race and visible minorities..." (Balakrishnan and Kralt, 1987, p.157). This would seem to be a logical conclusion given that the

socio-economic status hypothesis, the testing of which was operationalized in the regression from Principal Components analysis, did not explain the residential concentrations of the visible minorities and the Italians as well as it did the residential concentrations of the two charter groups and the Jews.

However, a look at the results of indexing the spatial distributions of the selected ethnic groups does not provide any clear answers: if social distance is one of the "other" factors which explains the residential concentrations, especially of the visible minority groups, then one would expect that the ethnic groups for which the regression models were a relatively poor fit would have similar and relatively high values on the two segregation indices, being the D Index and the R Index (see TABLE 2). This is somewhat the case since the Black, Chinese, Italian and South Asian groups all have values in the range .446 to .493 (inclusive) for the D index and in the range .443 to .489 (inclusive) for the R index. However, with respect to the D index, the British have an index value lower than this range while the Jewish and French groups have index values higher than this range, yet the regression models for these three groups fit well relative to those for the Italian and visible minority groups. And with respect to the R index, the British and French have index values lower than the range for the Black, Chinese, Italian and South Asian groups, while the Jewish group has an index value higher than this other range.

Thus, it seems social distance based on visibility cannot alone explain the residual variances in the regression models, especially when one also considers that the two (D and R) segregation index values for the Italians are higher than for two of the visible minority groups, that the Jewish group has the second highest and highest values on the D and R indices respectively, and that of the visible minorities, the Black group, the most "visible", has the lowest values on both indices (is most evenly distributed). The results are in agreement with Balakrishnan and Kralt's finding that the greatest residential segregation is not necessarily associated with visible minorities (1987).

Self-identity is possibly a factor involved in the residual variances of the regression models. The self-identity hypothesis was not operationalized since possible census data proxies for attitudes about and feelings for one's ethnic group are not available. For example, the data on Blacks and South Asians is not disaggregated according to place of birth, which would provided some information about the homogeneity (or lack thereof) of each of these two groups. One can assume that these groups are not as homogenous, at least culturally, as the Italian and Jewish groups. In fact, one criticism of the Ottawa Citizen's profiles of "Ottawa's Many Cultures" (1986) was that "Blacks", "Indochinese", "Indo-Pakistanis" and "Latin Americans" were treated as communities. While the content of the profiles may have stated that these communities were diverse, the labels nevertheless

ignored the varying cultural backgrounds of the many communities within these communities (Grant at OCISO, 1992, personal communication). Similarly, the Census may be criticized for not providing mark-in boxes for more non-European ethnicities. In addition, Balakrishnan and Kralt suggest that the more homogeneous cultural backgrounds of the persons belonging to the individual Southern European groups and the Jewish group compared to the Indo-Pakistanis and the Blacks in Montreal, Toronto and Vancouver, may be a possible explanation for the greater residential concentrations among the Greeks, Portuguese, Italians and Jews in those CMAs (1987, p.156). Thus, it seems logical to assume that in Ottawa-Hull as well, the greater residential concentration of the Jews with respect to all three visible minorities, and the Italians with respect to two of the visible minorities is also possibly explained by greater levels of self-identity.

A third possible factor involved in the residual variances of the regression models for the residential concentrations of the ethnic groups is period of immigration, sometimes called Immigrant Status. The empirical investigation of this possibility is described in part B.

A fourth possible factor involved in the residual variances of the regression models, and likely the most influential, is the language factor. Balakrishnan and Kralt point out that Black-Caribbeans, Indo-Pakistanis, and Chinese, especially from Hong Kong and Taiwan,

are often more fluent in English than Portuguese, Greek or Italian newcomers. Blacks, depending on their place of birth (for example Haiti or West Africa) are instead often proficient in French (ibid). In Ottawa-Hull, the Blacks and the Chinese may be less residentially concentrated than the Italians because of the language factor. The Blacks are the only visible minority, or other ethnic group besides the French for that matter, with concentrations in the City of Vanier, the historic area of French settlement east of Ottawa's core area. However, it is interesting to note that the French ethnics are concentrated in three census tracts in Vanier to the 'exclusion' of the Black ethnics, who are concentrated in the other two census tracts in the city (refer to Figures 4 and 9). Gilbert et al., using census data on enumeration areas in the City of Vanier, found that at the local scale, French home language and (official) bilingualism are associated, while immigrants are structurally related to the English-speaking population (1992, p.10; Table 1). The residential concentration of French ethnics is no doubt not only influenced by the linguistic factor, but it is also very likely influenced by other aspects of self-identity. The City of Vanier and the Quebec side of the CMA represent the "sacred" areas of the social values approach, which recognizes the influence of sentiment on residential patterning of ethnic groups (Timms, 1971, p.92). The empirical investigation of this possible influence of language facility on residential concentration is described in part B.

