



Identifying, mapping and modelling trajectories of poverty at the neighbourhood level: The case of Montréal, 1986–2006

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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 (1986–2006) in the proportions of recent immigrants and of residents with low levels of education.

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Introduction

Globalization, economic restructuring, demographic shifts, as well as changes in government policies have modified the social divisions of cities (Jargowsky, 2003; Van Kempen & Murie, 2009; Walk, 2001), notably the spatial distribution of low-income populations within metropolitan areas. As a result, the geography of poverty and social deprivation is now receiving growing attention in North America as well as in Europe (Cooke & Marchant, 2006; Heisz & McLeod, 2004; Kearns & Parkinson, 2001; Kitchen & Williams, 2009; Lupton & Power, 2004; Madden, 2003a, 2003b). To date, most of the empirical work on neighbourhood change has examined transformations between two points in time (Kitchen & Williams, 2009; Mikelbank, 2006; Reibel & Regelson, 2011; Vicino, 2008). With the exception of the recent work of Mikelbank (2011) on the Cleveland–Akron metropolitan area, few studies have analyzed trajectories with precision i.e. they have not investigated changes in the socioeconomic characteristics of neighbourhood populations over more than two points in time.

This low level of interest among geographers is surprising, given that longitudinal analysis has been developed considerably in the social sciences over the last two decades, both in North America and Europe. Indeed, many studies have investigated individual trajectories, notably professional, family and residential trajectories using, for example, event history analysis (Blossfeld, Drobnic, & Rohwer, 1998; Courgeau, 1985, 1993; Desrosiers & Lebourdais, 1991; Vandersmissen, Séguin, Thériault, & Claramunt, 2009). Transformations in the urban built environment have also received some attention, notably in relation to land use changes in cities and their suburbs (Hewitt & Escobar, 2011; Keys, Wentz, & Redman, 2007; Salvati, Munafo, Morelli, & Sabbi, 2012; Tavares, Pato, & Magalhães, 2012).

Likewise, in the 1980s–1990s, a number of researchers have analyzed gentrification processes at work in major American and Canadian metropolises (Berry, 1986; Bourne, 1993; Bunting & Fillion, 1988; Clark, 1987; Ley, 1986, 1993; Rose, 1984; Smith & Williams, 1987), whereas more recently, studies have documented the impoverishment of inner ring suburbs (Cooke & Marchant, 2006; Jargowsky, 2003; Lee & Leigh, 2007; Madden, 2003b; McConville & Ong, 2003; Short, Hanlon, & Vicino, 2007; Smith, 2006). Both processes – gentrification and inner ring suburb impoverishment – result in significant changes in the urban geography of poverty. The contribution of this paper is to demonstrate the value of trajectory analysis for understanding change in neighbourhood poverty over a 20-year period in the Montreal Census Metropolitan Area (CMA).

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Latent Class Growth Model is used as a tool to identify these trajectories. These trajectories are subsequently modelled using multinomial logistic regression.

Background

Studying changes in neighbourhood poverty

Recent studies on the geography of poverty, notably in American metropolises, document changes in the distribution of poverty zones within metropolitan areas, particularly the impoverishment of inner ring suburbs (Cooke & Marchant, 2006; Lee, 2011; Lee & Leigh, 2007). Other research investigates trajectories of poor neighbourhoods, such as the study of McConville and Ong (2003) which tracked the change, or lack of change, in poor neighbourhoods, i.e. whether neighbourhoods stayed poor, worsened or improved over time. In their study, changes are explained in relation to transformations in other neighbourhood characteristics such as ethnicity, immigration, education, employment and household type.

In Canada, few studies have analyzed changes in poverty (or in deprivation) at the intra-metropolitan scale. Most studies provide descriptive analyses at the census tract level of the redistribution of poverty or deprivation within metropolitan areas. Ley and Smith (2000), jointly taking into account four deprivation indicators measured at the census tract level, observed that some deprived census tracts in Toronto, Montreal and Vancouver in 1971 were no longer deprived by 1991, while other non-deprived neighbourhoods in 1971 had become so by 1991. In a more recent study also based on census data, Heisz and McLeod (2004) reported variations in both the proportion and the spatial distribution of low-income neighbourhoods within different Canadian metropolitan areas between 1981 and 2001. They noted that in 2001, low-income neighbourhoods in Montreal and Toronto were less concentrated in the inner city and were more present in inner-suburbs than they were in 1981. Similar changes in the spatial distribution of low-income neighbourhoods were also observed in many American metropolises (Jargowsky, 2003; Madden, 2003a). Although these studies document overall changes in the distribution of the low-income population in different metropolitan areas, they do not explore trajectories of neighbourhood poverty per se.

