

Bibliography and Review of Neighbourhood Typologies with a Focus on Canada, the United States, and Australia/New Zealand

Robert Murdie
and
Jennifer Logan

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Executive Summary

This bibliography and review of neighbourhood typologies was prepared as background to two research projects concerning the spatial patterns of neighbourhood structure and change in eight Canadian Census Metropolitan Areas (CMAs). The projects were called *Eight Canadian Metropolitan Areas: Who Lived Where in 2006? (Research Paper 229)* and *Eight Canadian Metropolitan Areas: Spatial Patterns of Neighbourhood Change, 1981–2006 (Research Paper 234)*.

The development of neighbourhood typologies dates to the work of Booth in London and Burgess in Chicago in the late 19th and early 20th centuries and the social area typology of Shevky and Bell from the 1950s. This bibliography and literature review, however, focuses on literature from the 1970s, the beginning of a multivariate statistical approach to neighbourhood classification.

Emphasis is placed on studies that attempt to measure change in a city's neighbourhood social geography and on research conducted in Canada, the United States and Australia/New Zealand with particular focus on Canadian studies. We also focus on the emergence of methodological refinements, including the development of joint comparative analyses whereby census tract data for several metropolitan areas in one census year are considered simultaneously or data for two or more years are combined for a single metropolitan area.

The research paper comprises two parts, a bibliography, including abstracts where available, and a detailed review of selected items from the bibliography. The bibliography is divided into two sections, the first identifying literature that concerns methodological issues and a longer second section highlighting literature summarizing the results from empirical analyses. In both parts, the entries are arranged chronologically from the late 1960s/early 1970s to the present. This provides an indication of the way in which this research has evolved over the last few decades. The detailed review of each item identifies the objective of the research, the methodology used, the variables or indicators incorporated in the research, the findings and a brief evaluation of the research.

Recent studies of neighbourhood typologies confirm the increased complexity of the social dimensions and social geography of Canadian and other western cities and point to increased instances of deprivation in these cities. These issues are explored in the Introduction. We conclude the Introduction by highlighting a number of suggestions that have been made for refining and enhancing neighbourhood typology studies including experimentation with different statistical procedures, resolving the spatial scale problem, longer temporal studies, and increased emphasis on measures of urban deprivation. Recognition and appreciation of the local context has also become important in interpreting the results from the analyses.

Authors

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1. Introduction

This bibliography and review of neighbourhood typologies was prepared as background to two research projects concerning the spatial patterns of neighbourhood structure and change in eight Canadian Census Metropolitan Areas (CMAs). The projects were called *Eight Canadian Metropolitan Areas: Who Lived Where in 2006?* and *Eight Canadian Metropolitan Areas: Spatial Patterns of Neighbourhood Change, 1981–2006*.

The objective of the two research projects was to improve understanding of the increasingly complex social geography of these eight CMAs employing a joint analysis of census tract data for 2006 and for change between 1981 and 2006. Details concerning the data used, the methodologies and the results from the analyses are in the two reports noted above (www.neighbourhoodchange.ca).

The development of neighbourhood typologies dates to the late 19th and early 20th centuries, especially the work of Charles Booth in London (Booth, 1902) and Ernest Burgess in Chicago (Burgess, 1925). Booth mapped a variety of socio-economic data for London and Burgess and his colleagues undertook neighbourhood-based analyses leading to the development of the first spatial model of socio-economic status in cities, the widely referenced concentric zone model.

This research was followed in the 1950s by social area analysis (Shevky and Bell, 1955), a precursor of the multivariate approaches to neighbourhood classification that emerged in the late 1960s and early 1970s. Social area analysis provides a systematic classification of residential areas within cities using census tracts as a unit of analysis. As conceived by Shevky and Bell (1955), it was based on the grouping of census characteristics into three hypothesized indexes: economic status (income, occupation, education); family status (age, type of household, labour force participation by women); and ethnic status (clusterings of people with common cultural backgrounds). Existing theories of social change formed the basis for these indexes. Social areas were mapped using census tracts for San Francisco and Los Angeles but otherwise relatively little empirical work was undertaken until the development of factorial ecology studies in the late 1960s/early 1970s. Instead, emphasis was placed on identifying the theoretical relationship between residential differentiation and modernization (Johnston, 1971: 315).

More extensive evaluation of social areal analysis became possible with the development of faster computers capable of handling large data sets. Empirical evaluation of social area analysis was undertaken using multivariate statistics such as factor analysis or principal components analysis (e.g., Foggin and Polèse, 1977; Murdie, 1969; Perle, 1982–83). The two statistical procedures are quite similar and when applied to spatial data are often referred to as factorial ecology studies.

Factorial refers to factor analysis or principal components analysis, the statistical technique used to identify the key dimensions in a set of interrelated data. The dimensions provide concise descriptions of a larger number of interrelated variables. Ecology, as applied in social science research, refers to any study that uses spatial units such as census tracts as the unit of analysis (Berry, 1971: 209, Rees, 1971: 220–21). More details concerning the methodology are provided in the two reports of structure and change in eight Canadian CMAs noted above.

The general conclusion from these analyses is that the three indexes proposed by Shevky and Bell are necessary but not sufficient to describe the socio-economic differentiation of a city's neighbourhoods. This resulted in the inclusion of more variables in subsequent analyses and the development of a number of methodological refinements. Emphasis was also placed on studies that obtained factor or component scores for each census tract. The scores allow an evaluation of the spatial distribution of the dimensions.

This bibliography and literature review focuses on literature from the 1970s, the beginning of a multivariate statistical approach to neighbourhood classification. It comprises two parts, a bibliography, including abstracts where available, and a detailed review of selected items from the bibliography. Particular focus is placed on studies that attempt to measure change in a city's neighbourhood social geography. The detailed review of each item identifies the objective of the research, the methodology used, the variables or indicators incorporated in the research, the findings and a brief evaluation of the research.

The bibliography is divided into two sections, the first identifying literature that concerns methodological issues and a longer second section highlighting literature summarizing the results from empirical analyses. In both parts, the entries are arranged chronologically from the late 1960s/early 1970s to the present. This provides an indication of the way in which this research has evolved over the last few decades. The emphasis is on research conducted in Canada, the United States and Australia with a particular emphasis on Canadian studies.

Much of the initial factorial ecology research concerned overviews and critiques of various research methods (e.g., Berry, 1971; Johnston, 1971; Rees, 1971; Hunter, 1972) and the extent to which the patterns have generality, at least for North American cities (Berry, 1971: 209–13). Critiques of the methodology suggested a need to experiment with different factorial methods, including orthogonal and oblique rotations. Spatial analyses were also undertaken using the scores, but the full development of spatial typologies had to await the advent of larger and more powerful computers. Experimentation with different spatial units is important in urban analysis because different results can be obtained for larger units such as census tracts compared with smaller dissemination areas. Another problem for which there is no easy solution is that both census tracts and dissemination areas are artificial constructs developed by census agencies rather than locally recognized neighbourhoods (e.g., Séguin et al., 2012).

More recent studies, as reported in Chapter 2, reflect a resurgence of interest in factorial ecology and classification approaches to neighbourhood research, aided by the enhanced computer power necessary to handle large data sets. This growing interest has led to methodological refinements and increased recognition of the advantages and disadvantages of these techniques in describing and evaluating the social structure of cities. One methodological refinement was the development of joint comparative analyses whereby census tract data for several metropolitan areas in one census year are considered simultaneously (e.g., Davies and Murdie, 1991a, 1991b) or data for two or more years are combined for a single metropolitan area (e.g., Le Bourdais and Beaudry, 1988).

These studies confirmed the increased complexity of the social dimensions of Canadian metropolitan areas. In some cases, the dimensions were mapped using census tracts as the spatial unit of analysis. An example of the latter is Balakrishnan and Jarvis's (1991) evaluation of the Burgess concentric zonal model of spatial differentiation, confirming that the gradient pattern persists in 14 Canadian cities, although the character of the zones has changed over time. Interest has also turned to more specific studies such as the role of gender in factorial ecology studies with the conclusion from one study that gender differences exist but are relatively minor in providing new insights about the social ecology of cities (Randall and Viaud, 1994; Viaud, 1995). In contrast, however, Davies and Murdie (1991) pointed to the existence of a specific gender dimension, at least in 1986.

More recently, emphasis has focused on the formal classification of urban neighbourhoods and the development of indexes of urban distress (e.g., Baum et al., 2002; Baum, 2004; Institute of Urban Studies, 2008; Hanlon, 2009; Mikelbank, 2004, 2009; Vicino, Hanlon and Short, 2011; Hulchanski et al., 2011). All are cross-sectional studies undertaken for a single point in time or for two or more points in time without specifically considering measures of change, what Perle (1982–83: 309) refers to as “a form of comparative statics.”

These studies point to substantial spatial variation in urban deprivation in various cities in Australia, the United States and Canada. Baum, for example, in a series of studies (2004, 2005, 2010) highlights the increased socio-economic divisions and instances of deprivation in these cities, attributable largely to post-industrial social structures. In the United States, both Mikelbank (2004) and Hanlon (2009) concluded following extensive comparative analysis that class, race and ethnicity increasingly distinguish suburbs, especially inner-ring suburbs that were originally assumed to be homogeneous.

In Canada, Hulchanski et al (2011) found considerable differences within the primarily suburban City #3, the most impoverished of three areas in the City of Toronto (census tracts that had decreased 20 percent or more in average individual income relative to the Toronto Census Metropolitan Area average between 1970 and 2005). Based on a cluster analysis of 31 variables from the 2006 census, the authors concluded that census tracts in City #3 could be further differentiated into four groups based on housing stock (high density, low density), family status (two-parent, single-parent), economic status, and race/ethnicity. This analysis gives further credence to Australian and U.S. studies that have also found both socio-economic differentiation and instances of deprivation in the suburbs.

A study conducted by the Institute of Urban Studies (2008) in Winnipeg is one of the most extensive comparative Canadian studies concerning urban deprivation. Researchers at the Institute developed and tested a Canadian Distress Index (CDI) using 24 census variables from the 2001 census for about 2500 census tracts in 10 cities of various sizes (Toronto, Montréal, Winnipeg, Ottawa, Edmonton, Regina, St. John's, Halifax, Red Deer, Drummondville). A more detailed spatial analysis was undertaken of Winnipeg, the home base of the research team. The report also includes an extensive literature review. The 24 variables were factor analyzed, resulting in four independent domains (poverty, education, labour, and marginalization). In constructing the index, weights were given to each domain based on the theoretical relevance of each factor. Poverty was deemed the most important, labour and marginalization the least. In Winnipeg, the spatial pattern of the index generally corresponded to the City of Winnipeg's neighbourhood designation, but also revealed suburban areas under distress. The authors concluded that local studies are needed to confirm the nature and extent of distress and the means to address it.

Other studies evaluate change more directly by combining data for two or more census years and analyzing measures of change (e.g., Murdie, 1969; Perle, 1982–83, Le Bourdais and Beaudry, 1988; Davies and Murdie, 1991a; Baum et al., 2002; Kitchen and Williams, 2009). These analyses are more challenging than cross-sectional studies, particularly given changes in the numbers and/or boundaries of census tracts over time and the lack of consistency in the availability and definition of variables. Perhaps for these reasons, most change studies concern a limited time period, usually 10 years.

Mikelbank's (2011) analysis of census tract data in Metropolitan Cleveland is an example of a recent study that covers a longer time period (1970–2000). This study is based on a cluster analysis of demographic, economic, and housing data for four time periods, 1970, 1980, 1990, and 2000. The study is unique in that data for each census tract for each of the four time periods were entered into the analysis at the same time. This allows census tracts from one time period to cluster with tracts from another time period. Five neighbourhood types were identified: struggling neighbourhoods, struggling African-American neighbourhoods, suburbia neighbourhoods, stability neighbourhoods, and new starts neighbourhoods. Concerning change, African-American neighbourhoods were least likely to change, while suburbia neighbourhoods were most likely to change. Suburbia neighbourhoods were least likely to adhere to conventional stereotypes about suburbs, thereby confirming the findings of other studies about suburban differentiation and change.

One of the most recent and extensive studies of neighbourhood social change in a Canadian city is Kitchen and Williams's (2009) study of Saskatoon using census data for 1991, 1996, and 2001. This study was based on a principal components analysis of 12 variables for 58 neighbourhoods over two separate time periods, 1991–96 and 1996–2001. The analysis resulted in four interpretable components of change in 1991–96 and five in 1996–2001. The differences in component structure between the two time periods reflect the fact that 1991–96 was a difficult period economically, while 1996–2001 was a period of economic recovery. For example, the first component in 1991–96 is labelled "Labour/Low Income," indicating low-income neighbourhoods with falling rates of labour force participation, especially among women, and homeownership. In contrast, the first component in 1996–2001, "Labour/Home Ownership," reflects im-

proving rates of labour force participation, particularly among women, and growing rates of homeownership in certain neighbourhoods.

Studies undertaken using direct measures of change underscore the methodological challenges of this research. In addition to choosing suitable statistical measures, these challenges include identifying an appropriate set of variables, determining a suitable measure of change, and selecting an appropriate time period. The guidelines for variables are similar to cross-sectional analyses except that the same set of variables must be available at the beginning and end points of the analysis. With respect to an appropriate time period, all studies undertaken to date have been for no more than a decade. In many instances, however, 10 years may not be long enough to show real change.

Concerning methodology, a number of recent studies have adopted a somewhat different procedure from conventional factorial ecology (e.g., Baum et al., 2002, 2004; Mikelbank 2004, 2011). This involves a cluster analysis of the original variables to identify relatively homogeneous groupings of census tracts and discriminant analysis to evaluate the importance of the variables in differentiating between groups and to test the validity of the groups (i.e., the number of correctly classified tracts). This approach avoids the use of factor analysis or principal components analysis to identify important dimensions in the data set and the use of factor or component scores as input to a cluster analysis. However, there is a similarity between factor analysis (or principal component analysis) and discriminant analysis in that both are based on combinations of the data that best summarize variations in the data set.

In summary, the literature review has been arranged chronologically to show the way in which analyses of neighbourhood structure and change have emerged in the post–Second World War period. Much of this change has resulted from the advent of computerized census data and faster computers capable of handling larger data sets, as well as more sophisticated multivariate statistical techniques. The initial studies focused on an empirical evaluation of Shevky and Bell's (1955) three hypothesized indexes of neighbourhood structure and change (economic status, family status and ethnic status). These studies confirmed that the three indexes are necessary but not sufficient indicators of the socio-economic differentiation of a city's neighbourhoods. This finding led to the development of factorial ecology studies that incorporated a much larger number of variables in the analysis and a number of methodological refinements.

The studies reported here reflect advances in data availability and methodologies, and in some cases focus on the role of specific variables such as gender and ethnicity in understanding the complexity of a city's social geography. Attention has also turned to the increased socio-economic divisions and instances of deprivation in post-industrial cities. In particular, these studies have identified increasing differentiation in North American suburbs based on class, race and ethnicity.

Methodological refinements include the development of joint analyses and the use of alternative methods of classification. Joint analysis may involve (a) the combination of census tract data for several metropolitan areas or (b) the combination of data for two or more years for a single metropolitan area into a single analysis. These procedures allow for more specific comparative analyses, both between metropolitan areas and over time. The use of cluster analysis followed by discriminant analysis represents an alternative to the more conventional

factorial ecology method of identifying a typology of census tracts. This approach avoids the use of factor or component scores and employs the original variables as input to the cluster analysis.