TABLE 8 shows that the regression models for the residential concentrations of the immigrant groups born in the "non-traditional" places of origin, namely Asia, Africa and the Americas (excluding the U.S.A) did not fit as well as the models for the residential concentrations of immigrants born in all places combined (RCIMMI), in the U.S.A. and in the U.K.. Thus, a considerable residual variance, especially in the cases of the residential concentrations of immigrants born in Africa, Europe, Asia and the Americas may again possibly be due to social distance and/or self-identity and/or period of immigration and/or the language factor. TABLE 2, showing the segregation indices of the immigrant groups from the rest of the population does seem to lend support to the social distance based on visibility hypothesis since the visible minority immigrant groups (Asia, Other Americas, Africa) have relatively high values on both the D and R indices. However, the European group has the lowest values on both indices, suggesting that group size may be influencing the results. In comparing the results in TABLE 2 for the ethnic groups and the immigrant groups one might have expected that, since the Black group has the lowest values of the visible minorities on both indices, that the group of immigrants from Africa would also have the lowest index values of the "new" immigrant groups. In fact, the African group is second only to the group born in "Other" places of origin in terms of high values on the indices. The explanation may lie in the fact that the Black ethnic group includes native-born Blacks, immigrants born in the U.S.A. and the

Caribbean, besides immigrants born in Africa. The first two of these groups at least are more culturally similar to the British and French ethnics than the Africans are to all other immigrants. The empirical investigations of the possible influences of the period of immigration and language factors on the residential concentrations of immigrant groups by place of birth is presented in part B.

B. Other Possible Influences

1. The Recency of Immigration Factor

In TABLES 10 and 11, the variable **"Residential Concentration > 1.7 of immigrants who immigrated after 1966"** was used as a regressor against residential concentration, along with the four factors. This was done in order to take into consideration the recency of immigration factor. The year 1966 was chosen as a cut-off year because 1967 was the year that the new immigration regulations came into effect which eliminated race and nationality as criteria in immigrant selection. Thus, immigration post-1966 represents the "new" or "non-traditional" immigration, while pre-1967 immigration represents the "traditional" immigration.

TABLE 10 presents the summary of the stepwise regression procedure for **residential concentration by ethnic origin** with the **dummy variable "Residential Concentration 1967 to 1986 > 1.7"** as a regressor, along with the four factors identified by the original Principal Components analysis. The models include a combination of

TABLE 10

STEPWISE REGRESSION OF THE 4 FACTORS AND RC 1967 TO 1986 > 1.7 ON RESIDENTIAL CONCENTRATION BY ETHNIC ORIGIN

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCBRIT	FACTOR2	0.1859	0.1859	42.4628	0.0001
	FACTOR3	0.1842	0.3701	54.0917	0.0001
	DUMMY	0.0111	0.3812	3.3047	0.0707
	FACTOR4	0.0166	0.3978	5.0587	0.0257
RCFREN	FACTOR2	0.3163	0.3163	86.0596	0.0001
	FACTOR3	0.0938	0.4101	29.4140	0.0001
	DUMMY	0.0590	0.4691	20.4356	0.0001
	FACTOR1	0.0114	0.4805	4.0241	0.0463
RCITAL	FACTOR1	0.0211	0.0211	4.0032	0.0469
	FACTOR2	0.0173	0.0383	3.3205	0.0700
	FACTOR4	0.0140	0.0524	2.7249	0.1005
RCJEW	FACTOR2	0.3453	0.3453	98.1015	0.0001
	FACTOR1	0.0616	0.4069	19.2083	0.0001
RCCHIN	DUMMY	0.2721	0.2721	69.5153	0.0001
	FACTOR2	0.0491	0.3212	13.3835	0.0003
	FACTOR1	0.0116	0.3328	3.2072	0.0750
RCSASIAN	FACTOR4	0.1614	0.1614	35.7999	0.0001
	FACTOR2	0.1572	0.3186	42.6795	0.0001
	DUMMY	0.0470	0.3656	13.6296	0.0003
	FACTOR1	0.0316	0.3972	9.6010	0.0023
	FACTOR3	0.0101	0.4073	3.0947	0.0802
RCBLACK	DUMMY	0.1910	0.1910	43.9205	0.0001
	FACTOR4	0.0623	0.2533	15.4391	0.0001
	FACTOR3	0.0138	0.2671	3.4643	0.0643
	FACTOR1	0.0124	0.2795	3.1502	0.0776

two to all five of the regressors. This dummy regressor does not appear in the models for the residential concentrations of Jews and Italians, and thus the models for these two dependent variables are the same here as in TABLE 7. On the other hand, this dummy variable dominates the new models for the residential concentrations of the Chinese (RCCHIN) and the Black (RCBLACK) groups, is somewhat important as a contributor to the new models for the residential concentrations of the French (RCFREN) and South Asian (RCSASIAN) groups, and is least important in its appearance in the model for the residential concentration of the British (RCBRIT). All of these new models, but especially the new models for the three visible minority ethnic groups, account for more of the variation in their respective dependent variables than the corresponding models in TABLE 7: the new model for RCCHIN accounts for 33% of the variation in that dependent variable, while the new model for RCBLACK accounts for 28%, and the new model for RCSASIAN accounts for 41% (compared to 18%, 21% and 33% respectively in TABLE 7).