A study by Kitchen and Williams (2009) offers a more comprehensive analysis of neighbourhood change. Looking at Saskatoon, a mid-sized Canadian metropolis, the authors characterized the socioeconomic profile of 58 neighbourhoods in 1991 (at the beginning of the period of observation), classifying them as low, middle or high socioeconomic status neighbourhoods. Then they analyzed the change in socioeconomic status in terms of decline, improvement or stability over a 10 year period up to 2001, focusing on two sub-periods 1991–1996 and 1996–2001. Considering the socioeconomic status at beginning of the study period and the type of evolution over time, they investigated the factors of change related to the socioeconomic characteristics of the population living in each neighbourhood. Although this study (Kitchen & Williams, 2009) is a fruitful contribution to the analysis of neighbourhood change, a period of ten years of observation may nevertheless be too brief to capture significant changes such as gentrification or suburban impoverishment.

Poverty trajectories and presence of populations at risk

According to classical studies of low-income populations, certain characteristics of individuals and their households are known to put them at a greater risk of poverty (Noble, Wright, Smith, & Dibben, 2006; Pampalon, Gamache, & Hamel, 2011).

For example, a strong presence of lone-parent families is a factor that makes a neighbourhood particularly susceptible to poverty concentration (Apparicio, Séguin, & Leloup, 2007; Heisz & McLeod, 2004; Kitchen & Williams, 2009; Lee, 2011; McConville & Ong, 2003; Pampalon et al., 2011), as does the presence of a high proportion of immigrants, especially recent immigrants (Heisz & McLeod, 2004; Ley & Smith, 1997, 2000; Walks & Bourne, 2006). Similarly, concentrations of populations with low levels of education (Kitchen & Williams, 2009; Lee & Leigh, 2007; Lupton & Power, 2004; Pampalon et al., 2011) as well as high unemployment rates (Kitchen & Williams, 2009; Lee, 2011; Lee & Leigh, 2007; Lupton & Power, 2004; McConville & Ong, 2003; Pampalon et al., 2011; Walks & Bourne, 2006) are associated with neighbourhood poverty. The presence of a high proportion of renters is also linked to poverty (Kitchen & Williams, 2009; Lee, 2011; Lee & Leigh, 2007; Lupton & Power, 2004), although being a renter could be seen more as a consequence of poverty than as a cause. A strong presence of these characteristics in the same geographical area thus increases the probability that it will be an area of concentrated poverty.

Until now, most of the work analysing socioeconomic changes in neighbourhoods has involved two points in time, rarely going beyond a period of ten years (Kitchen & Williams, 2009; Mikelbank, 2006; Reibel & Regelson, 2011; Vicino, 2008). With the exception of the study of Mikelbank (2011) on Cleveland, and the descriptive work of McConville and Ong (2003) on Southern California, it is rare for studies to identify 'real' neighbourhood trajectories. To identify real trajectories, it is important to consider more than two points in time and look beyond a period of ten years.

Research objectives

The aim of this article is to elaborate a typology of neighbourhoods according to their trajectories of poverty from 1986 to 2006 and to test if the presence of different populations at higher risk of poverty explains these trajectories. This article therefore makes both a methodological and empirical contribution by demonstrating the relevance of trajectory analysis and applying it to the Montreal CMA.

In a first step, we identify neighbourhood poverty trajectories within the Montreal CMA by grouping neighbourhoods characterized by similar levels of poverty at the beginning of the study period as well as by a similar pattern of change in their poverty levels from 1986 to 2006 – over a 20 year period. The study is based on census data from the years 1986, 1991, 1996, 2001 and 2006, at the census tract level. At each point in time, poverty is measured as a continuous variable, so a neighbourhood can be characterized by a complex trajectory. For example, a neighbourhood can experience declining poverty level, then increasing poverty level, followed by stable level of poverty, finishing with declining poverty level. Statistically, this is achieved by applying a clustering technique for longitudinal data – Latent Class Growth Model, described later. In a second step, we examine whether these neighbourhood trajectories are explained by different socioeconomic characteristics of the neighbourhood population at the beginning of the period, and/or by the changes in these characteristics over the 20 years.

Data and methods

Identifying trajectories of relative poverty concentration

To identify trajectories of poverty at the neighbourhood level in the Montreal CMA between 1986 and 2006, two preliminary steps were necessary: selection of a measure of poverty and then harmonization of the spatial units of observation over the five

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