Several suggestions have been made for refining and enhancing factorial ecology and related studies of neighbourhood differentiation. These include:

1. *Experimentation with different statistical procedures to make sure the results are not method-dependent.* Aside from different forms of multivariate statistics such as factor analysis or principal components analysis and cluster analysis, the most important may be comparing results based on the traditional factorial ecology approach, as used in the two companion reports on neighbourhood structure and change in eight Canadian CMAs noted above, with analyses based on cluster analysis followed by discriminant analysis.
2. *Resolving the spatial scale or modifiable area problem.* Most analyses to date are based on census tracts. Yet, results can differ depending on the spatial scale of analysis. Census tracts, for example, are generally less homogeneous than smaller dissemination areas and may give different results. This is likely a greater problem in smaller census metropolitan areas. Ideally, analyses should be undertaken for at least two different spatial scales of analysis. These issues, including the impacts for policy recommendations, are fully explored in Séguin et al. (2012).
3. *Separate analyses for metropolitan areas of different size.* In the studies of neighbourhood structure and change noted above, the three largest metropolitan areas (Montréal, Toronto, and Vancouver) may have influenced the outcome of the analysis. It might be noted, however, that Davies and Murdie (1991) found relatively little difference for 24 Canadian census metropolitan areas (CMAs) when separate analyses were undertaken for three size categories of CMAs. However, larger CMAs have more complex social structures and this difference needs to be tested.
4. *Longer temporal studies.* Most longitudinal studies cover only a decade, which may not be long enough to capture the reality of socio-spatial change. There is also need for studies that identify the changes that take place and how neighbourhoods transition from one time period to the next. This type of analysis would aid in understanding processes of neighbourhood upgrading and downgrading. The major problem in such studies is dealing with the increasing number of census tracts as cities grow and existing tracts are subdivided. This issue is considered in the report on the spatial pattern of neighbourhood change in eight Canadian CMAs noted above. Morenoff and Tienda (1997) and Mikelbank (2011) are also good examples of recent temporal studies covering a longer time period and the issues that need to be considered when dealing with a longer time frame.
5. *Inclusion of more detailed variables.* Separate analyses could be undertaken for variables such as gender and ethnicity. The importance of gender in neighbourhood classification studies remains inconclusive and ethnic differences vary from one CMA to the next.
6. *Recognition of local context.* To fully interpret the results from these statistical analyses it is important to involve local experts and review local research reports that could provide a basis for interpreting the nature and validity of neighbourhood typologies.

References for the Introduction (all other references are in the bibliography)

Booth, C. (1902). *Life and Labour of the People in London (Poverty)*. London and New York: Macmillan.

Burgess, E.W. (1925). "The Growth of the City: An Introduction to a Research Project." In R.E. Park, E. W. Burgess, and R.D. McKenzie (eds.), *The City* (pp. 47-62). Chicago: University of Chicago Press.

Shevky, E. and W. Bell (1955). *Social Area Analysis*. Stanford: Stanford University Press.

2. Bibliography

* = Items selected for more detailed review in Chapter 3.

2.1 Methodological Issues

Berry, B. (1971). “Introduction: The Logic and Limitations of Comparative Factorial Ecology.” *Economic Geography* 47 (Supplement: Comparative Factorial Ecology): 209–219.

No abstract available

Johnston, R. (1971). “Some Limitations of Factorial Ecologies and Social Area Analysis.” *Economic Geography* 47 (Supplement: Comparative Factorial Ecology): 314–323.

No abstract available

Rees, P. (1971). “Factorial Ecology: An Extended Definition, Survey, and Critique of the Field.” *Economic Geography* 47 (Supplement: Comparative Factorial Ecology): 220–233.

No abstract available

Hunter, A. (1972). “Factorial Ecology: A Critique and Some Suggestions.” *Demography* 9 (1): 107–117.

Abstract: Studies in factorial ecology have typically used the principal factor procedure coupled with varimax rotation. Since it can be shown that the results one obtains vary according to the factor and rotation models [one] employs, and since there is no one “best” way of obtaining initial and derived factor solutions, it is proposed that future research in the area adopt an approach involving the simultaneous use of several different computing algorithms for obtaining initial solutions and both orthogonal and oblique rotation procedures to avoid the possibility that the results one obtains are not method-dependent. Ideally, the factor models employed should differ maximally with respect to the principles upon which they are based. If one finds a given factor regardless of the method [one] uses, only then can [one] assert with any confidence that it is not an artifact of [the] method. Factorial ecologists are often interested in computing “factor scores,” but “true” factor scores are not uniquely computable; they can only be estimated. Since the proposed research strategy involves using either a component or an image model, in which the corresponding scores are exact and uniquely computable, the factor score problem is, in a

sense, solved. Next it is suggested that, by using orthogonal solutions, factorial ecologists may be overlooking a very important piece of information – the correlation between the factors. There is some reason to believe that this varies from city to city, and may account for the fact that some factors which emerge in studies of Western cities are sometimes not found in cities elsewhere. Some comments are also made on the value of using census tract data, and on the availability of computer programs for different initial and derived factor solutions.

Johnston, R.J. (1976). “Residential Area Characteristics: Research Methods for Identifying Urban Sub-areas – Social Area Analysis and Factorial Ecology.” In D.T. Herbert and R.J. Johnston (eds.), *Spatial Processes and Form*, Vol. 1 (pp. 193–235). New York: Wiley.

No abstract available

Janson, C-G. (1980). “Factorial Social Ecology: An Attempt at Summary and Evaluation.” *Annual Review of Sociology* 6: 433–456.

No abstract available

Reibel, M. (2011). “Classification Approaches in Neighborhood Research: Introduction and Review: Complexity, Thresholds and Categories in Neighborhood Research.” *Urban Geography* 32 (3): 305–316.

No abstract available

Séguin, A-M., P. Apparicio, and M. Riva. (2012). “The Impact of Geographical Scale in Identifying Areas as Possible Sites for Area-Based Interventions to Tackle Poverty: The Case of Montréal.” *Applied Spatial Analysis* 5 (3): 231–251.

Abstract: Many studies in geography have demonstrated that results can vary according to scale and configuration of spatial units. However, implications of the MAUP – Modifiable Area Unit Problem – have received little attention in urban planning and policy studies. The first objective of this paper is to demonstrate how identification of poor areas (residential areas with 40% or more of low-income population) is sensitive to changes in scale. The second objective is to measure the completeness (to what degree targeting only poor areas is adequate to reach all the poor population of a metropolis) and the efficiency (to what degree the population benefitting from targeted interventions is poor) of area-based interventions. The methodology to identify poverty areas is based on three spatial levels of analysis: dissemination areas (DAs), census tracts (CTs) and districts, namely micro, meso and macro levels. Hierarchical linear models are used to analyze the variance partitioned between these levels. Results of multilevel analyses demonstrate that CTs are more heterogeneous on the basis of DAs than Zones according to CTs. Independently of the scale of analysis, results show that the majority of low-income population is living in areas with no poverty concentration in Montréal (completeness dimension). Moreover, results show that about half of the population living in zones of poverty concentration is not poor even when micro-zones are used for measurement (efficiency dimension). These results illustrate the importance of scale in identifying poverty areas, which also have implications for social policy interventions.

2.2 Empirical Evidence

Murdie, R.A. (1969). *The Factorial Ecology of Metropolitan Toronto, 1951–1961*. Research Paper 116. Chicago: Department of Geography, University of Chicago.

No abstract available

Bourne, L., and G. Barber. (1971). “Ecological Patterns of Small Urban Centers in Canada.” *Economic Geography* 47 (Supplement: Comparative Factorial Ecology): 258–265.

No abstract available

Palm, R., and D. Caruso. (1972). “Factor Labelling in Factorial Ecology.” *Annals of the Association of American Geographers* 62 (1): 122–133.

Abstract: In the factorial ecology of American cities, the labels “socio economic status” and “life cycle” have been given to the two principal axes on the basis of several consistently related variables. If the general use of these names implies recurring processes of housing choice and city growth, which result in the observed residential patterns, then all variables related to these processes should exhibit consistent relationships to the principal axes. A systematic comparison of the loadings of variables for 10 American cities reveals both consistencies and notable differences in the relationships of attributes to the two major dimensions. Careful attention to the characteristics of the populations submitted to the technique of factorial ecology is required to account for the variations, and may suggest new or refined explanations for the spatial relationships. Regional variations in social stratification, demographic characteristics, occupational structure, local housing market conditions and preferences, city age, and morphology seem to account for many of the differences.

Davies, W.K.D., and G.T. Barrow. (1973). “A Comparative Factorial Ecology of Three Canadian Cities.” *The Canadian Geographer* 17 (4): 327–353.

No abstract available

Bailly, A., et M. Polèse (1977) “Processus urbains et modèles spatiaux : écologie factorielle comparée Edmonton-Québec.” *Le Géographe Canadien* 21 (1): 59–80.

No abstract available

Foggin, P., and M. Polèse. (1977). *The Social Geography of Montreal in 1971*. Research Paper No. 88. Toronto: University of Toronto, Centre for Urban and Community Studies. (Translation of *La Géographie Sociale de Montréal en 1971*. Montréal: Institut national de la recherche scientifique, I.N.R.S.–Urbanisation).

Abstract: On the basis of 63 variables drawn from the 1971 census, the authors describe the social and residential geography of the Montréal metropolitan area. With the aid of factor analysis they describe the patterns shaping Montréal’s residential space, thereby attempting to better understand how Montréalers choose their residential locations. The results show that the principal factors underlying such choices are social, family and ethnic status. Finally, with these

factors and with a cluster analysis of 368 census tracts, the authors identify homogeneous social areas within Montréal.

Bailly, A.S., and M. Polèse. (1978). “La différenciation de l’espace urbain de Québec : une application de l’analyse discriminante en géographie urbaine.” *Cahiers de géographie du Québec* 22 (55): 29–49.

Résumé: Puisqu’il n’est pas de connaissance géographique sans différenciation des paysages, la géographie quantitative ne peut se contenter des seules méthodes factorielles. Avec l’analyse discriminante, les poids locaux ne constituent plus l’étape finale, mais le point de départ de l’analyse spatiale. Ainsi procédons-nous à l’étude des espaces socio-économiques et familiaux pour la région métropolitaine de Québec. Loin d’être conforme aux modèles nord-américains, cette ville présente un double aspect: l’un culturel et symbolique, favorisant la conservation de plusieurs secteurs centraux, l’autre économique, entraînant invasions et successions dans les aires périphériques. Même si l’analyse discriminante pose plusieurs problèmes méthodologiques, elle offre au géographe un instrument qui peut servir de support logique pour bâtir une théorie de la ville.

Davies, W.K.D. (1978). “Alternative Factorial Solutions and Urban Social Structure: A Data Analysis Exploration of Calgary in 1971.” *The Canadian Geographer* 22(4): 273–297.

No abstract available

Polèse, M., and S. Carlos. (1978). *Ecologie factorielle d’un système urbain : une analyse globale des facteurs de différenciation spatiale en milieu urbain pour les principales villes du Canada*. Etudes et documents 13. Montréal: INRS–Urbanisation.

No abstract available

Balakrishnan, T., and G. Jarvis. (1979). “Changing Patterns of Spatial Differentiation in Urban Canada, 1961-1971.” *Canadian Review of Sociology and Anthropology* 16 (2): 218–227.

Abstract: Using census tract data, patterns of spatial differentiation in 1971 are examined and found to be fairly close to those that existed in 1961. Spatial patterning of socioeconomic status was dominantly sectoral, family status was zonal, and ethnic status not markedly one or the other. Though the changes during the decade are small, our findings run contrary to the evolutionary hypothesis of Schnore with regard to socioeconomic differentiation. The majority of Canadian cities actually increased in the status of inner-city census tracts and decreased in the status of outlying, suburban tracts. Family status is becoming more zonally differentiated, which is supportive of the evolutionary hypothesis. Ethnic status describes only rather weak zonal and sectoral patterns in either year.

Guay, L. (1981). “Différenciation et ségrégation urbaines: Québec 1951, 1961 et 1971.” *Recherches sociographiques* 22 (2): 237–255.

Résumé: A partir des données des recensements de 1951, 1961 et 1971 de l’agglomération de Québec, cet article analyse la différenciation et la ségrégation spatiales de la population de Québec selon un ensemble de caractéristiques démographiques, socio-économiques et ethno-

linguistiques. L'Etude de la différenciation spatiale est fondée, techniquement, sur l'analyse factorielle et celle de la ségrégation sur un indice de ségrégation mesurant la distance spatiale entre un groupe d'occupations et tous les autres groupes. Il apparaît clairement, dans l'étude de la différenciation, que les secteurs de recensement continuent, dans le temps, à se démarquer les uns des autres selon la position économique, le statut familial et l'origine ethnique. Cependant, d'autres caractéristiques de l'occupation et du travail des femmes surtout, rendent le tableau plus complexe. Quant à la ségrégation proprement dite, ce sont principalement les groupes de professionnels, d'administrateurs et de techniciens qui affichent la plus forte distance spatiale.

***Perle, E. (1982/3). "Ecology of Urban Change – An American Example." *Urban Ecology* 7: 307–324.**

Abstract: The recent literature of urban social ecology has produced an emergent body of theory and methodology together with empirical verification. Yet the entire conception is dependent upon cross-sectional analyses or international comparisons, with little attention directed to processes of change. This paper focuses explicitly on system change by comparing cross sections over time and by the direct decomposition of change data. The first approach, which has been extensively utilized, should provide evidence consistent with existing theory. The second approach, which is less well understood, should provide an alternative set of perspectives. Empirical content is provided by analyzing a consistent 43 variable set for the census tracts of Detroit both for 1960 and 1970. In addition, the same variable set is constructed to represent change over the decade and then analyzed for the identification of change dimensions. For both time periods theoretically expected dimensions emerge. However, the substantive simplicity of the 1960 structure is far more complex a decade later. Much of the additional complexity involves the separation of family status related variables from a unidimensional concept to an increasingly multidimensional representation. It is suggested that these findings are not unique and they may represent the emergence of post-industrial patterns. Although cross-sectional findings and change dimensions derived from change variables are related, they are not the same. These two approaches provide differing perspectives on the nature of urban system modification.

Hamm, B., R. Currie, and D. Forde. (1988). "A Dynamic Typology of Urban Neighbourhoods: The Case of Winnipeg." *Canadian Review of Sociology and Anthropology* 25 (3): 439–455.

Abstract: The process of urban development through the stages of growth, stability and decline was the foundation of a typology of neighbourhood change developed in 1978 by the City of Winnipeg. Since that time, Statistics Canada census data for Winnipeg reaggregated by neighbourhoods have become available. Because the neighbourhood is the most significant spatial unit for city planners as well as for many residents, this paper first proposes to establish a dynamic typology of neighbourhoods based on a factor analysis of 1971 and 1981 census data aggregated by neighbourhood. A second goal is to evaluate the importance of the level of aggregation of the data, and to look at the relative usefulness of the typology developed by the city and the typology developed through factor analysis of census data.

***Le Bourdais, C., and M. Beaudry. (1988). "The Changing Residential Structure of Montréal 1971-81." *The Canadian Geographer* 32 (2): 98–113.**

Abstract: This paper attempts to analyse the changing residential composition of the Montréal metropolitan region over time. More specifically, it examines the principal dimensions of Montréal's residential structure in 1971 and 1981, by conducting two separate factorial analyses based on census data; this part of the study is completed by a direct analysis of change, through factor analysing indices established by combining 1971 and 1981 variables. The cross-sectional comparisons underline the regularities between the two residential configurations. The analysis of relative changes uncovers the principal modifications in Montréal's residential space through the period, showing in particular that some neighbourhoods registered major shifts in the composition of their population, due to ethno-linguistic movements or to social mobility.

Balakrishnan, T., and G. Jarvis. (1991). "Is the Burgess Concentric Zonal Theory of Spatial Differentiation Still Applicable to Urban Canada?" *Canadian Review of Sociology and Anthropology* 28 (4): 526–539.