TABLE 11 presents the summary of the stepwise regression procedure for **residential concentration of immigrants by place of birth** with the **dummy variable "Residential Concentration 1967 to 1986 > 1.7"** as a regressor, along with the four factors identified by the original Principal Components analysis. This dummy variable is a significant regressor in all but the models for the residential concentrations of immigrants born in the U.S.A. and in "Other"

TABLE 11

STEPWISE REGRESSION OF THE 4 FACTORS AND RC 1967 TO 1986 > 1.7 ON RESIDENTIAL CONCENTRATION OF IMMIGRANTS BY PLACE OF BIRTH

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCIMMI	FACTOR2	0.3215	0.3215	88.1275	0.0001
	DUMMY	0.1972	0.5187	75.8173	0.0001
	FACTOR1	0.0888	0.6075	41.6313	0.0001
	FACTOR3	0.0153	0.6228	7.4189	0.0071
RCUSA	FACTOR2	0.4709	0.4709	165.5561	0.0001
	FACTOR1	0.0464	0.5173	17.7701	0.0001
	FACTOR4	0.0099	0.5272	3.8625	0.0509
RCUK	FACTOR2	0.4316	0.4316	141.2453	0.0001
	FACTOR3	0.1192	0.5508	49.0815	0.0001
	FACTOR1	0.0177	0.5685	7.5495	0.0066
	FACTOR4	0.0096	0.5781	4.1516	0.0430
	DUMMY	0.0117	0.5897	5.1764	0.0241
RCEURO	FACTOR2	0.1529	0.1529	33.5797	0.0001
	FACTOR1	0.0859	0.2388	20.8663	0.0001
	FACTOR4	0.0242	0.2630	6.0356	0.0149
	DUMMY	0.0402	0.3032	10.5640	0.0014
RCASIA	DUMMY	0.3852	0.3852	116.5185	0.0001
	FACTOR1	0.0497	0.4349	16.2747	0.0001
	FACTOR2	0.0372	0.4721	12.9801	0.0004
	FACTOR4	0.0120	0.4841	4.2676	0.0403
RCAFR	DUMMY	0.1256	0.1256	26.7095	0.0001
	FACTOR2	0.0948	0.2204	22.5038	0.0001
	FACTOR4	0.0328	0.2532	8.0799	0.0050
	FACTOR1	0.0236	0.2768	5.9794	0.0154
	FACTOR3	0.0201	0.2969	5.1941	0.0238

TABLE 11 CONTINUED

STEPWISE REGRESSION OF THE 4 FACTORS AND RC 1967 TO 1986 > 1.7 ON RESIDENTIAL CONCENTRATION OF IMMIGRANTS BY PLACE OF BIRTH

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCOAMER	DUMMY	0.3910	0.3910	119.4076	0.0001
	FACTOR1	0.0586	0.4496	19.6870	0.0001
	FACTOR4	0.0555	0.5050	20.6151	0.0001
	FACTOR2	0.0078	0.5128	2.9292	0.0887
RCOTHER	FACTOR2	0.1413	0.1413	30.6093	0.0001

places. This dummy variable dominates the new models for the residential concentrations of immigrants born in the Other Americas (RCOAMER), Asia (RCASIA) and to some degree the model for the residential concentrations of those born in Africa (RCAFR). This dummy variable appears as an important contributor to the new model for the residential concentration of the group of all immigrants (RCIMMI), while it appears as an additional and least important regressor in the new models for RCUK and RCEURO. The new models incorporating the recency of immigration factor for the residential concentrations of immigrants from the "non-traditional" places of birth, namely the Americas, Asia and Africa, account for substantially more of the variation in their respective dependent variables than the corresponding models in TABLE 8: the model for RCOAMER accounts for 51%, the model for RCASIA accounts for 48% and the model for RCAFR accounts for 30% (compared to 35%, 28% and 23% respectively in TABLE 8).

The patterns of positive and negative residuals of more than 2 standard deviations were mapped for the Chinese ethnic group and the groups of immigrants born in Asia and the Other Americas for the single variable models involving recency of immigration. The first map does not show an interesting pattern, but for the group of immigrants born in Asia, the positive residuals seem to identify those census tracts which combine high numbers of more recent immigrants with high concentrations of this immigrant group, while the negative residuals seem to identify those census tracts which

do not combine the first characteristic with high concentrations of immigrants born in Asia. There were too few positive or negative residuals of more than 2 standard deviations for the group of immigrants born in the Other Americas to make any statement based upon the distribution of the residuals.

Concentration of immigrants who arrived post-1966 is, perhaps not surprisingly, an important factor in the models for the residential concentrations of the visible minority ethnic and immigrant groups, suggesting that recency of immigration, for whatever associated reasons (lack of resources, problems of language or culture, etc.), has at least a short-term influence on residential segregation. Based on the results in TABLE 9 for immigrants defined by period of immigration, socio-economic status and more recently family status are the most important regressors on period of immigration post-1966, a rather confusing development with respect to the usual associated reasons put forward to explain why recency of immigration and residential concentration are positively related.

2. The Language Factor

TABLE 12 presents the summary of the stepwise regression procedure for **residential concentration by ethnic origin** with the variable **"percent of the population speaking non-official languages in the home"** (PNONOFF) as a regressor, along with the four factors identified by the original Principal Components analysis. This regressor appears in all of the models, but is especially significant in the new models for the residential concentrations of

TABLE 12

STEPWISE REGRESSION OF THE 4 FACTORS AND PNONOFF
ON RESIDENTIAL CONCENTRATION BY ETHNIC ORIGIN

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCBRIT	FACTOR2	0.1859	0.1859	42.4628	0.0001
	FACTOR3	0.1842	0.3701	54.0917	0.0001
	PNONOFF	0.0323	0.4024	9.9439	0.0019
	FACTOR4	0.0096	0.4120	2.9968	0.0851
RCFREN	FACTOR2	0.3163	0.3163	86.0596	0.0001
	FACTOR3	0.0938	0.4101	29.4140	0.0001
	PNONOFF	0.1493	0.5594	62.3681	0.0001
RCITAL	PNONOFF	0.3635	0.3635	106.2203	0.0001
	FACTOR3	0.0299	0.3934	9.1137	0.0029
	FACTOR4	0.0227	0.4161	7.1694	0.0081
	FACTOR1	0.0150	0.4311	4.8172	0.0294
RCJEW	FACTOR2	0.3453	0.3453	98.1015	0.0001
	FACTOR1	0.0616	0.4069	19.2083	0.0001
	PNONOFF	0.0096	0.4165	3.0419	0.0828
RCCHIN	PNONOFF	0.5263	0.5263	206.6279	0.0001
	FACTOR4	0.0332	0.5595	13.9364	0.0003
	FACTOR2	0.0225	0.5819	9.8852	0.0019
RCSASIAN	FACTOR4	0.1614	0.1614	35.7999	0.0001
	FACTOR2	0.1572	0.3186	42.6795	0.0001
	PNONOFF	0.0315	0.3501	8.9154	0.0032
	FACTOR1	0.0427	0.3928	12.8598	0.0004
	FACTOR3	0.0105	0.4033	3.2082	0.0749
RCBLAC	FACTOR4	0.1390	0.1390	30.0183	0.0001
	PNONOFF	0.0538	0.1927	12.3195	0.0006
	FACTOR3	0.0208	0.2135	4.8551	0.0288
	FACTOR1	0.0136	0.2270	3.2100	0.0748

Chinese and Italian ethnics. In the first case, PNONOFF accounts for 53% of the variation in the dependent variable in a model with a total R^2 value of 58%. In the second case, PNONOFF accounts for 36% of the variation in the dependent variable in a model with a total R^2 value of 43%. PNONOFF is a more significant regressor in the model for the residential concentration of French ethnics than it is in the models for the residential concentrations of the Black, British and South Asian groups. PNONOFF is least significant in the model for the residential concentration of Jews. All of the new models fit somewhat to significantly better than the corresponding models in TABLE 7. The total R^2 values for these models which incorporate the language factor versus the total R^2 values for the corresponding models in TABLE 7 are: 56% versus 44% for RCFREN; 43% versus 5% for RCITAL; 58% versus 18% for RCCHIN; and, 40% versus 33% for RCSASIAN.

TABLE 13 presents the summary of the stepwise regression procedure for **residential concentration of immigrants by place of birth** with the variable **"percent of the population speaking non-official languages in the home"** (PNONOFF) as a regressor, along with the four factors identified by the original Principal Components analysis. This independent variable does not appear in the models for the residential concentrations of immigrants born in the U.S.A., Africa, and in "Other" places. On the other hand, PNONOFF dominates the models for the residential concentrations of the group of all immigrants (RCIMMI), of immigrants born in Europe

TABLE 13

STEPWISE REGRESSION OF THE 4 FACTORS AND PNONOFF
ON RESIDENTIAL CONCENTRATION OF IMMIGRANTS BY PLACE OF BIRTH

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCIMMI	PNONOFF	0.5684	0.5684	244.9988	0.0001
	FACTOR2	0.2221	0.7905	196.1519	0.0001
	FACTOR3	0.0431	0.8336	47.6476	0.0001
	FACTOR1	0.0123	0.8459	14.6048	0.0002
	FACTOR4	0.0019	0.8478	2.2740	0.1333
RCUSA	FACTOR2	0.4709	0.4709	165.5561	0.0001
	FACTOR1	0.0464	0.5173	17.7701	0.0001
	FACTOR4	0.0099	0.5272	3.8625	0.0509
RCUK	FACTOR2	0.4316	0.4316	141.2453	0.0001
	FACTOR3	0.1192	0.5508	49.0815	0.0001
	PNONOFF	0.0192	0.5700	8.2097	0.0047
	FACTOR4	0.0111	0.5810	4.8297	0.0292
	FACTOR1	0.0066	0.5877	2.9191	0.0892
RCEURO	PNONOFF	0.5417	0.5417	219.8162	0.0001
	FACTOR2	0.0877	0.6294	43.7841	0.0001
	FACTOR4	0.0363	0.6656	19.9506	0.0001
	FACTOR3	0.0334	0.6990	20.3067	0.0001
RCASIA	PNONOFF	0.6350	0.6350	323.6518	0.0001
	FACTOR4	0.0565	0.6915	33.8647	0.0001
	FACTOR2	0.0129	0.7045	8.0570	0.0050
	FACTOR1	0.0041	0.7086	2.5999	0.1086
RCAFR	FACTOR2	0.1041	0.1041	21.6129	0.0001
	FACTOR4	0.0772	0.1813	17.4565	0.0001
	FACTOR1	0.0462	0.2275	10.9939	0.0011