Abstract: Using census tract data from the censuses of 1961, 1971 and 1981, this paper examines the durability of concentric zonal patterns in socio-economic status and family size predicted by Burgess's theory in the 14 largest metropolitan areas of Canada. Although the character of the zones may have changed over time in modern-day Canada, it was found that the gradient pattern itself not only persists, but may have intensified as far as socio-economic status and family size are concerned. This persistence is attributed to the strong societal norm of owning a single-family detached dwelling and the development and maintenance of roadways which still make it worthwhile to commute to work in Canadian cities.

***Davies, W.K.D., and R.A. Murdie. (1991). "Consistency and Differential Impact in Urban Social Dimensionality: Intra-Urban Variations in the 24 Metropolitan Areas of Canada." *Urban Geography* 12(1): 55–79.**

Abstract: Relatively few factorial ecologies have explored either the consistency of the social dimensionality of urban areas in more than a few cities or the separation of city-specific from general effects. This study of almost 3,000 census tracts in all 24 Canadian metropolitan areas (CMAs) used 35 variables from 1981 census data to solve these problems. It shows there is a persistent similarity in six of the seven to nine dimensions found in separate analyses of three city size categories: over 1 million; 500,000 to 1 million; 100,000 to 500,000 people. From this basis a combined study of all the centers shows that 85% of the variability can be summarized by nine dimensions called Economic Status, Impoverishment, Ethnicity, Early and Late Family, Family/Age, Pre-Family, Non-Family, Housing, and Migrant Status. The evidence for several different family-related axes illustrates the increasing complexity of the social dimensionality of modern cities based on family differentiation. F-ratio values and Eta coefficients are used to show that all the first-order axes, except Migration and Ethnicity, have much greater variability within, rather than between the cities, demonstrating the general rather than the city-specific nature of these dimensions. An analysis of the highest scoring tracts on the axes demonstrates the way in which some CMAs have relatively high incidences of some of the characteristics, thereby identifying the particular characteristics of many centers.

***Davies, W.K.D., and R. Murdie. (1991). "Changes in the Intraurban Social Dimensionality of Canadian CMAs: 1981–1986." *Canadian Journal of Regional Science* 14 (2): 207–232.**

No abstract available

Davies, W.K.D., and R.A. Murdie. (1993). "Measuring the Social Ecology of Cities." In L.S. Bourne and D. Ley (eds.). *The Changing Social Geography of Canadian Cities* (pp. 52–75). Kingston and Montréal: McGill-Queen's University Press.

No abstract available

Davies, W.K.D., and R.A. Murdie. (1994). "The Social Complexity of Canadian Metropolitan Areas in 1986." In F. Frisken (ed.), *The Changing Canadian Metropolis: A Public Policy Perspective* (pp. 203–236). Berkeley and Toronto: Institute of Governmental Studies Press and Canadian Urban Institute.

No abstract available

Randall, J.E., and G. Viaud. (1994). "A Gender-Sensitive Urban Factorial Ecology: Male, Female, Grouped and Gendered Social Spaces in Saskatoon." *Urban Geography* 15 (8): 741–777.

Abstract: social, demographic, and economic changes related to gender have occurred within North American cities in the past generation. It is hypothesized that these changes may have led to the emergence of distinct male and female social spaces that have not been fully accommodated within the classical urban factorial ecologies. This paper compares and analyzes four gender-specific data bases (male-oriented, female-oriented, grouped, and gendered) through a series of four factorial ecologies for census tracts in the city of Saskatoon, Canada. It is discovered that, at an aggregate level of analysis, both male and female social spaces are similar when assessed in terms of the composition of the components, the saturation levels, the correlations between components, and the spatial distribution of the component scores. However, separation of gender into different data sets leads us to the conclusion that subtle gender-specific differences, formerly masked by classical factorial ecologies, are clarified by this gender-sensitive approach. These subtle distinctions also lead us to question the validity of the labels traditionally attached to the components in classical factorial ecologies.

Viaud, G.B. (1995). *Toward a Gender-Sensitive Interpretation of Urban Residential Areas: Empirical Analysis of Montreal and Saskatoon*. Unpublished PhD Dissertation. Saskatoon: University of Saskatchewan, Department of Geography.

Abstract: The purpose of this dissertation is to address the critique made by certain feminist and social geographers concerning the lack of "gender sensitivity" seen to characterize the interpretation of the social residential structures of urban residential areas. More specifically, the dissertation focuses on the multivariate factor ecological approach. The main goal is to assess whether or not a gender-sensitive interpretation of the social structure of the "regions" within cities can provide a more realistic portrait of the Canadian urban reality than is already provided in the current factor ecological literature. Two paths, one dealing with theoretical and methodological issues, and a second more empirical in focus, are followed. Results show that although

there exist gender differences between female and male social areas, these are only minor ones. The argument is made that feminists may have overlooked the importance of ecological processes in their critique of factorial ecology and overestimated the role of women in new patterns of social variation. A gender-sensitive interpretation of the social structure of the “regions” within cities, therefore, seems to add only few new insights to our understanding of the urban mosaic. Whether this is the direct result of a lack of spatial segregation of female characteristics within cities, or whether this is mostly due to a shortage of appropriate census data, is difficult to ascertain. The complexities of interrelationships between women and men in all facets of urban life make any attempts at distinguishing gender a complicated task.

***Morenoff, J.D., and M. Tienda. (1997). “Underclass Neighborhoods in Temporal and Ecological Perspective.” *Annals, AAPSS* 551 (May): 59–72.**

Abstract: This article places the growth of an urban underclass in the broader context of trends in inequality and the stratification of place in global cities. Using Chicago as a case study, we construct a multidimensional typology of urban neighborhoods to illuminate trends in the spatial distribution of opportunity, the impact of immigration on the city’s ecological structure, and modal patterns of neighborhood change. Our empirical analysis documents (1) the increasing spatial polarization of Chicago’s neighborhoods, fueled by a concentration of both affluence and socioeconomic disadvantage; (2) the erosion of working-class areas as an ecological category; (3) the emergence of Hispanic neighborhoods as a distinct ecological type; and (4) the existence of race-specific patterns of neighborhood upgrading. These trends have broader implications for the study of spatial inequality in advanced industrial cities.

Bourne, L.S., and A. Lorus. (1999). “How Similar are Urban Neighbourhoods in Canada? A Classification Based on External Environments.” *Canadian Journal of Urban Research* 8 (2): 143–171.

Abstract: For a long time, the differences and similarities among urban neighbourhoods in Canada have been the subject of research. The present article studies this question in examining certain characteristics of urban neighbourhoods using Census Tracts from Canadian CMAs for the years 1981 and 1991. The authors assert that three contextual environments are crucial in shaping the properties of urban sub-areas: (1) position in the urban system and the functional hierarchy of places, as measured by the size of the metropolitan area in which the sub-areas are located; (2) the region of the country; and (3) their relational situation with respect to ecological zones within their respective metropolitan areas. The study identifies the particular attributes that differentiate the neighbourhoods, separate from those of city of which they are a part. It then seeks to construct classifications using discriminant analysis. The study concludes that the Census Tracts differ systematically according to the size of the city and to the region, the neighbourhoods that are most distinctive being those in the largest cities, as well as those in Quebec and the Atlantic Provinces. The most pronounced differences, however, are found among the ecological zones in the heart of the metropolitan areas, the most characteristic neighbourhoods belonging to the central city and the newer suburbs. However, as time passes, the particular characteristics of the central city fade, while distinctions increase in former suburbs in decline.

***Baum, S., P. Mullins, R. Stimson, and K. O'Connor. (2002). "Communities of the Postindustrial City." *Urban Affairs Review* 37 (3): 322–357.**

Abstract: The authors discern the community structure of the postindustrial city, with reference to Australia. They focus empirically on three major types of Australian urban center: urban regions, metropolitan areas that are not part of urban regions, and other major cities. These three account for almost three-quarters of the Australian population. The authors draw on a conceptualization formulated by Marcuse and van Kempen to guide the analysis, with a combination of cluster analysis and discriminant analysis being applied to aggregate (essentially census) data to identify the communities. Nine major Australian urban communities are identified—four are affluent, four are disadvantaged, and one is a working-class community. The communities found, however, differed greatly from those cited in the Marcuse and van Kempen schema.

Baum, S. (2004). "Measuring Socio-economic Outcomes in Sydney: An Analysis of Census Data Using a General Deprivation Index." *Australasian Journal of Regional Studies* 10 (1): 105–133.

Abstract: The release of the ABS 2001 census data has allowed renewed analysis of the spatial patterns of social phenomena to be reviewed with up-to-date data. This paper adopts a methodology first outlined in Canadian studies to calculate several measures of deprivation across Sydney suburbs. The methodology uses principal components analysis and develops measures of deprivation across various socio-economic and demographic aspects. The paper also calculates a general deprivation index based on weighted factor scores. The analysis illustrates that significant spatial variations exist across different aspect of urban deprivation, but that generally urban deprivation is concentrated in the western suburbs of Sydney with smaller pockets in suburbs located in the inner-city and towards the New South Wales central coast. The analysis provides further support for the methodology and points to several avenues of future research.

***Baum, S. (2004). "The Socio-Spatial Structure of Australia's Metropolitan Regions." *Australasian Journal of Regional Studies* 10 (2): 157–179.**

Abstract: The release of the 2001 Census of Population and Housing by the Australia Bureau of Statistics provides an opportunity to update material relating to the social structure of Australian cities. Using multivariate statistical techniques this paper describes a typology of local areas across Australia's metropolitan regions focusing on how various social, demographic and economic factors can be used to differentiate between areas. Taking its lead from traditional social area analysis approaches, the paper identifies several factors which when combined help to explain the socio-spatial structure of Australia's metropolitan regions.

***Mikelbank, B. (2004). "A Typology of U.S. Suburban Places." *Housing Policy Debate* 15 (4): 935–964.**

Abstract: Suburbs are becoming increasingly diverse as they continue to comprise larger portions of the metropolitan population and employment. Former perceptions of suburban uniformity are being eroded by the variance in form and function that now characterizes them. This article analyzes data collected on 3,567 non-central-city, incorporated, metropolitan places in the United States along the dimensions of population, place, economy, and government. Specific-

ly, a hierarchical clustering procedure, combined with discriminant analysis, identifies 10 distinct types of suburbs in the data. Level, composition, and combinations of wealth, employment, and race drive the distinctions among suburban clusters, many of which do not fit our traditional characterizations of suburbia. In fact, only about half of all the suburbs considered are strongly characterized by these traditional traits, and these suburbs contain less than one out of every three residents considered in the analysis.

Baum, S. (2005). "Socio-economic Disadvantage in Post-Fordist Cities." *Social City* 15. Queensland, Australia: Griffith University Conference on the State of Australian Cities 2005.

Abstract: New national and international economic and social forces have reshaped national geographies in general and the characteristics of cities in particular, resulting in a range of diverse social and spatial outcomes. These outcomes, which include greater differentiation across, within and between metropolitan regions and cities, have become a feature of the economic and social forces associated with post-Fordist social structures. Within Australian cities clear divisions across socio-economic lines are seen to exist, and these divisions can be seen as being reflected in a number of measures of social malaise. The analysis presented in this paper sets up a typology of advantage and disadvantage across Australia's extended metropolitan regions and considers the way in which the broad patterns developed can be used to inform a greater understanding of disadvantage within Australian cities.

Baum, S., M. Haynes, Y. van Gellecum, and J. Hoon Han. (2006), "Advantage and Disadvantage across Australia's Extended Metropolitan Regions: A Typology of Socioeconomic Outcomes." *Urban Studies* 43 (9): 1549–1579.

Abstract: New national and international economic and social forces have reshaped national geographies in general and the characteristics of cities in particular, resulting in a range of diverse social and spatial outcomes. These outcomes, which include greater differentiation across, within and between cities has become a feature of the economic and social forces associated with post-Fordist social structures. Taking localities across Australia's metropolitan regions, this paper develops a typology of advantage and disadvantage using a model-based approach with clustering of data represented by a parameterised Gaussian mixture model and confidence intervals of the means providing a measure of differences between the clusters. The analysis finds seven clusters of localities that represent different aspects of the socio-spatial structure of the metropolitan regions studied.

Viaud, G. (2006). "Deux chantiers de l'écologie factorielle : le genre et les petites villes (Factorial ecology's two challenges: gender and small cities)." *Cahiers de géographie du Québec : revue internationale de géographie humaine* 50 (141): 303–309.

No abstract available

Baum, S. (2008). *Suburban Scars: Australian Cities and Socio-Economic Deprivation*. Research Paper 15. Queensland, Australia: Griffith University, Urban Research Program.

No abstract available

Institute of Urban Studies, Canada Research Chair in Urban Change and Adaptation, Rural and Small Town Institute (2008). *Community Distress: Towards a National Measure*. Winnipeg: University of Winnipeg.

Abstract: This report developed and tested a proposed Canadian Distress Index (CDI) model capable of exploring distress across and within Canadian cities. The proposed index is discussed in terms of its ability to inform policy making concerning Canada's urban centres. The report considers a community to be in distress when it displays significantly weaker social, economic, environmental, and physical attributes; and has insufficient internal resources and capacity to respond to those conditions. The report reviews the primary theories that explain and explore distress and are captured broadly within theories of neighbourhood change. It examined national and international precedents for measuring distress, which vary substantively in approach and application with the most comprehensive examples drawing on both qualitative and quantitative information sources. International measurements of urban distress were examined for their capacity to capture a national perspective. From this review it was determined that factor analysis would be a useful analytical tool. Twenty-four variables were drawn from the Census of Canada. Following a series of preliminary analytical steps, factor analysis was then used to develop the final models variables representing four domains comprising the Canadian distress index (CDI). Final weightings for each of the domains were proposed using statistical tests. The CDI model was then tested using 10 cities and 2,500 census tracts to produce rankings of the cities and census tracts for both their composite score and also how they ranked among the four domains. It was determined that the composite ranking provides a glimpse into relevant factors, but that a local context would be necessary to fully interpret the results. This might involve the review of more local qualitative data or opinions from local experts to help understand the local contributors to distress. The Index was found effective in comparing cities within tiers in the urban hierarchy, but less capable of comparing cities across tiers.

***Hanlon, B. (2009). "A Typology of Inner-Ring Suburbs: Class, Race, and Ethnicity in U.S. Suburbia." *City & Community* 8 (3): 221–246.**

Abstract: Inner-ring suburbs initially built in the postwar period and before have evolved into places with varied characteristics, assets, and problems. Analyzing a sample of 1,742 inner-ring suburbs nationwide, this article identifies five different types: "vulnerable"; "ethnic"; "lower income and mixed"; "old"; and "middle class." This typology indicates that inner-ring suburbs, often perceived as homogenous entities, are in fact places largely differentiated by issues of class, race, and ethnicity. As this article demonstrates, the identification of these different types of inner-ring suburbs reveals much about suburban transformation, stability, and decline in the United States.

Kitchen, P., and A. Williams. (2009). "Measuring Neighborhood Change in Saskatoon, Canada: A Geographic Analysis." *Urban Geography* 30 (3): 262–288.

Abstract: The majority of research on neighborhood change in Canada has followed a cross-sectional approach and has relied on census tracts as the basic unit of geography. Due to concerns over methodology and data comparability, very few studies have attempted a direct analysis of change. In response, this article presents a protocol for measuring neighborhood social change applied to Saskatoon, Canada and employs census data for neighborhoods that have

been officially designated by the city's Planning Department. Our study found that about half of Saskatoon's 58 neighborhoods experienced stability between 1991 and 2001. However, decline was just as likely to occur in middle- and high-socioeconomic status (SES) neighborhoods as in low-SES neighborhoods while improvement was more likely to occur in the low-SES group. A pronounced division was visible among low-SES neighborhoods, particularly in the city's core. The analysis also found that income, gender, and housing had a strong impact on neighborhood social change and inequality. Interpretation of the findings revealed that a number of factors ranging from local conditions to wider economic and policy shifts had an influence on changing conditions in Saskatoon's neighborhoods.

Robson, B., with K. Lymeropoulou and A. Rae. (2009). *A Typology of the Functional Roles of Deprived Neighbourhoods*. Manchester: Manchester University, Centre for Urban Policy Studies.

Abstract: This working paper discusses a typology which has been developed by Professor Brian Robson (with Kitty Lymeropoulou and Alasdair Rae), as part of the evaluation of the National Strategy for Neighbourhood Renewal (NSNR) undertaken for Communities and Local Government. The evaluation team, led by AMION Consulting, includes Pion Economics and the Centre for Urban Policy Studies. The purpose of the typology is to understand better the different functional roles that deprived neighbourhoods play in their wider locality. This is important when plans are being developed to improve the attractiveness of deprived neighbourhoods and the circumstances of their residents. Since all local authorities have been tasked with improving their deprived neighbourhoods as part of the report of the Sub-National Review of Economic Development and Regeneration (HMT, BERR, Communities and Local Government, 2007), this typology should be of interest to all local authorities and members of Local Strategic Partnerships. The typology was used by officials in Communities and Local Government when they were developing their thinking for the Regeneration Framework (Communities and Local Government, 2008). The final evaluation report for the NSNR is expected to be published by the Department in 2009.

Baum, S. (2010). "Space and Place: Social Exclusion in Australia's Suburban Heartlands." *Urban Policy and Research* 28 (2): 135–159.

Abstract: As a prolonged period of Australian prosperity ends, attention has now begun to turn to the likely impacts of a severe economic downturn. The pain of recession is unlikely to be evenly distributed across the population or across space. Not that the previous economic good fortune was evenly spread across society. It is, therefore, expected that a new layer of socio-economic stress will be laid over existing patterns of social and spatial disparity. In this context, questions of deprivation and social exclusion are an important ongoing concern. Deprivation and social exclusion are operative at a number of levels of society. Neo-liberal thought and policy has been directed at the level of the individual. However, space and place are also important, as spatially concentrated disadvantage has structural consequences for both individual fortunes and the broader social fabric. This article considers the spatial distribution of disadvantage across our major metropolitan regions and considers potential approaches to address social exclusion in our suburban heartlands.

***Hulchanski, D. et al. (2011). *Toronto's City #3: A Profile of Four Groups of Neighbourhoods. (A Supplement to the "Three Cities of Toronto" Analysis of Trends, focused on City #3, the 40% of the City's Neighbourhoods with the Lowest Incomes)*. Toronto: University of Toronto, Cities Centre.**

Abstract: This document provides maps, charts and a detailed table of demographic characteristics of four groups of neighbourhoods in City #3, the approximately 40% of Toronto's census tracts that have experienced a sharp decline in average individual income over the past 35 years. It is based on a statistical analysis (K-means cluster analysis) using a set of 31 socio-economic and demographic features. This analysis resulted in the division of City #3's 206 census tracts into four fairly distinct groups of census tracts. This is a supplement to the report: J.D. Hulchanski, *The Three Cities within Toronto: Income Polarization among Toronto's Neighbourhoods, 1970–2005*, University of Toronto, Cities Centre, 2011. Available at www.NeighbourhoodChange.ca

***Mikelbank, B.A. (2011). "Neighborhood Déjà Vu: Classification in Metropolitan Cleveland, 1970-2000." *Urban Geography* 32 (3): 317–333.**

Abstract: The classification of 40 years of neighborhood data for the Cleveland, OH, region reveals five types of neighborhoods—*Struggling, Struggling African American, Stability, New Starts, and Suburbia*. The way in which these neighborhoods appear, disappear, and reappear in different locations throughout the region and throughout the study period gives rise to the term *neighborhood déjà vu*. It aptly describes how a changing neighborhood may seem to transition to something entirely different, but in reality is simply becoming another established type of neighborhood. Cluster analysis acts upon demographic, economic, and housing data for census tracts from 1970, 1980, 1990, and 2000 to identify these neighborhood types. What makes this analysis unique is that the clustering procedure operates on each tract in each of the census years. Thus, each neighborhood is treated as four individual observations: one for each of the census years. By defining each variable relative to its census year mean, the data are comparable across census years, allowing for neighborhoods of one time period to cluster with neighborhoods from another time period. Thus, the five neighborhood types are spread not only throughout the region, but also throughout the study period. This yields the ability to trace through time and space the rise (or fall) or concentration (or diffusion) of any of the resulting neighborhoods. Of particular concern is that spatially, traditional *Suburbia* neighborhoods are migrating farther and farther from the urban core, and that numerically, they are disappearing from the region altogether – as of 2000, only 55% of 1970s *Suburbia* neighborhoods remained.

Reibel, M., and M. Regelson. (2011). "Neighborhood Racial and Ethnic Change: The Time Dimension in Segregation." *Urban Geography* 32 (3): 360–382.

Abstract: This nationwide study of neighborhood racial and ethnic transitions examines the varieties and dynamics of U.S. neighborhood change between 1990 and 2000. The authors use innovative and robust cluster analysis techniques to classify U.S. census tracts in the 50 largest metropolitan areas. We interpret the resulting clusters according to their central tendencies and explore inter-metropolitan and regional patterns in relative cluster frequencies. Finally, we estimate multilevel logistic regression models of the covariates of cluster membership. We conclude that within cities, trends toward greater and potentially stable diversity in some neighbor-

hoods co-exist with continuing White flight and re-segregation in other local areas. Further, at both the metropolitan and neighborhood levels increasing diversity is associated with the significant presence of multiple minorities, while White flight and re-segregation are associated with the rapid growth of either Blacks or Hispanics. This variability in transition outcomes can at least in part be attributed to demographic structure at the metropolitan scale and to the distance from established minority enclaves of the neighborhoods themselves.

***Vicino, T.J., B. Hanlon, and J.R. Short. (2011). "A Typology of Urban Immigrant Neighborhoods." *Urban Geography* 32 (3): 383–405.**

Abstract: Using census data from 2000, the authors examine differentiation among urban immigrant neighborhoods in a sample of U.S. metropolitan areas. They use principal components analysis (PCA) followed by cluster analysis to identify four types of urban immigrant neighborhoods: Hispanic, White Working Class, Asian, and Gentrified. This typology describes the diversity of immigrant populations and immigrant neighborhoods across the urban U.S.

McGuire, L. (2012). *The Ten Cities of Toronto: Patterns of Socio-Economic Inequality and Polarization Throughout the Toronto Census Metropolitan Area*. Unpublished Master's Thesis, Department of Geography, University of British Columbia.

Abstract: The Greater Toronto Area (GTA), Canada's largest urban region, is currently facing a strenuous experience of inequality and polarization. In the contexts of social, political, and economic landscapes, the Toronto region is becoming increasingly defined by a spatial divergence of social classes, a divergence that threatens the ability of many citizens to access the resources their wealthier neighbours enjoy. In the context of an increasingly unequal urban landscape, this thesis employs a critical quantitative and theoretical approach to explore the Greater Toronto Area, home to more than six million people. Following an introduction to the issues facing the GTA, chapter two explores the mechanics of a capitalist housing market, and examines the effects of a neoliberal urban governance strategy on the city. Chapter three outlines a multidimensional quantitative methodology to explore the presence of social inequality and polarization, whereby chapter four introduces a taxonomy of neighbourhoods, materializing social divides through the domains of housing, citizenship, wealth, and labour. Critical to this examination is the exploration of the gentrifying downtown, the declining inner suburbs, and the rapidly expanding outer suburbs. The fifth chapter more closely examines the relationship between immigration and housing in the GTA, mapping and analyzing the relationships between new residents and housing affordability stress. The results deepen an understanding of social inequality in the GTA, spatializing divisions between immigrant groups as they navigate the turbulent housing market. Finally, the thesis reflects on the challenges facing Canada's largest urban region, arguing for new conceptualizations of our urban areas, and new conversations about urban housing strategies. These arguments strive to set a context for new urban governance strategies grounded in an interest of truly just and equal cities for all residents, challenging the existing social divisions that divide our cities today.

Owens, A. (2012). "Neighborhoods on the Rise: A Typology of Neighborhoods Experiencing Socioeconomic Ascent." *City & Community* 11 (4): 345–369.

Abstract: Neighborhoods are an important source of inequality, and neighborhood change may lead to changing opportunities for residents. Past research on neighborhood upgrading tends to focus on one process: gentrification. I argue that a broader range of types of neighborhood socioeconomic ascent requires examination. This article documents the different types of neighborhoods ascending from 1970 to the present. Using principal components analysis and cluster analysis, I report the prevalence of socioeconomic ascent, based on increases in neighborhood income, rents, house values, and educational and occupational attainment, among five to seven types of neighborhoods in each decade. I also examine population and housing changes that co-occur with ascent to identify processes of ascent beyond gentrification. Overall, findings suggest mixed implications for neighborhood inequality. While white suburban neighborhoods make up the bulk of neighborhoods that ascend in each decade, minority and immigrant neighborhoods become increasingly likely to ascend over time, though displacement may occur.

Séguin, A-M., P. Apparicio, and M. Riva. (2012). "Identifying, Mapping and Modelling Trajectories of Poverty at the Neighbourhood Level: The Case of Montréal, 1986–2006." *Applied Geography* 35: 265–274.

Abstract: Longitudinal analysis is rarely leveraged in the field of geography to understand neighbourhood change despite many studies documenting important transformations within metropolitan areas (e.g., gentrification, impoverishment of inner suburbs, etc.). This paper aims to identify and model trajectories of neighbourhood poverty in Montreal over five consecutive census years (1986, 1991, 1996, 2001 and 2006), using Latent Class Growth Modelling. Neighbourhoods are classified in eight groups, identifying those with stable, increasing or declining trajectories of poverty. Multinomial logistic regression analysis shows that the proportion of residents with low levels of education, unemployment rate, proportion of recent immigrants and the proportion of renters measured at the beginning of the period (1986) are important predictors of poverty trajectories, as are variations throughout the study period (1986 to 2006) in the proportions of recent immigrants and of residents with low levels of education..

3. Detailed Review of Selected Items from the Bibliography

Perle, E. (1982/3). "Ecology of Urban Change – An American Example." *Urban Ecology* 7: 307–324.

Objective

This paper provides an early insight on social ecology and urban ecological structure. It focuses on system change by comparing cross-sections over time with findings derived from the direct analysis of change matrices. The author hypothesizes that the first approach, which is already well studied, should provide empirical evidence consistent with existing theory, while the second approach, which is less well understood, should provide a second set of perspectives on social system change. Perle predicts that while the two sets of perspectives are related, they are expected to provide different results.

Methodology

Empirical content is provided by analyzing a consistent 43 variable set for the census tracts of Detroit for 1960 and 1970. In addition, the same variable set is constructed to represent change over the decade and then analyzed for the identification of change dimensions. The variables were designed after earlier studies to provide meaningful comparison and represent a reasonably stable ecological basis. The variables were transformed to common logarithms prior to the various analyses, though the author does not specify why he chose this method. The variables for both period of analysis were also analyzed using an oblique biquartimin rotation.

1960 and 1970 Variables

- Demographic: Median age of inhabitants; percent of population less than 18 years of age; percent of population 65 years of age or more
- Education: Median school years completed; percent of population completing no school through some high school; percent of population completing four or more years of college
- Racial and ethnic: Black location quotient ("Negro" in the variable list reflecting a different terminology at the time); percent of population foreign stock; Polish location quotient; Italian location quotient

- Marital status: Percent of husband-wife families; percent of population widowed, separated or divorced
- Household and family: Percent of families with own children 6 years of age or less; percent of families with annual incomes less than \$4,000; Percent of families with annual incomes of \$25,000 or more; median income of families; percent of housing units overcrowded (more than 1.01 persons/room); percent of housing units with no automobile; percent of housing units with two automobiles; median number of persons per housing unit.
- Employment: Percent of employed using private auto in the journey to work; unemployed location quotient; percent of females in the labour force; percent of married females in the labour force; percent of employed in professional, technical or management occupations; percent employed that are craftsmen, foremen or operatives; percent employed as private household or related service workers; percent employed in manufacturing industries; percent employed in service industries.
- Housing: Percent of housing units owner occupied; percent of housing units renter occupied; percent of non-white owner occupied housing units; percent of non-white renter occupied housing units; percent of housing units with no or shared bathroom; percent of housing units with one or more bathrooms; percent of housing units lacking plumbing facilities; percent of housing units built prior to 1940, percent of housing units built between 1950 and 1960; percent of housing units built between 1960 and 1970 (added variable for 1970); median gross rent of renter occupied housing; percent of housing units single family detached; median value of owner occupied housing.
- Mobility: Percent of housing units into which present residents moved 0-2 years ago; Percent of housing units into which present residents moved over 20 years ago.

Findings

Ecological structure 1960

- The 1960 data matrix contained 459 observations (census tracts) representing the City of Detroit, and the enclaves of Highland Park and Hamtramck.
- Factor analysis of the 459 x 42 matrix yielded six dimensions with eigenvalues ≥ 1 , jointly accounting for 78.3 percent of the total common variance. Thirty-three of the 42 variables display communalities ≥ 0.7 and communalities < 0.5 occur for only four variables.
- The 1960 ecological structure corresponded reasonably well with the theoretical concepts of expected social differentiation. It was noted that residents are older, have low skill employment and residential stability.
- The author found the separation of residential stability and older housing stock from family status, socioeconomic status, and older residents a bit puzzling.

Ecological structure 1970

- In 1970 Detroit, Highland Park and Hamtramck were represented by 444 census tracts. Most of the tracts were identical to those of 1960.
- Factor analyses of the 444 x 43 data matrix produced six dimensions with eigenvalues ≥ 1 , jointly accounting for 70.19% of the total common variance. Communalities of ≥ 0.7 and < 0.5 appear only in five instances.

- The author reports that the six-dimensional basis for 1970 describes the structure of the 43 variables rather well.
- As was expected in the findings, the triad of family status, socioeconomic status and ethnicity/segregation appear. Housing value was associated with SES, housing type and family status, while housing condition was not associated with race and ethnicity. Housing type and housing condition were both associated with family.
- Segregation is primarily defined in terms of race, residence, and some occupational stratification; incomes, housing conditions, family characteristics, and education were excluded from this dichotomy.
- Female labour force participation, as expected, was integral to the family status concept and was found to be independent of other dimensions.

Ecological Structures Compared

- For 1960, the oblique biquartimin rotation showed evidence that ethnicity/segregation and low skill employment are related to family status and that residential stability is related to older residents.
- Residential stability and older housing stock was correlated with older residents. There were modest inter-correlations of ethnicity/segregation and low skill employment with family status, which is a unique situation attributable to the particular characteristics of the labour market.
- Though a six-dimensional orthogonal basis has been derived for 1960, the factor inter-correlations indicate that maybe only four or five dimensions are truly orthogonal.
- For 1970, all factor inter-correlations resulting from an oblique biquartimin rotation are small, except for the relationship between female labour force participation and value of housing stock. There is an inverse relationship with female labour force participation, which is dominated by married females in two-earner households.
- Ecological structure is substantially different and more complex in 1970 than in 1960. For example, ethnicity/segregation was more important in 1970 than 1960 (blacks moved from the CBD to other parts of the city), female labour force participation became an independent dimension, and the age continuum dimension covered the entire distribution whereas a decade ago it focused on the elderly.
- The emergence of female labour force participation, particularly married females as an orthogonal dimension is significant.