TABLE 13 CONTINUED

STEPWISE REGRESSION OF THE 4 FACTORS AND PNONOFF
ON RESIDENTIAL CONCENTRATION OF IMMIGRANTS BY PLACE OF BIRTH

VARIABLE	REGRESSOR	PARTIAL R**2	MODEL R**2	F	PROB>F
RCOAMER	PNONOFF	0.2483	0.2483	61.4401	0.0001
	FACTOR4	0.1404	0.3887	42.4738	0.0001
	FACTOR1	0.0439	0.4326	14.2508	0.0002
	FACTOR3	0.0084	0.4410	2.7395	0.0996
RCOTHER	FACTOR2	0.1413	0.1413	30.6093	0.0001

(RCEURO), of immigrants born in Asia (RCASIA) and of immigrants born in the Other Americas (RCOAMER). The R^2 value for PNONOFF compared to the R^2 value for the total model for each of these groups are as follows: 57% versus 85% (RCIMMI); 54% versus 70% (RCEURO); 64% versus 71% (RCASIA); and, 25% versus 44% (RCOAMER). Clearly, the total R^2 values of the above models are significantly higher than the corresponding values in TABLE 8.

The patterns of positive and negative residuals of more than 2 standard deviations were mapped for the Italian and Chinese ethnic groups, and for the groups of immigrants born in Asia and the Other Americas. Only the residual analysis for the last group included the full model besides the single variable model involving the non-official languages factor. For the Chinese ethnic group, positive residuals seem to identify those census tracts which combine high percentage of persons speaking non-official languages with high or very high concentrations of this ethnic group, while negative residuals seem to identify those census tracts which do not combine the first characteristic with concentrations of this group. The other residual maps do not seem to identify any interesting patterns, mainly because of few positive and negative residuals of more than 2 standard deviations.

Finally, it is worth taking another look at TABLE 9. To produce the results, the four factors were regressed against the residential concentration of immigrants by period of immigration.

The percentage of variance in the dependent variable accounted for declined with each period until the 1983-86 period, when it increased relative to the 1978-82 period. This general trend seems to indicate that factors not considered in the regression models, such as self-identity and linguistic facility may influence the residential concentrations of the more recent immigrant cohorts more than the residential concentrations of the longer established immigrant cohorts. Balakrishnan and Kralt hypothesize that, "...in the long run, segregation that can be attributed to factors such as official language facility, recency of immigration, and cultural background will decrease as integration into the host society increases and class differences by ethnicity decrease". They wonder if social distance based on race and visibility is not more persistent (1987, p.157).

The results of this study of the differential residential concentrations of ethnic and immigrant groups in Ottawa-Hull indicate that family status, socio-economic status, recency of immigration and language facility are, in 1986, still important variables explaining residential concentration. Social distance based on race and visibility does not appear to be, as yet, the most important variable explaining residential concentration of the visible minority groups.

VII: CONCLUSIONS

Citing Darroch and Marston (1969) McGahan states that:

> ...contrary to the rather oversimplified approach of social area analysis, ethnic status can be measured in terms of at least six separate indices--national or ethnic origin, race, religion, immigrant status (i.e., period of immigration), birthplace, and language (1982, p.217).

McGahan argues that in order to "achieve a comprehensive understanding of the ecological distribution of ethnic collectivities in any city it is necessary to take account of all the components of ethnic status. This has not yet been adequately done in urban ecological research" (ibid). This thesis has attempted to approach such a comprehensive understanding by examining the ecological distribution of immigrant groups representing different ethnic origins, places of birth and periods of immigration.

The investigation of the possible factors influencing the existence of and differences in the residential concentrations of ethnic and immigrant groups, using quantitative data analysis of census tract or other small area data for urban areas, generally reveals that no single possible cause can explain all or often even half of the concentration of each selected group. The present study comes to the same conclusion. However, if one had to select the factor or variable which likely influences the residential concentration of each selected ethnic and immigrant group the most based on the results of the regression analyses in this study, the following would be proposed (the signs in parentheses indicate the direction

of the associations as indicated by the regression coefficients): FAMILY STATUS for the groups of immigrants who immigrated before 1946 (-), between 1978-82 (-) and between 1983-86 (-); SOCIO-ECONOMIC STATUS for the Jewish (+), French (-) and British (+) ethnic groups, for the groups of immigrants born in the U.S.A.(+), in the U.K.(+) and in "other" (+) places of origin, as well as for the groups of immigrants who immigrated between 1946-66 (+) and between 1967-77 (+); MOBILITY/MODERNITY VS. RETIRED for the South Asian (+) ethnic group; recency of immigration for the Black (+) ethnic group, and for the groups of immigrants born in the Other Americas (+) and Africa (+); language facility (or rather lack of) for the Chinese (+) and Italian (+) ethnic groups, and for the groups of immigrants born in Asia (+) and Europe (excluding the U.K.) (+).