Relative Change Analysis

- The 42 variables used in the 1960 ecological analysis were used again for the relative change analysis. Each variable was represented by dividing the standardized values for 1970 by 1960. Thus, derived values greater than unity indicate that the variable took on larger magnitudes in 1970 than in 1960, values less than unity indicate decreased magnitudes over the decade and values equal to unity indicate no change.
- The low values for housing and employment variables, and larger values for household and family demographics demonstrate that housing stock and employment structure represent forms of relative stability over a decade.
- The first factor of the relative change analysis identifies increases related to residents and their personal characteristics, including an increase in nuclear families with multiple auto-

mobiles and young children and blue-collar occupations, which is attributable to neighbourhood renewal of residential areas near the CBD.

- The second factor represents neighbourhood succession (i.e., older age whites leaving areas being occupied by blacks with large families).
- The third factor shows expansion and growth of Black neighbourhoods identified with uncoupled families, working wives, low-skill occupations and young children.
- The fourth factor is related to education and housing quality, which shows change due to immigration and renewal as some of the poorest areas of the city were eliminated over the decade. The last dimension shows increasing disparity between the wealthy and the poor. The five-dimensional basis for the relative change analysis is truly orthogonal.

Evaluation

This study shows the emergence of post-industrial city patterns through analysis of cross-sectional findings and change dimensions. These two approaches provide differing perspectives on the nature of urban system modification and shed light on a pattern emerging in Detroit, comparable to other major North American cities during that time frame. It was also one of the earliest studies to compare change dimensions with structure dimensions for the same set of variables.

Le Bourdais, C., and M. Beaudry. (1988). "The Changing Residential Structure of Montréal 1971–81." *The Canadian Geographer* 32 (2): 98–113.

Objective

The paper aims to identify the main factors describing the residential geography of Montréal and to determine whether these factors vary – or remain stable – through time. The first part of the paper examines the residential structure of the Montréal metropolitan region in 1971 and 1981 by conducting two separate factorial analyses based on census data. The second part of the paper is based on a factor analysis of change indices established by combining the 1971 and 1981 data sets to study the structure of relative change between 1971 and 1981.

Methodology

The analysis is based on the 1971 and 1981 census tract data from the Montréal Census Metropolitan Area (CMA). Many of the variables selected were from previous studies, particularly Foggin and Polèse (1977), who developed an analysis of Montréal's residential structure in 1971. This study uses 59 variables in 1971 and 60 in 1981. The factor analysis is based on 561 census tracts in 1971 and 654 in 1981. The factor analysis of these data led to the extraction of six factors, accounting for 80.2% and 78.0% of the total variance found among variables in 1971 and 1981. These factors identify three dimensions, namely, family, socioeconomic and ethnic.

Variables Retained

- Percent of total population aged: 0–4; 5–9; 10–14; 15–19; (20–24)*; 25–34; 35–44; 45–54; 55–64; 65 and over

- Percent of population 15 years and over: Single; married; widowed; (separated and divorced); percent of 15-24 years married or living in couples
- Percent of households containing: Husband-wife, one family; single parent, one family; multiple families; (no family)
- Percent of households with: 1 person; 2 persons; (3 persons); 4 persons; 5 persons and over
- Percent of households who: Own their dwelling; (rent their dwelling)
- Percent of occupied private dwellings that are: Single detached; (other types)
- Percent of occupied private dwellings with: 1-3 rooms; 4 rooms; (5 rooms); 6 rooms and over
- Percent of population 15 years and over with: Elementary education; high school education; (post-secondary education); university education
- Rates (percent) of population 15 years and over: Male participation rate; female participation rate
- Percent of experienced labour force working in: Direction and administration; professional work; clerical work; sales; service; manufacturing; construction and transportation; (primary and non-classified)
- Percent of population 15 years and over with personal income: Under \$4,000 (under \$10,000); (\$4,000–5,999) (\$10,000–14,999); \$6,000–9,999 (\$15,000–24,999); \$10,000 and over (\$25,000 and over)
- Percent of families with a total income: Under \$2,000 (under \$5,000); \$2,000–3,999 (\$5,000–9,999); \$4,000–5,999 (\$10,000–14,999); \$6,000–9,999 (\$15,000–24,999); \$10,000–14,999 (\$25,000–34,999); \$15,000 and over (\$35,000 and over)
- Percent of total population born in: Québec; elsewhere in Canada; United Kingdom; (elsewhere)
- Percent of total population by mother-tongue: English; French; (other)
- Percent of total population by ethnic group: British; French; Italian; Dutch and Scandinavian; (other)
- Percent of immigrant population by year of arrival: before 1945; (1945-71); 1972-81 (added in 1981).

* The categories in parentheses refer to the variables omitted from the analysis in order to avoid a closed-number system (all percentages summing to 100).

Findings

Montreal's Residential Structure in 1971 and 1981

- The dimensions describing Montréal's residential patterns in 1981 are quite similar to those observed in 1971. The separate analyses have shown that the three basic dimensions (family, socioeconomic, and ethnic) identified in urban ecology are still important factors in structuring urban space.
- Direct comparison of the two factor-loading matrices indicates a general pattern of aging between 1971 and 1981, similar to most other industrial countries. Also, the two-year analysis revealed that single-parent families were no longer associated with older family tracts in 1981; there were also more single-parent families in the 1970s due to more liberal divorce

laws, which led to single-parent families being more evenly distributed across the CMA as younger families located in central zones near jobs and services.

Changes in Residential Structure in 1971 and 1981

- The factor analysis applied to the data led to the extraction of 6 factors that account for 54.6 percent of the total variation among variables.
- 23 variables have communalities less than 0.5 and 9 have communalities under 0.3.
- Larger communalities were found mostly among the demographic and family variables as well as among the ethnic variables
- The family dimension opposed “upper-class” and “blue-collar” neighbourhoods, and the second “white-collar” and “lower-class” tracts
- The ethnic dimension differentiated urban space along a linguistic component (French and English neighbourhoods) as well as along an immigrant component (native and immigrant).
- The increasing dispersal of low-income immigrants in Montréal is largely related to gentrification in the inner city.

Evaluation

The study is an early example of the use of factor analysis to understand residential structure and change. It provides a useful example of utilizing variables over two time periods to complete a direct analysis of change. It also shows patterns of change in Montréal from 1971 to 1981, which could be used for comparison in future research.

Davies, W.K.D., and R.A. Murdie. (1991). “Consistency and Differential Impact in Urban Social Dimensionality: Intra-Urban Variations in the 24 Metropolitan Areas of Canada.” *Urban Geography* 12 (1): 55–79.

Objective

This is one of the earlier studies exploring the consistency of the social dimensionality of urban areas. The analysis was based on the 1981 census, combining data for nearly 3,000 census tracts in all 24 Canadian metropolitan areas (CMAs). The study aims to advance the methodology from the 1960s and 1970s particularly related to the use of single variable methods to measure social dimensionality as well as address three main issues: (1) identify new urban patterns of social differentiation, particularly linked to family life, in a multivariate context; (2) determine the extent to which there is consistency in the dimensions across a set of cities in a nation and across city-size variations; and (3) determine whether there is consistency in the incidence of the dimensions in each CMA.

Methodology

The study utilized the factorial method identified by Davies (1984: 202–203) and combined nearly all 3,000 census tracts of Canadian metropolitan areas (CMAs) into a single data matrix. The data set consisted of 35 variables derived from census information available for all 24 CMAs. Each variable was considered to be representative of 14 possible dimensions defined on the basis of previous findings as well as observed social changes since the 1950s. The standard Shevky and Bell (1955) axes of Economic Status, Family Status, and Ethnicity to-

gether with McElrath's (1968) and Timm's (1971) addition of Migration Status were included as well as variables from other studies including Pre-Family, Late Family, Substandardness, and Housing or Growth. Since family changes were anticipated in this analysis, a separate Age dimension as well as Young and Completed family dimensions were added. Since all CMAs were studied together, each census tract in Canada was measured on a common metric to see if there were city specific differences in the incidence of factor scores.

Two to four variables were used to index each hypothesized dimension. A deliberate decision was made to focus on family-related variables since family and household changes were hypothesized as a major source of change during the postwar period. In order to keep the analysis manageable, only three ethnic and place of birth variables were included (those of French origin, those of all other ethnic groups except British and French, and those who were born outside Canada).

All indicators were calculated as either percentage or ratio values and closed numbers were avoided. In order to evaluate city-size differences four separate studies were conducted: Big Metropolitan centres (Montréal, Toronto, Vancouver); Medium Metropolitan centres (six centres with 500,000 to one million people); Small Metropolitan centres (15 centres with 100,000 to 500,000) and All Metropolitan centres (all 24 CMAs).

Principal Axes component analysis was applied to all four data sets followed by both Varimax and Direct Oblimin ($\delta = 0$) rotations.

Variables/Indicators

- Age: percent of population 0-14 years, percent of population over 65 years
- Family: Average number of persons per family; percent of husband and wife families
- Pre-family: percent of adults 18-24 years; percent adults never married, female participation rate in the labour force.
- Young family: percent children <6 years old at home; percent adults 25-34 years
- Late family: 18-24 years living at home as percent of children, percent adults 45-54 years
- Completed family: percent adults 55-64 years; percent families without children at home
- Non-family: percent husband/wife families without children; non-family/family ratio
- Family breakdown: percent of families with only female parent; divorced/married adults ratio
- Socio-economic: Census families with income >\$40,000; percent of males in managerial occupations; percent males in industry/ construction occupations; percent census families with low income i.e., <\$7,150 per person in metropolitan area.
- Substandardness: Rate of male unemployed; percent of dwellings needing minor and major repairs
- Educational attainment: percent degree holders; percent with Grade 9 education or below
- Migrant: Median time within residence; percent migrants moving within census tract within last five years; percent of migrants moving (5 years) between provinces within last 5 years; percent population moved residence within last 5 years.
- Housing: percent under a decade old; percent renting accommodation; percent living in apartments
- Ethnicity: percent of French origin; percent of non-British/French origin; percent born outside Canada

Findings

- For all CMAs, the results indicate that 85% of the variability in the original 35 variables can be summarized by nine dimensions: economic status, impoverishment, ethnicity, early and late family, family/age, pre-family, housing and migrant status.
- For the analyses by size of centre, the Big Metropolitan analysis accounted for 87% of the original variance over nine factors. All variables had communalities over 0.75.
- The Medium Metropolitan and Small Metropolitan analyses for which seven axes were extracted accounted for 85% and 81% of the variance, respectively.
- The results indicate a persistent similarity in six of the seven to nine dimensions found in separate analyses of the three city size categories: over 1 million, 500,000 to 1 million, and 100,000 to 500,000 people.
- F-value ratios and Eta coefficient calculations show that all the factors, except Migration and Ethnicity, have much greater variability within, rather than between the cities.

Big Metropolitan Results: Major factors

- Economic Status shows high and low social class separation.
- An Ethnicity factor separates persons of French origin from the non-British and immigrants.
- Family and Age shows separation of the older age and completed family variables.
- Early and Late Family factor indicates that the traditional age and family axis is no longer sufficient to define the social complexity of these Canadian CMAs.
- Impoverishment reflects a growing sector of disadvantaged members of society linked to low income, renters and apartment living and female single parents.
- Migrant status is an important feature of Canadian cities linked to long-distance migrants compared to those moving within census tracts.
- Housing separates tracts with poorer housing and units needing repair from newer housing.

Medium and Small Metropolitan Results

Most loadings are similar to the Big Metropolitan analysis with two main differences:

- Combination of the Non-family and the Family-Age factors in producing a general family status vector separating old age and non-family from young families and children.
- An absence of a clear Migrant factor where variables associated with the axis are linked with the Housing Vector.

All Metropolitan Area Analysis

- A nine-factor model accounting for 86% of the variance was evaluated. The interpretation was similar to the nine factors identified in the Big Metropolitan analysis.
- A factor analysis was undertaken using correlations between the nine factors. The results produce a five-factor solution accounting for 84.3% of the correlations between the initial nine factors.
- The results show how old age, completed family, impoverishment and non-family are all intimately related at this higher level of generalization
- At the most general level, the higher order results appear to confirm the importance of McElrath's (1968) modification of the traditional Shevky-Bell (1955) dimensions.

Social Variations between the CMAs

- Score weights were defined as factor loadings for all variables with loadings $\geq +5$ or ≤ -5 with the further restrictions that a variable be selected for only one factor and that a variable not be used to define any factor if its second highest loading was within 0.1 of the first.
- The F-ratio approach and Eta-values distribution of the highest and lowest scoring tracts on each factor were used.
- Ethnicity and Migrant status have relatively high F-ratio and Eta values and thereby exhibit considerable variation between the CMAs.
- For all other factors, the variations between the census tracts within CMAs are large enough to outweigh the differences between centres.
- There is a high degree of consistency between the results of the analyses carried out at three different city size scales, though the big metropolitan centres displayed more complex social structures
- A number of factors in addition to the standard three or four factors of early factorial ecologies should be recognized as important sources of differentiation.

Evaluation

The study has shown that it is possible to provide a comparative measurement of all census tracts in a complete population of CMAs. The separate analyses by size of CMA show that there is still more consistency than differences in the three factorial results, confirming that multivariate analysis can produce useful results. The authors recommend that future research involve the addition of more detailed variables, particularly related to occupation or gender differences. Also, more research should examine earlier work to trace the details of metropolitan area changes through time.

Davies, W.K.D., and R. Murdie. (1991). "Changes in the Intraurban Social Dimensionality of Canadian CMAs: 1981–1986." *Canadian Journal of Regional Science* 14 (2): 207–232.

Objective

The study contributes to the understanding of social differentiation within Canadian CMAs in three ways: (1) it provides a conceptual background to the analysis of census tract change in methodological terms; (2) it contributes to the quantitative literature on the social geography of Western cities by applying multivariate methods to census data (1986) for all census tracts in all 25 Canadian CMAs and compares the results to a parallel study carried out on 1981 data; and (3) it summarizes the extent to which the dimensions have a differential impact among CMAs with regard to major location-specific variations but also according to variations between 1981 and 1986.

Methodology

This study is based on a joint analysis of 36 variables from the 1986 Canadian census by census tract for 25 metropolitan areas. These variables were selected based on previous factorial ecologies as well as speculations about socio-demographic changes in urban areas.

The objective was to measure the socio-spatial complexity of the 25 metropolitan areas. The analysis included all census tracts over 150 population and/or 50 households. In total, 3,448 tracts were used with an average population of 4,392 inhabitants.

Pearson product moment correlation coefficients were calculated for each pair of variables, followed by principal axes component analysis. The final solutions used the oblique rotation method, using the direct oblimin technique with gamma at 0.0 to ensure compatibility with the 1981 results. The eleven-axis solution accounted for 88.1 percent of the original variance in the 1986 data set in which the communalities for all variables were greater than 0.75.

Component scores were calculated for all census tracts for all centres using the approximation method described by Murdie (1980) rather than the traditional regression method.

Variables/Indicators

- Age: Percent of population 0-14 years, percent of population over 65 years
- Family: Average number of persons per family; percent of husband and wife families
- young adult/pre-family: percent of population 20-24 years; percent of families in labour force
- Early family: Percent of children at home <6 years old; percent of population 25–34 years
- Late family: Percent of population 45-54 years; percent of children at home 18–24 years
- Completed family: Percent of population 55-64 years; percent of husband and wife families without children at home
- Non-family: Ratio of non-family to family persons; percent of families without children; percent of adults never married
- Family breakdown: Percent of families with female parent; ratio of divorced to married adults
- Economic status: Median household income (percent of households with annual income of \$40,000 or more); percent of employed males in managerial occupations; percent employed males in primary/ industry/ construction occupations; percent of employed females in clerical occupations
- Impoverishment: Percent of economic families with low income as defined by Statistics Canada; percent of males in labour force unemployed; (percent of dwellings needing repair)
- Educational attainment: Percent of degree holders; percent with less than Grade 9 education
- Migration: (Median length of occupancy of home); percent of population changing residence in last five years; percent of movers moving within census subdivision; percent of movers moving from different province
- Housing: Percent of dwellings constructed in previous decade; percent of dwellings constructed before 1946; percent of dwellings rented; percent of dwellings in apartment blocks of 5 or more stories (percent of dwellings that are apartments)
- Ethnicity: Percent of population of French origin; percent of non-British / non-French origin; percent of population born outside Canada
- Female: Average female income; percent of females in labour force unemployed

Findings***Factor Dimensions***

- The results are similar enough to the earlier study to confirm the basic social dimensionality of the metropolitan census tracts of Canada.
- The persistence of migrant and housing dimensions provides minor additional axes of differentiation. An important change to earlier literature lies in the division of the former unitary family dimension, producing four separate family factors, including a low-income, single-parent family factor.
- A gender axis was found in 1986, indicating that gender variations can be considered major sources of variation in their own right.
- The economic status sector was one of the strongest, which showed high positive loadings for males in managerial occupations, people with a university education and high female income. They were similar to those in 1981, but the addition of the new female income variable should be noted.
- The impoverishment factor shows that Canadian census tracts do not have a single scale of prosperity. The ethnic component showed two dimensions.
- Very few people of French origin or low education migrated between the provinces between 1981 and 1986.
- The family and age axis consists of positive loadings for children and persons-per-family variables and negative ones for old age, completed family, and apartment indicators.
- Strong variable loadings were also found in the non-family factor. All of the variables are higher indicating the intensification of this character, except for the single persons variable (due to divorce rates).
- The results suggest that the social complexity of Canadian metropolitan areas is greater than indicated by the traditional three-axis model of Shevky and Bell (1955).

Differential Impact of the Dimensions

- The presence of distinctive factorial dimensions stems from a two-stage process: one produced by a societal influence and the other derived from an ecological or geographical effect, in which people with these characteristics are concentrated into census tracts.
- The ETA2 statistic was used to measure the degree of between city variation in factor scores compared to within-city variation.
- The ethnicity factor displays high city-specific variations in 1986, as indicated by the high ETA2 score (0.62) – the highest of the 11 factors, which is partly related to the francophone population in the Quebec CMAs. All other values, except long-distance movers are small.
- The differences in ETA2 values between 1981 and 1986 were minor. Correlation coefficients calculated between the percentage of tracts in the top and bottom quintiles for each axis over the 24 comparable cities and nine factors in 1981 and 1986 showed that 9 out of 18 paired comparisons had correlation coefficients over 0.9 and another six were over 0.75. Only the long-distance mover and young-adult factors show more than a 5 percent difference in values between the two dates.
- The results confirmed that social differentiation in Canadian CMAs can no longer be compared to the traditional dimensions identified for the post–Second World War city by social area analysis (Shevky and Bell, 1955).

Evaluation

This study provides a basic profile of the social dimensionality of Canadian metropolitan areas. The article also shows the extent to which the major dimensions have a differential impact in the various CMAs. The important change compared to earlier literature is that the former unitary family status dimension has devolved into four separate axes, showing how the Shevky and Bell three-axis model has become obsolete. The authors recommend future empirical work in this area to investigate spatial variations of the scores within the centres and to carry out longer temporal investigations of change in order to determine the dynamic evolution of the social dimensionality of Canadian cities.

Morenoff, J. D., and M. Tienda. (1997). "Underclass Neighborhoods in Temporal and Ecological Perspective." *Annals, AAPSS* 551 (May): 59–72.

Objective

This article examines the growth of the urban underclass in the broader context of trends in inequality and the stratification of place in global cities. Using Chicago as a case study, the authors construct a multidimensional typology of urban neighborhoods to address three issues/goals: (1) to examine changes in Chicago's ecological structure; (2) to analyze the patterns of neighbourhood change that undergird transformations in that structure; (3) to understand the implications of this ecological change for different racial and ethnic groups.

Methodology

The authors changed the earlier approach of neighbourhood classification, which would rank neighbourhoods with poverty rates over 40% as "ghetto poor," rates of 20 to 40% as "poor," and those with poverty rates under 20% as "non-poor." Since this approach tends to focus on the poorest neighbourhoods, imposes arbitrary cut-off points, and neglects other socio-demographic dimensions that shape neighbourhood trajectories, the authors devised a strategy that allows ecological categories across a multidimensional array of empirically observed neighbourhood change. The paper incorporated a cluster analysis of 825 Chicago census tracts for 1970, 1980, and 1990 with a set of 10 variables, which included:

- Rates of poverty
- Public assistance
- Unemployment
- College graduates
- White-collar workers
- Female-headed families
- Owner occupancy
- Residence in the same house for at least five years
- Age structure: residents aged 17 and younger and aged 75 and older

These variables were analyzed using a cluster analysis to group census tracts into broader categories.

Findings

The cluster analysis yields a fourfold typology of Chicago neighbourhoods from 1970 to 1990 with the following four categories:

- Stable middle class neighbourhoods: aging populations, tend to have a high socioeconomic status, moderate number of college graduates and white collar workers, as well as a high rate of owner occupancy and residential stability. This group diminished in size over time, from 41% in 1970 to 34% in 1990.
- Gentrifying yuppie neighbourhoods: relatively high socioeconomic status, an unstable residential character with few youth and slightly higher number of elderly, low level of residential stability, high rates of college-educated residents and white-collar workers, and a predominantly white population.
- Transitional working class neighbourhoods: lower socioeconomic status, but close to city-wide averages (poverty above, and public assistance, unemployment and female headship fall below), low rate of college education and white-collar workers, high percent of youth and low rate of elderly, lower than average residential stability and owner occupancy, also becoming increasingly dominated by Hispanics.
- Ghetto “underclass” neighbourhoods: severe socioeconomic deprivation; high rates of poverty and unemployment, public assistance, and female-headed households.

Changes over Time

- Chicago’s neighbourhoods became more polarized from 1970 to 1990 with a decline in the stable middle class (from 41% to 34%), an increase in gentrifying neighbourhoods (from 11% to 21%) and an increase in the urban underclass.
- The transitional neighbourhoods were the most fluid and served as turning points in the neighbourhood trajectories, either downgrading or gentrifying.
- Most of the neighbourhood downgrading took place in the 1970s (40% of neighbourhoods moved into the ghetto underclass), while most of the upgrading took place in the 1980s (30% moved either to stable middle class or gentrifying category).
- The transitions from stable middle-class to transitional working-class neighbourhoods were associated with a rapid growth of Hispanic population, increasing from 6% in 1970 to 45% in 1990. The non-Hispanic white population declined during this time from 94% to 27%. Neighbourhoods that followed this trajectory were of lower socio-economic status than the stable middle-class category.
- Black neighbourhoods that upgraded were more likely to join the stable middle class, whereas white neighbourhoods were more likely to join the gentrifying neighbourhoods.
- The study confirms that the process of ghetto formation is almost exclusively black, and increasingly homogenous in composition.

Evaluation

The study sheds light on how neighbourhoods transition, including the spatial concentration of affluence and the erosion of the traditional working-class areas. The article shows the importance of transitional neighbourhoods with regard to neighbourhood change. For instance, once a neighbourhood became gentrified or ghettoized, it was unlikely to change to a different category. Also, when neighbourhoods upgrade, they appear to follow race specific patterns. For

example, the article examines how the Hispanic population carved its own ecological niche in the transitional neighbourhoods, which had not previously been examined in that light. The authors suggest that more research should be conducted on spatial concentration of affluence. Also, research should specify a set of casual mechanisms that may determine the direction that neighbourhoods will take when they reach certain turning points. Understanding neighbourhood processes of upgrading and downgrading will help address policy issues that could work towards ameliorating the spatial concentration of the urban underclass.

Baum, S., P. Mullins, R. Stimson, and K. O'Connor. (2002). "Communities of the Postindustrial City." *Urban Affairs Review* 37 (3): 322–357.

Objective

The study aims to shed light on postindustrial communities in Australia, examining nine urban communities that are urban regions (polycentric urban forms – includes Sydney, Melbourne, and Brisbane), metropolitan areas that are not part of urban regions and other major cities. The authors discuss the conceptual basis of city and community in the post-industrial age using the typology developed by Marcuse and van Kempen to conceptualize the community structure of global cities. The model examines five main types of affluent communities (citadel of global elite, middle-class suburban, gentrified, edge-city, and exclusionary) and three main types of vulnerable communities (ghetto of the excluded, immigrant enclave and public housing (welfare)). This article aims to see if these communities are present in the three groupings of Australian post-industrial cities.

Methodology

Hierarchical cluster analysis and stepwise discriminant analysis were applied to data collected from the 1986 and 1996 censuses, with 1986–1996 data used to measure change. The study was based on 240 statistical local areas (SLAs).

Eight broad dimensions were selected, corresponding to those used in research on the economic and social transformations of post-industrial cities and their communities. Each dimension was measured by a variety of individual variables: The dimensions and variables included:

- Structural economic change – used the Australian Productivity Commission (1998) measures:
 - Percent change in number of persons employed (1986–1996)
 - Percentage point change in the unemployment rate (1986–1996)
 - Percentage point change in the proportion of households earning more than \$40,000 (1996 equivalent) (1986–1996)
- Occupation – Followed Reich's (1992) classification of the global economy occupational structure using three key groups: routine production workers, in-person service workers and symbolic analysts. All categories are given an aggregate score, with symbolic analysts given the highest weight.
- Industry – Reduced the Australian Bureau of Statistics' 17 classifications to 6 groups: extractive activities, transformative industries, distributive services, producer services, social services and personal services. Each group was given an aggregate score with social ser-

vices, producer services and personal services given the largest weight due to Australia's service-based economy.

- Human Capital – Measured by formal education attainment: the proportion of persons holding a minimum of a college/university degree and the number of persons with the most limited level of formal education.
- Income – Proportion of high-income households (> AUD\$63,500) and the proportion of low-income households (<AUD \$14,500) in 1996.
- Unemployment – The overall unemployment rate and the youth unemployment rate in 1996
- Household disadvantage – Includes single-parent families, recently arrived immigrants (1991–1996) and age (older persons).
- Housing – Three measures:
 - Proportion of households living in public housing
 - Proportion of households in financial stress (bottom 40% of households spending more than 30% of income on housing)
 - Residential turnover – number of people who moved between census periods.

Findings

- A hierarchical cluster analysis of the 240 SLAs using the variables noted above resulted in a nine-cluster solution.
- The discriminant analysis of the nine clusters resulted in eight discriminant functions. The first four (human capital, high-income households, unemployment and disadvantage and employment growth) accounted for the majority of the variance. Each was significantly different the other. The results from the discriminant analysis indicated that 92.9% of observations were correctly classified using the hierarchical cluster analysis
- The first function (43.1% of the variance) is associated with levels of human capital and affluence.
- The second function (23.5% of the variance) is associated with growth in employment and levels of low-income households.
- The third function (13.1% of the variance) relates to levels of unemployment
- Of the nine clusters, four were identified as affluent, four vulnerable and one “average.”

Affluent Communities

- The affluent communities comprise 45.8% of the SLAs (privileged community of the global age, affluent community of the metropolitan fringe, gentrifying community, and threatened affluent community)
- The privileged community of the global age represents 12.9% of SLAs. They are present in all three urban regions and in Perth. In terms of Marcuse and van Kempen's (2000a, 2000b) classification, no “citadels of the elite” were evident.
- The affluent community of the metropolitan urban fringe represents 7.1% of SLAs. They are present in the three urban regions as well as in Perth and Canberra. This community has parallels to Marcuse and van Kempen's (2000a, 2000b) community but does not always have a major commercial centre.
- The gentrifying community covers 16.2% of the SLAs. Of all the cities analyzed only Canberra does not have this community type.

- The threatened affluent community includes 9.6% of the SLAs. They exist in Canberra, Melbourne, Adelaide, and to a lesser extent Sydney.

Vulnerable Communities

- The four vulnerable communities account for 32.5% of the SLAs (community of deindustrialization, declining extractive industries, vulnerable urban/metropolitan fringe, and vulnerable community at the fringe of urban areas)
- The community of deindustrialization accounts for 7.5% of the SLAs. These are located in Melbourne, Adelaide, Sydney, and the industrial cities of Newcastle and Wollongong.
- The community reliant on declining extractive industries – only represents 5% of SLAs. These communities are located on the fringe of three urban areas: Adelaide, Perth, and Melbourne.
- The vulnerable community of the urban/metropolitan fringe – covers 14.6% of the SLAs. It is present in all urban areas except Canberra.
- The vulnerable community at the Fringe of the urban region – covers 5.4% of all SLAs. It is most apparent in the Brisbane urban region concentrated totally on the Gold Coast and Sunshine Coast, also present in Perth and in a minor way in Melbourne and Sydney.
- The community of battlers (average community) – is neither wealthy nor poor and accounts for 21.7% of SLAs (working-class community which has gotten by). Only Canberra and Hobart do not have this community.

Evaluating the Marcuse and van Kempen Thesis

Three main conclusions:

1. Australian cities are different from the preceding (industrial) age – only the affluent community on the metropolitan fringe has similarities with the earlier age. The vulnerable communities are a new addition. Those affected by the demise of the old economy have developed vulnerable communities while those benefitting from the global economy have more affluent communities.
2. Seven of the Australian cities have different community structures as they each have a different economic history and therefore established a different mix of communities. Melbourne is the only city with all nine communities.
3. The Marcuse and van Kempen (2000a, 2000b) community structure does not represent Australian urban communities. The only two communities in common are the gentrified/gentrifying community and the middle-class suburban community/affluent community of the urban fringe. Australia also does not have a ghetto community of the excluded, which Marcuse discussed in detail. Other distinguishing features include no discernable ethnically based community, no marked public housing community (only represents 5% of housing stock in Australia), urban communities are located on the fringe rather than in the inner city as is the case in the U.S., and the largest single community identified in this study is the working-class community – the battlers – which is not cited by Marcuse and van Kempen (2000a, 2000b).

The Australian study identified equal numbers of affluent and disadvantaged communities reflecting the affluence of the new age and the disadvantage brought by deindustrialization.

Evaluation

This taxonomy provides a context to understand any detailed study of a particular community. The analysis provides a broad focus of the main communities, but it must be noted that these communities are relatively large and may contain sub-communities within. Because the Australian urban community structure differs greatly from the Marcuse and van Kempen (2000a, 2000b) community structures, it is likely that a wide variety of community structures exist in the developed world.

References

Marcuse, P. (1997). "The Enclave, the Citadel, and the Ghetto: What has Changed in the Post-Fordist US City?" *Urban Affairs Review*, 33 (2): 228–64.

Marcuse, P. and R. van Kempen (2000a). "Introduction." In P. Marcuse and R. van Kempen (eds.), *Globalizing Cities: A New Spatial Order* (pp. 1–21). Oxford, UK: Blackwell.

Marcuse, P. and R. van Kempen (2000b). "Conclusion: A Changed Spatial Order." In P. Marcuse and R. van Kempen (eds.), *Globalizing Cities: A New Spatial Order* (pp. 249–75). Oxford, UK: Blackwell.

Baum, S. (2004). "The Socio-Spatial Structure of Australia's Metropolitan Regions." *Australasian Journal of Regional Studies* 10 (2): 157–179.