TABLE 14 is a summary of the above proposals. From this last table it appears that the "classical" dimensions of ecological differentiation, i.e. family status and socio-economic status in general seem to influence the residential concentrations of the immigrant groups differentiated by period of immigration and the residential concentrations of the "charter" and "traditional" ethnic and immigrant groups. Recency of immigration and lack of language facility in general seem to influence the residential concentrations of the "new" ethnic and immigrant groups. Two exceptions are the Italians and the group of immigrants born in Europe.

TABLE 14

SUMMARY OF FACTOR OR VARIABLE MOST INFLUENCING RESIDENTIAL CONCENTRATION OF EACH GROUP

ETHNIC OR IMMIGRANT GROUP	FACTOR OR VARIABLE MOST INFLUENCING RESIDENTIAL CONCENTRATION
Immigrated before 1946	FAMILY STATUS (-)
Immigrated between 1978-1982	FAMILY STATUS (-)
Immigrated between 1983-1986	FAMILY STATUS (-)
Jewish ethnics	SOCIO-ECONOMIC STATUS (+)
French ethnics	SOCIO-ECONOMIC STATUS (-)
British ethnics	SOCIO-ECONOMIC STATUS (+)
Born in the U.S.A.	SOCIO-ECONOMIC STATUS (+)
Born in the U.K.	SOCIO-ECONOMIC STATUS (+)
Born in "other" places	SOCIO-ECONOMIC STATUS (+)
Immigrated between 1946-66	SOCIO-ECONOMIC STATUS (+)
Immigrated between 1967-77	SOCIO-ECONOMIC STATUS (+)
South Asian ethnics	MOBILITY/MODERNITY VS. RETIRED (+)
Black ethnics	Recency of immigration (+)
Born in the Other Americas	Recency of immigration (+)
Born in Africa	Recency of immigration (+)
Chinese ethnics	Language facility (lack of) (+)
Italian ethnics	Language facility (lack of) (+)
Born in Asia	Language facility (lack of) (+)
Born in Europe (excluding the U.K.)	Language facility (lack of) (+)

It should be added that for some of these groups, the factor or variable identified in Table 14 may have only been slightly more influential than the next most influential factor or variable (refer back to regression Tables 7-13).

The negative association of family status with the earliest immigrant cohort (before 1946) reflects the mature age of these immigrants, and the map of this cohort's residential concentration (Figure 18), showing a relatively central characteristic, conforms with what would be expected of the residential distribution of the elderly based on the concentric model (Figure 23). The negative association of family status with the two most recent immigrant cohorts suggests that these cohorts are largely composed of single Independent Class immigrants and refugees, and possibly also elderly immigrants who have been sponsored by relatives. The maps of the residential concentrations of these cohorts (Figures 21 and 22), which combine central and peripheral locations, conform with what would be expected of the residential distribution of single working-age and elderly residents based on the concentric model (Figure 23), but also seem to reflect the influence of differences in income (Figure 25) of the immigrants.

The correspondence of the maps of Jewish concentration (Figure 6), British concentration (Figure 3), concentration of immigrants born in the U.S.A. (Figure 11), in the U.K. (Figure 12), in "other" places of origin (Figure 17) and concentration of immigrants who

arrived between 1946-66 (Figure 19) with the distribution of high and very high socio-economic status areas in the region (Figure 24) is easy to see. The correspondence of the map of French concentration (Figure 4) with the distribution of areas of low socio-economic status (Figure 24) is equally as easy to see. Less obvious is the correspondence of the map of residential concentration of immigrants who immigrated between 1967-77 (Figure 20) and the distribution of areas of high socio-economic status in the region (Figure 24). The results of this thesis are consistent with other studies identifying the ethnic-immigrant socio-economic hierarchy in Ottawa (Hill, 1976; Learoyd and Robitaille, 1991, refer to pages 14-15 of this thesis).

The correspondence of the map of South Asian residential concentration (Figure 8) with the distribution of census tracts characterized by high mobility and female participation (Figure 26) suggests that this group is mainly comprised of Independent immigrants. The maps of the residential concentrations of the Black ethnic group (Figure 9), and the groups of immigrants born in the Other Americas (Figure 16) and Africa (Figure 15) correspond better with the maps for the concentrations of the three most recent immigrant cohorts (Figures 20, 21, 22) than with any of the factor maps. However, there is some correspondence of the map for the residential concentration of the Black group with areas of high mobility and female participation (Figure 26). Likewise, there is some correspondence of the map for the residential concentration of

immigrants born in the Other Americas with areas of high mobility and female participation (Figure 26). And, there is some correspondence of the map for the residential concentration of immigrants from Africa with areas of high socio-economic status (Figure 24). These results suggest that visible minority ethnics and immigrants in Ottawa-Hull are typical of the streams coming to Canada from the Third World (refer to the summary of some of the characteristics of selected immigrant groups from the Third World by Simmons (1990) on pages 9-10 of this thesis). Regression analysis has allowed the correspondences between the patterns of residential concentrations and the patterns of the region's social geography to be empirically evaluated.