Objective

This study attempts to understand the social structure or the pattern of social areas across the metropolitan areas of Sydney, Melbourne, Brisbane, Adelaide, Perth, Hobart, and Canberra. From a policy perspective, analysis of social areas may be beneficial in identifying areas of need in terms of service provision, social intervention, or for pilot programs in areas that warrant future study.

Methodology

The paper analyses the social structure of cities using hierarchical cluster analysis and discriminant analysis. The data were derived for the Australian Bureau of Statistics statistical local areas (SLAs). The data were grouped into clusters based on the degree of similarity across several socio-economic indicators and then analyzed to see which factors differentiated best between the groups.

A total of 31 variables were derived from the Australian Bureau of Statistics 2001 Census of Population and Housing. The data were available at levels of aggregation from collection districts (CDs) comprising approximately 200 to 300 households to state- and national-level data. Given the goal to consider the structure of local communities, statistical local areas (SLAs) were chosen, with the exception of Canberra and Brisbane where SLAs were collapsed into larger units to account for the small population numbers.

Variables used in the Analysis

- Family status demographic: percent of single parent families; percent of couples with children; percent of couples without children; aged person dependency rate; youth dependency rate.
- Human capital: percent of persons aged 15 and over who left school in year 10 or earlier; percent of persons with a degree or above.
- Income: percent of low-income households; percent of high-income households.
- Race/ethnicity: percent of population who have arrived in Australia since 1996; percent of persons with low English skills.
- Housing: percent of households who are owner/purchasers; percent of households who rent privately; percent of households who rent from state housing authorities; percent of persons who have moved from a different SLA since 1996.
- Occupation: percent of persons in the workforce characterized as professionals or managers; percent characterized as associate professionals or advanced clerical workers; percent characterized as labourers or production and transport workers; percent characterized as intermediate or elementary clerical workers or tradespersons.
- Industry: percent of persons in the workforce classified in extractive industries; percent classified in transformative industries; percent classified in distributive services; percent classified in in producer services; percent classified in social services; percent classified in personal services.
- Work force engagement: Unemployment rate; youth unemployment rate; male labour force participation rate; female labour force participation rate; percent of males employed part-time; percent of females employed part-time.

Findings

- The hierarchical cluster analysis resulted in 10 groups of SLAs while the resultant discriminant analysis provided four interpretable functions to differentiate between the clusters
- The discriminant analysis resulted in 10 discriminant functions with the first four providing the largest share of explained variance (91.0%). About 90% of the communities were correctly classified.
- Discriminant functions that account for the majority of the variance include: household or family structure (51.8%), employment and occupation structure (17.9%), the presence of aged persons (14%) and ethnic background (7.3%).
- The 10 groups of SLAs include:
 - Low socio-economic/ethnic background communities (23 SLAs): persons with low English skills, recent arrivals and above average unemployment rates.
 - Inner city non-family-high ethnicity-transitional communities (16 SLAs) : mostly located in the inner city of the metropolitan areas and are characterized as places of transition undergoing decline or gentrification.
 - Transitional life-cycle non-family-oriented near-middle communities (41 SLAs) near inner and middle suburbs characterized by the emergence of the new middle class and a generational shift in population.
 - Middle Suburbia (19 SLAs) high proportions of owners/purchasers and a mixed family structure (couples with and without children, and age dependency)

- Higher SES/mortgage belt communities (41 SLAs) located in the middle-outer areas of metropolitan regions, with above-average owner/purchasers, youth dependency and couples with children.
- Middle/outer suburb disadvantaged communities (41 SLAs) located in the middle and outer areas of cities that have become disadvantaged through economic restructuring.
- Mortgage belt battlers (22 SLAs) characterized by traditional family structures and mixed SES.
- Higher SES/established communities (16 SLAs) associated with affluence and older households (established communities).
- Low socio-economic status mortgage belt communities (32 SLAs) often located in outer areas of the cities where affordable housing and low interest rates have contributed to home purchasing.
- Outer suburban severely disadvantaged communities – (5 SLAs) low SES located in localities that have been hard hit by economic restructuring and associated social problems.

Evaluation

The article is unique in that it used a methodology different from that traditionally used to examine social areas within cities. While the descriptive presentation of “community types” is not new and to some extent reflects the findings from earlier studies using the ABS census data, the usefulness of the analysis lies in the ability to overlay other indicators across the typology.

Mikelbank, B. (2004). “A typology of U.S. suburban places.” *Housing Policy Debate* 15 (4): 935–964.

Objective

This study aims to develop a typology of United States suburbs. Suburban municipalities are organized, classified, and analyzed according to their economic, demographic, fiscal, and spatial structures. The study shows how increased heterogeneity in the suburbs does not match traditional perceptions of suburban America, but also how this diversity extends to only about half of the suburbs covered in the study. The primary research objective is to increase the depth, breadth and current understanding of the economic, fiscal, social, and spatial workings of the nation’s suburban places.

Methodology

Census data were gathered to capture the essence of a suburb’s character with regard to population, place, economy and government. The population and place data were obtained from the 2000 decennial census, data relating to the economy came from the 1997 economic census, and government data were collected from the census of the governments. The final database used for the analysis contained information for 3,567 non-central city places.

A hierarchical cluster analysis was used to develop the typology of suburbs while discriminant analysis provided a statistical foundation for evaluating the validity of the clusters.

Variables

Two types of variables from the decennial census were included. The first group comprised:

- Total population*
- Population density*
- Percent: White alone; Black alone; Asian alone; some other race alone; two or more races; foreign born; families that are married and have children under 18; married couple families that have no children; single-parent families that have children under 18; population 25 and older with a high school degree; population 25 and older with a bachelor's degree; population 5 years of age or younger; population 5 years of age and over (different house five years ago); owner occupied housing; vacant housing (not seasonally occupied); vacant housing (seasonal, recreational, or occasional)
- Median age
- Median household income in 1999*
- Average household size
- Average number of vehicles per household
- Median rent*
- Median value, owner-occupied units*
- Median year built
- Highway proximity
- Adjacency to the central city

Variables from the economic census included:

- Total employment*
- Percent employment in/percent establishments in: manufacturing; wholesale trade; retail trade; real estate and rental leasing; professional, scientific, and technical services; administration and support and waste management and remediation services; educational services; health care and social assistance; arts and entertainment and recreation; accommodation and food services.
- Percentage of the working population 16 and over commuting to the central city for employment
- Ratio of employees to establishments
- Average commuting time

Variables from the government census included:

- Total direct expenditures*
- Percentage of direct expenditures spent on capital outlay
- Total taxes
- Percentage of total taxes composed of property taxes

*Variables are entered into the cluster analysis as natural logarithms

Findings

Middle America suburbs (a total of 2,123 suburbs): score above average on percent white and black populations, but lower on the other racial and foreign born categories, have high school education and lower incomes and housing values.

White Bedroom (1,116 suburbs): small in terms of employment and population:

- Seasonal Wealth (54): coastal, high income, high housing value
- Traditional suburbs (394): married families with children under 18, low density, newer housing
- Small Retail suburbs (668): small populations, low overall levels of employment and establishments.

Manufacturing: large percentage of population in manufacturing:

- Struggling suburbs (828): low house values, incomes and percentage of population with a bachelor's degree, and small percentage of owner occupied housing.
- Black suburbs (179): same characteristics as the struggling suburbs but with a higher proportion of blacks.

Healthy suburbs (1,444): score high on foreign born, income, housing values, rents, total employment and people with a bachelor degree.

Suburban success (1,156): higher incomes, education, rents and house values, stable, low vacancy as well as older population

- Prosperity (285): high education and income, score high on technical, scientific and professional service establishments
- Working Stability (457): large populations and high numbers of establishments and employment.
- Aging (414): population is older and more densely populated.

Working diversity (288): high percentage foreign born, larger than average households, low percentage of white, married families with no children; low housing stability, highway accessibility

- South/Western Diversity (85): working diversity characteristics is more present in this category.
- Central Diversity (203): larger overall population; higher employment, rent and taxes and more establishments; located closer to central cities.

Discussion

- Just over half of all suburbs (50.9%) still fit into the stereotypical view of suburbs (White Bedrooms and Prosperity and Aging places).
- The suburbs do not form a single unique cluster at the 10-, 4- or even 2-cluster solution as they each have their own character.
- The traditional suburban clusters are smaller in population and only account for 31.9% of the population in the entire set of suburbs.
- Race plays a primary role in distinguishing among suburbs (Manufacturing, Working Diversity)

- The suburbs are much more diverse in racial diversity, foreign born, family structure, and employment than what was previously associated with suburbs
- Taking into account the 4-cluster solution only White Bedroom fits the old suburban stereotype

Evaluation

This research shows the complexity of America's suburbs. While the author acknowledges the limitations of the analysis, including the variations within clusters and outlier data, the study nonetheless provides a meaningful way to classify and organize large data sets. This research provides a foundation for the future analysis of suburban differentiation. Additional research into the types of transitions and interactions occurring between cities and suburbs, as well as among suburbs, can better prepare each location for unique opportunities and challenges related to changes in their form and function.

Hanlon, B. (2009). "A Typology of Inner-Ring Suburbs: Class, Race, and Ethnicity in U.S. Suburbia." *City & Community* 8 (3): 221–246.

Objective

The article explores distinct types of inner-ring suburbs and seeks to answer: (1) whether all inner-ring suburbs are in distress; (2) how varied the places are; and (3) if older inner-ring suburbs comprise only poor suburbanites. This is accomplished by developing a typology of inner ring suburbs to demonstrate the similarities and differences among places.

Methodology

Hanlon draws on the typologies of previous work as well as findings from a principal component analysis (PCA) and cluster analysis, to develop a typology for inner-ring suburbs. Census data, primarily from 2000 for inner-ring suburbs of the 100 most populated metropolitan areas in the United States were used as input to the analysis. A total of 1,742 inner-ring suburbs were used in the analysis. The development of a typology proceeded as follows:

- The data included 44 variables from the U.S. Department of Housing and Urban Development, 2006 State of the Cities Data System for 1,742 inner-ring suburbs. A PCA analysis was undertaken to determine the patterns of difference among the suburbs. Using component scores from PCA analysis, a cluster analysis was performed to create a typology of the suburbs.
- There were more inner-ring suburbs in the Northeast and Midwest compared with the South and West.

Variables Used to Develop the Typology (2000 Census)

- Population: percent change in population from 1980 to 2000; percent population non-Hispanic white; percent population non-Hispanic black; percent population non-Hispanic other race; percent population Hispanic; percent population foreign born; percent single-parent families with children.

- Income and poverty: Median household income; Median household income ratio to suburban median household income; population living in poverty; Household income below national 20th percentile; Household income above national 80th percentile.
- Education: percent population that did not graduate from high school; percent population that graduated from college.
- Employment: percent labour force unemployed; percent labour force in (a) management and professional occupations; (b) service; (c) sales; (d) farming and fishing; (e) construction and extraction; (f) production and transportation; (g) agriculture and mining; (h) construction; (i) manufacturing; (j) transportation and public utility; (k) trade; (l) finance, insurance, and real estate; (m) business and repair services; (n) personal services; (o) professional services; (p) public administration.
- Housing: percent housing built in the 1990s; percent housing built between 1940 and 1959; percent housing built before 1939; median value of housing; median housing value ratio to suburban median housing value; rent below national 20th percentile; rent above national 80th percentile; percent occupied housing units; percent vacant housing units; rental housing units; percent owner-occupied housing units.

Findings

- Five components explained almost 60% of the total variance in the original data set.
- The communality values for each of the 44 variables ranged from a low of 0.53 to a high of 0.95, with an average of 0.79.
- Component loadings:
 - Component 1: expensive housing, well-educated residents employed in professional occupations.
 - Component 2: low incomes, unemployed, employed in service occupations, non-Hispanic black and single parents.
 - Component 3: non-Hispanic other race populations, immigrants, rental housing and low educational attainment.
 - Component 4: positive loadings for employment in personal services, negative for manufacturing, production and transportation employment.
 - Component 5: high loadings for construction and maintenance occupations.
- The main drivers of differentiation are socio-economic status, race and ethnicity, employment and housing characteristics. Findings also show a variation related to the rise of immigration and the rise of black and Hispanic enclaves
- The PCA notes a shift from manufacturing to service-based economy as well as distinct inner-ring suburbs where residents were employed in low-paying personal service, maintenance and construction jobs.

A typology of inner-ring suburbs

The following types of suburbs were identified:

- Vulnerable inner ring suburbs: 43% of the suburbs were characterized as vulnerable. These suburbs experienced socio-economic decline, disinvestment, racial and ethnic transition and loss of an industrial base from 1980-2000.
- Ethnic inner ring suburbs: 11% of the suburbs were classified as ethnic in 2000. More than a third of residents in these suburbs were foreign born, 45% were Hispanic and the remain-

der was non-Hispanic Black in 2000. These suburbs grew by 1.4 million residents since 1980.

- Lower-income and mixed inner-ring suburbs: Only 3% of suburbs were lower income and mixed. These suburbs are similar to the ethnic group though they tend to have more of an overall mix of white, black, Hispanic and other ethnic populations. On average 60% of the population is non-Hispanic white.
- Old inner-ring suburbs: 12% were old suburbs. More than one-quarter of the housing stock was built before 1939, with two main groups living in them: old and wealthy and old and much poorer.
- Middle-class inner-ring suburbs: These suburbs accounted for 31% of the inner ring. These suburbs experienced a population decline of nearly 300,000 from 1980 to 2000. On average, nearly 80% of the residents in these suburbs were white, though this percentage varied by region.

Evaluation

The article shows the evolving nature of the inner-ring suburbs, particularly in terms of racial and ethnic composition, thereby questioning the assumption that middle-class Americans consistently seek out the outer suburban fringes. The article suggests that further research is required to identify features of stable middle-class suburbs so that decline can be prevented or mitigated. For example, are there policies or planning initiatives that have helped certain middle-class inner ring suburbs avoid decline? Are these areas accessible to employment opportunities that have helped their continued endurance?

Mikelbank, B.A. (2011). "Neighbourhood Déjà Vu: Classification in Metropolitan Cleveland, 1970–2000." *Urban Geography* 32 (3): 317–333.

Objective

The purpose of this research is to identify the distinct types of neighbourhoods at several points in time across census years (1970–2000) for Cleveland, Ohio. Thus, the research is comparative as each neighbourhood is evaluated relative only to the other neighbourhoods in that census year. Spatial and temporal transitions between neighbourhood types are also examined.

Methodology

- Data from the Neighbourhood Change Database (NCDB) was collected for the census years 1970, 1980, 1990, and 2000 for the Cleveland-Akron Consolidated Metropolitan Statistical Area (CMSA).
- Variables were selected using previous research as a guideline. Only variables that had been consistently collected since the 1970 decennial census were included.
- The total number of observations (unique neighbourhoods) considered is 3,392 (848 neighbourhoods x 4 time periods).
- Data for each unique neighbourhood was entered into the analysis as a z-score calculated relative to that neighbourhood's year.
- Hierarchical Cluster Analysis (HCA) was chosen to identify unique types of neighbourhoods over the time period 1970 to 2000. Once these neighbourhood types were formed a Discri-

minant Analysis (DA) was used to better understand the variables used in the cluster formation.

Variables

Demographic

- Age: proportion of the population: under 5 years; 5–17 years; 18–64 years; 65 or more years
- Family structure: proportion of families: married with children; single-parent families with children; non-family households
- Race/ethnicity: proportion of the population: White; African-American; Hispanic; Foreign born
- Population density

Housing

- Tenure: renter-occupied; owner-occupied
- Vacant units
- Structural characteristics: proportion of units: single-family detached; single-family attached; two-family units; three-or four-family units; five-plus units
- Unit age: proportion of units constructed: during the previous decade; two decades ago; three decades ago; four or more decades ago
- Average value: owner-occupied housing
- Average rent: renter-occupied housing

Socio-economic measures

- Education levels: proportion of those 25 and over with: some high school, but no degree; high school diploma, but no college; some college, but no degree; college degree or more
- Proportion of high school-aged population not in high school
- Average household income
- Proportion of households receiving public assistance
- Poverty rate
- Elderly poverty rate (64 years +)
- Unemployment rate
- Proportion of renters paying more than 35% of income on rent
- Proportion of working population working in their country of residence

Dynamics

- Proportion of households moved into current unit: during the previous decade; two decades ago; three or more decades ago
- Proportion of households' residence five years ago in: same house; different house, same country; different house elsewhere in the same state

Findings

Cluster identification

The first substantial change in the within-group variation among clustered neighbourhoods occurs at the five-cluster solution. These are identified as:

- Struggling neighbourhoods: includes two types of neighbourhood clusters: Struggling (465) and Struggling African-American (359). Overall, the neighbourhoods declined from 147 in 1970 to 216 in 2000. Both neighbourhoods score similar on many variables, but Struggling African-American shows more signs of distress. They both have the highest rates of poverty, unemployment, renter burden, as well as the lowest income and education.
- Suburbia neighbourhoods: was the most numerous cluster type identified in the analysis with 1,142 neighbourhoods identified over the four census years. This type scores highly on owner-occupied housing, high value, single-detached housing, low vacancy rates, married families with children and high incomes. A high proportion of the housing stock was built in the 1980s and 1990s, and there is an indication that they played a role as bedroom neighbourhoods. This neighbourhood type declined as 178 suburbia neighbourhoods transitioned into another neighbourhood type from 1970 to 2000.
- Stability neighbourhoods: These neighbourhoods more than doubled in number between 1970 to 2000 (from 104 to 216). They have high median values on the proportion of the population in the same house five years ago and households that moved into their current unit three or more decades ago, single-family detached, owner occupancy and elderly population. There is a high proportion of white population and a low proportion of African-Americans.
- New Starts neighbourhood: These neighbourhoods increased from 138 to 216 between 1970 and 1980. It is the opposite of Suburbia as it has few children and is more diverse. High scores for college and bachelor's degrees, many non-family, renter occupied households and buildings with five or more units. House values and rents are above median.

Discriminant analysis indicated that 85% of the neighbourhoods were predicted correctly.

Changes over Space and Time

- Mikelbank measured whether neighbourhoods remained the same or transitioned to one of the other four neighbourhood types at each of the three opportunities for change (1970 to 1980, 1980 to 1990, 1990 to 2000)
- African-American neighbourhoods were least likely to change, with a 9% transition rate. More than half of all Non-African-American Struggling neighbourhoods that changed type became African-American Struggling neighbourhoods.
- Suburbia neighbourhoods transitioned most often with 26% changing to another neighbourhood type, most often Stability (134), New Starts (99) or Struggling (5), and most often at the fringe of the region's large cities. This neighbourhood is conforming less and less to traditional stereotypes.
- In 1970 the New Starts neighbourhoods were more concentrated, presumably related to persons with a high level of university education. By 2000 there were more of these neighbourhoods and they were substantially more dispersed throughout the region.
- Stability neighbourhoods are mostly located in the region's cities and proximate to them, by 2000 they expanded from the nearby city and disappeared from the rural landscape indicating the loss of rural stability over the time period.
- All of the neighbourhood types that were present in 2000 were also present in each of the three previous decades – déjà vu. They appeared and reappeared throughout the study time period but often at different locations.

Evaluation

Both the changes that occur *in situ* and the way in which neighbourhood types occur at different times throughout the region yield relevant policy insights and lay the foundation for future research efforts. One limitation posed by the research is the consistency of neighbourhood boundaries over time and the availability of relevant data within those boundaries. Also, going back three decades from 2000, the richness of the data was more limited, particularly in terms of racial and ethnic diversity measures. However, considering each neighbourhood as a unique observation in one clustering procedure was a novel approach at the time of this article as it revealed the dynamic and persistent patterns of metropolitan neighbourhoods. Future analysis could delve more deeply into the process behind the patterns or expand to compare analyses of metropolitan areas that are similar or even seemingly distinct in nature.

Vicino, T.J., B. Hanlon, and J.R. Short. (2011). "A Typology of Urban Immigrant Neighbourhoods." *Urban Geography* 32 (3): 383–405.

Objective

This study examines the spatial structure of urban America and its immigrant residents, drawing on the framework of Mikelbank (2004). The goal of this study is to develop a typology of immigrant urban neighbourhoods in large U.S. cities by analyzing the demographic and socio-economic characteristics of 10,116 census tracts in the central cities of 18 Consolidated Metropolitan Statistical Areas (CMSAs) in the U.S. Large scale immigration has changed the demography and social character of urban neighbourhoods, inspiring two primary research questions: (1) How do the various characteristics of urban immigrant neighbourhoods differ among the cities of large metropolitan regions? And (2) what can these characteristics tell us about the spatial structure of this differentiation?

Methodology

- The study uses census tract data for 18 CMSAs (i.e., two or more primary metropolitan statistical areas (PMSAs)) from Census 2000. Urban and suburban tracts were separated in each CMA with a total of 10,116 urban tracts
- A location quotient for the foreign-born population was used to identify tracts with relatively high proportions of immigrants for each urban tract. The location quotient compared the percentage of the foreign-born population in each urban tract within a metropolitan area to the percentage of the population foreign-born in all urban tracts within that same metropolitan area in 2000.
- Principal components analysis (PCA) followed by cluster analysis was used to identify variation among urban immigrant neighbourhoods across large metropolitan areas in the U.S.
- The data matrix used in the study included 48 variables for each of the 2,691 urban immigrant neighbourhoods.

Selection of variables by categorical theme in the PCA

- Race and ethnicity: percent of population non-Hispanic White; percent of population non-Hispanic black; percent of population non-Hispanic Asian; percent of population two or more races; percent of population Hispanic; percent of population non-Hispanic Other; percent of

the population foreign-born European; percent of the population foreign-born Asian; percent of the population foreign-born African; percent of the population foreign-born Oceanic.

- Age: percent of population under 18; percent of population between 18 and 64; percent of population over 65.
- Family structure: percent of population in family households; percent of population living alone; percent of population in non-relative households; percent of family households; percent of married households with children; percent of single households; percent of female-headed households with children; percent of married households without children.
- Education: percent with no high school diploma; percent with high school diploma; percent with BA; percent with a postgraduate degree
- Employment: percent in manufacturing; percent in agricultural and mining; percent in construction; percent in retail trade; percent in information; percent in FIRE; percent in professional occupation; percent in education, health, and social services; percent in arts, entertainment and recreation; percent in food and accommodation; percent in public administration
- Income: percent of population in poverty; median household income
- Housing: percent of housing units owner occupied; percent of housing units renter-occupied; percent of housing units built in the 1990s; percent built in the 1980s; built in the 1970s; percent built in the 1960s; percent built in the 1950s; percent built in the 1940s; percent built pre-1939.

Findings

- 110 million residents live in the 18 CMSAs, representing 40% of the nation's population. Broken down, this represents just over 70 million people living in suburban areas and 40 million people living in urban tracts
- 21 million immigrants live in the 18 CMSAs with 11 million living in the suburbs and just under 10 million in urban tracts.
- More than seven million immigrants lived in the urban areas of Chicago, Los Angeles, New York and San Francisco.
- There were 8.5 million immigrants in suburban tracts of Chicago, Los Angeles, Miami, New York, San Francisco and Washington, DC.
- Every metropolitan area had higher rates of clustering in their cities than in their suburbs. Immigrant clustering was significant in New York, Los Angeles, San Francisco, Boston and Miami.
- There were 2,691 urban immigrant neighbourhoods (with a location quotient of 1.25 or greater, Miami had the highest proportion of immigrants whereas Cincinnati had the lowest. In absolute numbers New York, Chicago, and Los Angeles had the largest number of immigrants.

Distinguishing urban immigrant neighbourhoods

- The seven components extracted explained 62% of the variation in the original dataset with the first component explaining about one-quarter and the second explaining 11%.
- Two-thirds of variables had a communality value greater than 0.70.

- Component 1: Variables with high loadings relate to age, household and family structure, education and professional occupation. It describes urban neighbourhoods with large numbers of immigrants and young, educated, single and professional households.
- Component 2: Variables with noteworthy loadings relate to income and household family structure. It identifies immigrant neighbourhoods that have households with partners who are married but without children, homeowners and relatively high-income earners.
- Component 3: Characterized by immigrant neighbourhoods with few Hispanics, many Europeans and typically older residents. It describes the first wave of immigration to the U.S.
- Component 4: Relates specifically to the Asian population
- Component 5: There are significant loadings for the non-Hispanic black population, female-headed households with children, and employment in the areas of education, health and social services.
- Component 6: Variables related to housing age, describing immigrant neighbourhoods with housing units that were built mainly during the 1970s and 1980s.
- Component 7: High positive loadings for married households with children, owner-occupied housing and income. Shows social stratification with high-income households co-located with much poorer residents.
- Similar to previous studies, this PCA demonstrates that variables differentiating urban immigrant neighbourhoods are income and education, race and ethnicity, household family structure and age of housing.

The variation of urban immigrant neighbourhoods

- Component scores from 2,691 urban immigrant census tracts from the PCA were used to identify clusters of urban immigrant neighbourhoods using a k-means clustering technique. Based on previous studies, between three and six clusters were selected, with five proving the most optimal.
- Cluster 1 was identified as “Hispanic.” On average, 45% of the population was foreign born and more than half of the residents were Hispanic. This cluster had the highest average poverty rate (24%) and 44% of residents lacked a high school diploma.
- Cluster 2 was labeled “White Working Class,” and had the second largest number of tracts. About 49% of the population was born in Europe, 67% were non-Hispanic whites and about one-quarter was born in Asia.
- Cluster 3 was identified as “Asian.” Nearly two-thirds of the foreign-born population was from Asian countries. They had slightly higher incomes than white working class immigrant neighbourhoods but also slightly higher poverty rates.
- Cluster 4 was labeled “Gentrified.” This cluster had the lowest percentage (31%) of foreign born. Approximately one-half of these neighbourhoods were non-Hispanic white. This cluster has the highest average median income, but also has a high poverty rate (17%).
- The distribution of urban immigrant neighbourhood types varies by city. In many cities Hispanic and Asian neighbourhoods were the most prevalent, and in a few cities, White Working-Class or Gentrified areas prevailed, while others had a mix of different types of immigrant neighbourhoods.

Evaluation

The study shows the usefulness of using PCA combined with cluster analysis for classifying ur-

ban neighbourhoods, such as central city immigrant neighbourhoods in metropolitan America as well as how gentrification and racial composition can affect the types of immigrants who settle there. The authors note that whether or not a city is a sanctuary city (i.e., protecting undocumented migrants) has implications for the number and the composition of immigrants who arrive. Most of the cities in the study were declared as “sanctuary cities,” whereas many of their surrounding suburbs were not, with some putting forth policies to exclude undocumented immigrants from their jurisdictions. The article illustrates the importance of understanding what drives the geography of immigrant neighbourhoods as it has implications for politics, planning and public policy.

Hulchanski, D. et al. (2011). *Toronto’s City #3: A Profile of Four Groups of Neighbourhoods. (A Supplement to the “Three Cities of Toronto” Analysis of Trends, Focused on City #3, the 40% of the City’s Neighbourhoods with the Lowest Incomes)*. Toronto: University of Toronto, Cities Centre.

Objective

This paper is a supplement to the report: J.D. Hulchanski, *The Three Cities within Toronto: Income Polarization among Toronto’s Neighbourhoods, 1970–2005*, University of Toronto, Cities Centre, 2011. The purpose is to graphically delve into the demographic characteristics of four groups of neighbourhoods in City #3, as well as examine the decline in income and growing income inequality over the past 35 years.

Methodology

- The four groups within City #3 were created using K-means cluster analysis using a set of 31 socio-economic and demographic variables from census 2006 data
- Figures reported for 1971, 1981, 1996, 2001, and 2006 are aggregations of census tract data using 2001 census tract boundaries as a base.

Census 2006 variables used in the cluster analysis

- Population per sq. km
- Dwellings per sq. km
- Social housing (1999) as percentage of dwellings 2006
- Percent rented housing
- Percent single detached housing
- Percent apartment housing
- Percent children & youth under 20 years of age
- Percent seniors 65 years and over
- Persons per household (same as persons per dwelling)
- Lone-parent families as percentage of family households
- Percent Canadian-born population
- Percent recent immigrant (arrived 2001-2006)
- Percent visible minority population
- Percent Chinese visible minority population
- Percent South Asian visible minority population

- Percent Black visible minority population
- Percent Other visible minority (non-Chinese, non-Black, non-South Asian) population
- Percent population 25 years and over with a university degree
- White-collar professional occupations as percentage of the workforce
- Blue-collar occupations as percentage of the workforce.
- Sales and service occupations as percentage of the workforce
- Self-employed as percentage of the workforce
- Unemployment rate
- Average monthly rent
- Average dwelling value
- Average household income
- Percent economic family income from government transfers
- Percent dwellings built before 1971
- Percent dwellings built after 1971
- Longitude of census tract geographic centre (the x-coordinate of the centroid)
- Latitude of census tract geographic centre (the y-coordinate of the centroid)

Findings

- City #3 represents 43% of Toronto's 2006 population. It is defined as those census tracts in the City of Toronto that decreased 20% or more in average individual income relative to the Toronto CMA average 1970–2005.
- Neighbourhood Groups A & B description – Two-parent households living primarily in single detached owner-occupied housing, average to higher than average socio-economic status (SES), mixed ethno-cultural and immigration status.
 - Group A – Lower density, mostly large two-parent households of higher SES living in new owner-occupied housing. Many foreign-born non-whites, especially Chinese.
 - Group B – Lower density, predominantly two-parent households, more seniors, of average socio-economic status living in older owner-occupied housing. Lower foreign born, higher white population.
- Neighbourhood Groups C & D description – Two-parent and some single-parent family households living in rental apartments, average to lower-than-average socio-economic status, higher unemployment, relatively high proportion of non-white visible minority immigrants.
 - Group C – High-rise rental, mostly two parent households of mixed socioeconomic status, higher educated, living in rental apartments. More foreign born, recent immigrants, South Asians and other non-white visible minorities.
 - Group D – High-rise rental, predominantly two parent households and a relatively high proportion of single parent families of lower socio-economic status, blue collar jobs, lower education levels, living in rental apartments and social housing. More children, blacks and non-white visible minorities.
- Income change from 1970 to 2005 was -37% relative to CMA average. All four subgroups of City #3 were below the CMA average income by 1990. For each census period the incomes steadily declined.
- Of the 59 census tracts in the City of Toronto that have social housing, 30 are located in City #3 (26% are in Group A, 33% are in Group B, 19% are in Group C, 22% are in Group D).

- City #3 has the largest percentage of visible minority groups (66% compared to 47% for the Toronto average, 35% for City #2 and 18% for City #1).
- City #3 also has the highest percentage of foreign-born (61%) compared to 50% for Toronto as a whole. The subgroups within City #3 that have the highest percentage of foreign born are Groups A and C, both with 70% foreign born.
- 88% of City #3's neighbourhoods are low income in 2005; 67% of Toronto's low income neighbourhoods are in City #3.

Evaluation

This supplement provides useful information about the most impoverished of Toronto's 3 Cities, City #3. It provides thought-provoking tables and graphs to illustrate the differences between City #3 and Toronto as well as the four subgroups within City #3.