Finally, the residential concentrations of the Chinese (Figure 7) and Italian (Figure 5) ethnic groups and the groups of immigrants born in Asia (Figure 14) and Europe (excluding the U.K.) (Figure 13), according to the results of this study, are best explained by lack of facility in the official languages. For the Chinese ethnics and the group of immigrants from Asia this is probably due to recency of immigration (see Tables 10 and 11). For the Italian ethnics, an "...entrance status...closely tied to the need for unskilled labour..." and chain migration (Pigler Christenson, 1986, p.88), have probably inhibited the acquisition of official language competency, at least for the older members of this group. The same may also be true for other groups of European immigrants concentrated in 'ethnic occupations'.

Residential concentration is not necessarily a negative phenomenon, as ethnic and immigrant areas in the city can provide the newly arrived immigrant with a familiar social environment in otherwise largely unfamiliar surroundings. McGahan discusses the functions of the inner city working-class neighbourhood:

> It represents, in short, "a vast 'processing mechanism'...a port of exit as well as a port of entry " (Fried, 1965:128). That many of its residents are at least second-generation, however, clearly suggests that such "processing" is not completed within a relatively short period of time (1982, p.270-71).

Ethnic and immigrant clustering in neighbourhoods, like the inner city working-class neighbourhood, ideally allows gradual assimilation into the host society, if assimilation is desired. On the other hand, if the immigrant aspires to return to the place from which he or she emigrated, residential clustering can ensure that cultural norms and values are maintained. Goldberg and Mercer point out that, while in the United States there is "...no official recognition of cultural or ethnic pluralism at the federal level" and there exists a "national culture" , "...it is fair to say that on balance that [sic] the arrival of new people in Canadian cities has been accommodated and, paradoxically, that ethnic residential segregation is neither feared nor despised (1986, pp.40-41).

Residential concentration is a negative phenomenon when individuals and groups are compelled to cluster because of lack of resources (low socio-economic status) or problems of access to resources (such as language training) or because of discrimination and associated limitations on opportunities for advancement (income

commensurate with occupation and education). Since self-identity can be stimulated by discrimination in the host society, an important area of future research is the extent to which self-identity is stimulated by sentiment as opposed to the extent to which it is a reaction to negative attitudes in the host society. Such a study would require indepth interviews, but indices of segregation and factorial ecology at the metropolitan and local levels could identify the areas of the city in which to concentrate such a research strategy.

In terms of policy implications, if social distance based especially on race and visibility is indeed more persistent in the long run than factors such as problems getting credentials recognized and language difficulties, then multicultural and multiracial education of the population must be a priority. Samuel quotes Tienhara (1974), who concluded that "'negative attitudes to immigration [revealed in public opinion polls] are based on perceived--not necessarily real--actual or potential threats to individual well being, be it economic, social, cultural or political'" (1990, p.389). Immigration Canada (1992) is attempting to address the basis of these negative attitudes in information sheets such as the one entitled "Immigration to Canada...myth versus fact", obviously recognizing the importance of public education.

In the mean time, greater attempts should be made to ensure that immigrants have access to the resources they need (appropriate testing of skills, language and skills training programs, etc.) and the wages they merit. Some steps in the direction of changing procedures to allow for cultural differences in the way a person's ability to do a job can be demonstrated or to eliminate culturally-biased tests are being taken locally. For example, the Advisory Committee on Visible Minorities reports in its Annual Report of 1987 that the Ottawa Police Force was in a process of revamping the testing procedure for entry in the force: the changes "are expected to make the tests (diagnostically and psychologically) culture-free, as much as possible, to reflect ethnic and racial diversity in Canada" (p.6). Language training is increasingly important as half of all new immigrants who arrived in Ottawa-Carleton since 1986, the year for which data were analyzed, have no ability in either English or French (Social Planning Council of Ottawa-Carleton, 1992). Since self-employment is a growing class of employment, more support should be targeted to those who are in or will enter this class by choice or by default. Reitz points out that besides the economic benefit to the individual immigrant, support of self-employment also benefits the larger community:

> Policy designed to strengthen ethnically controlled businesses at all levels would contribute directly to cultural pluralism. ...Whether opportunity is restricted depends on the structure of these work settings in relation to the dominant society. ...If the settings are large enough to be important (namely in the Southern European and Chinese groups), income opportunities are comparable to those available to comparably educated persons outside these settings, at least at the lower levels of education (1984, p.522).

Finally, the following list is taken from a "ranking of the social needs of individuals and groups who are marginalized in Ottawa-Carleton" presented in the Social Planning Council of Ottawa-Carleton's third sectoral report entitled Living on the Margins: Barriers to Labour Force Participation and Access to Basic Goods and Services in Ottawa-Carleton. The specific needs of ethnic and visible minorities and francophones are highlighted, along with the needs of other groups such as the disabled and the homeless. Five needs relating to ethnic and immigrant groups have rankings between "of critical importance" and "very important" namely:

Daycare assistance or programs for single parents and immigrant women to attend employment and related programs;

Educating the public to reduce racist attitudes and practices;

Improving accessibility of mainstream health and social services for persons with special needs, and persons from diverse ethnic and cultural backgrounds;

Providing education and training to service providers on the needs and rights of persons with special needs, and persons from diverse ethnic and cultural backgrounds; and,

Providing new immigrants with opportunities to gain "Canadian" life skills and learn about employment practices;

Five other needs have rankings between "very important" and "somewhat important" with respect to ethnic and visible minorities in the community of Ottawa-Carleton, namely:

Monitoring commitment to employment equity policies;

Coordinating information on language and employment training programs for immigrants and refugees;

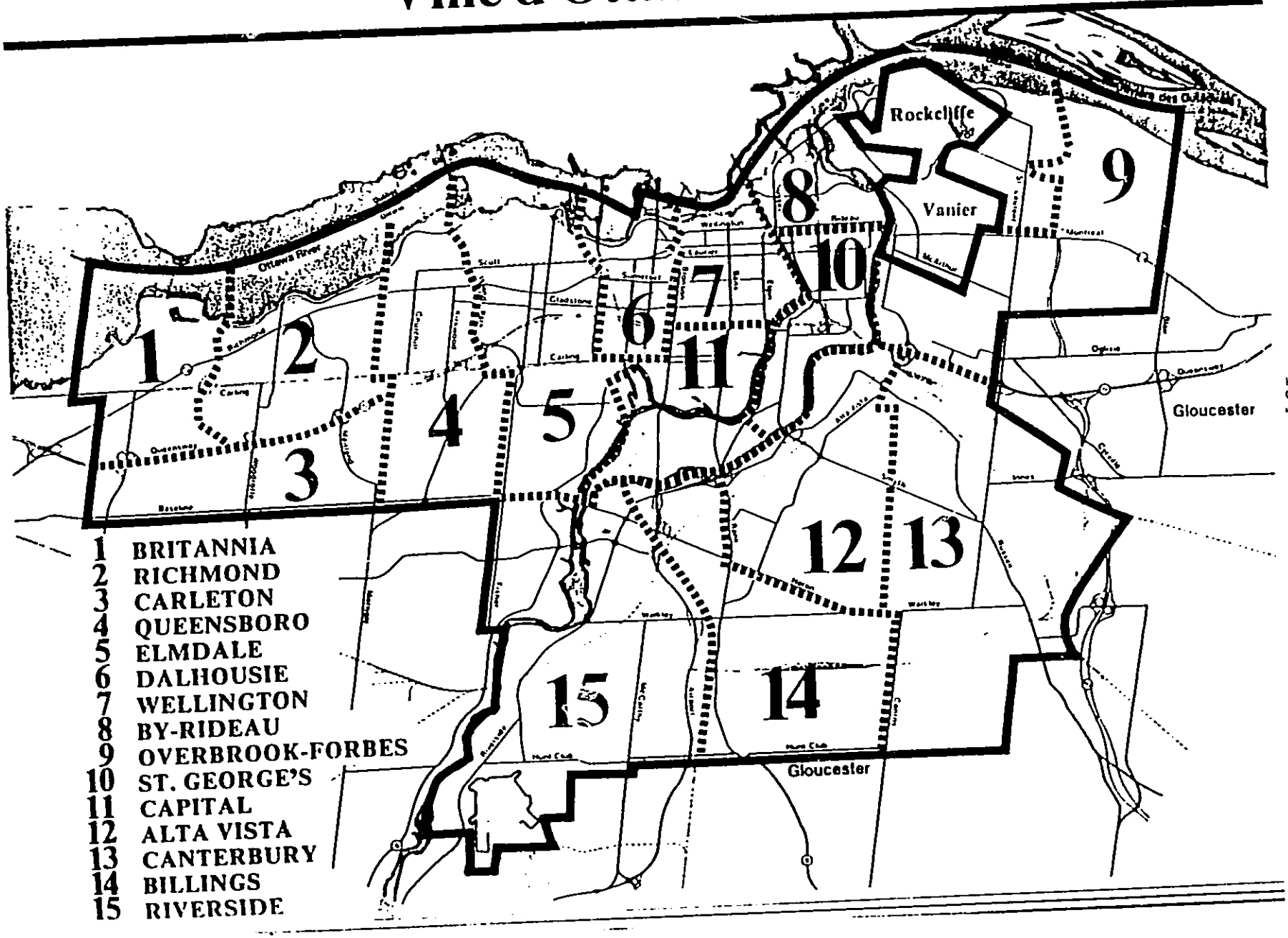
Culturally sensitive language training for immigrants;

Individual, specialized counselling for immigrants and refugees;

Assistance and support to foreign-born professionals in gaining recognition of credentials and obtaining employment;

(Learoyd and Robitaille, 1991, pp.96-99). Perhaps a study such as this thesis could serve the implementation of policies based on such rankings of needs by giving some indication of which groups are likely to require which kind of support most, and where in the community the groups are located.

City of Ottawa — Ward Map
Ville d'Ottawa — Carte des quartiers



Source: Ottawa: Its City Government. Ottawa: (Corp. of the) Cityof Ottawa, 1985. p.31.

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