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Modeling Residential Mobility in Montreal, 1860–1900

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Residential change is a part of the modern North American lifestyle, and it has been argued that city dwellers of the nineteenth century were even more mobile. Today about one-fifth of residents in the United States and Canada change their addresses in a year, and about half the population moves within a five-year period (Glick 1993; Short 1978). Knights (1971) suggested that in mid-nineteenth-century Boston perhaps as much as half the population entered or left the city every year or two.

Geographical mobility, in general, refers to any change in primary place of habitation, whether that change entails a move between two dwelling units in the same building or a move between two continents. Local moves are usually referred to as residential mobility, whereas long-distance moves are regarded as migration. Most early studies of nineteenth-century mobility followed Stephan Thernstrom's (1964) landmark examination of Newburyport, Massachusetts, and dealt primarily with the phenomenon of out-migration from urban areas rather than intra-urban moves (see, for example, Weber 1976; Kirk and Kirk 1974; Thernstrom 1973; Blumin 1969). By calculating the percentage of names that fail to reappear in a source such as the census or city directory after a given period of time (usually ten years), such studies typically concluded that “migration out of nineteenth century cities took place on a massive scale” (Thernstrom and Knights 1971, 19). Thernstrom speculated that those out-migrants may have constituted a sort of “permanent floating proletariat” (1973, 42) who drifted from one city to another.

More recent studies have questioned those old ideas associating migration, “transiency,” and poverty or marginality in nineteenth-century society (see Widdis 1992; Bouchard 1991; Hardy 1989; Bodnar 1985; Darroch 1981; Stephenson 1979). With more sensitive tracing procedures, new studies have shown that migrants were neither rootless nor aimless and that migration was channeled within complex cultural, institutional, and kinship networks as families sought employment in new labor markets or, more simply, a better life. Whereas historians have been most effective in explaining why certain individuals or families migrated from country to city, or between cities, research explaining the movement of people within cities in the nineteenth century has been more limited. Using comprehensive survey data, Rossi’s (1955) modern classic, Why Families Move, told us that local moves are adjustments to changes in housing need as households grow, shrink, age, or alter their social and economic position. In this article I attempt to explain the household adjustment process by examining the effects of such factors as socioeconomic status and family situation on household mobility in late-nineteenth-century Montreal. I will provide evidence that suggests an underlying logic of household moves as adaptations to nineteenth-century conditions of life, further contradicting the old notion of a “floating” tide of population.

Although studies of present-day household mobility provide a well-developed set of theories and substantial evidence of empirical regularities with respect to who moves and how far, historical applications have been severely limited by the quality of available data. To overcome this limitation, Montreal offers exceptional sources. In addition to the usual documents available for most North American cities—census records, property tax rolls, and city directories—this project takes advantage of two exceptional sources in the rental tax rolls and the complete civil records of baptisms, burials, and marriages. By combining these high-quality sources, and by working with a sample drawn from a larger project with full reconstitution of families, I have been able to explore household mobility using a life-course perspective. With this comprehensive database, it was possible to test for the nineteenth-century context, hypotheses derived from the literature of present-day mobility, and to design a multivariate (logit) analysis that
takes into account the impact on household persistence of such factors as social status, tenure type, age, cultural background, and family size. I provide evidence suggesting that households in the nineteenth-century city moved for basically the same reasons they do today; however, I also discuss other factors that are not widely suggested in the modern mobility literature and do not easily lend themselves to a multivariate analysis, but remain important in describing the nineteenth-century experience.

Between 1861 and 1901, Montreal underwent rapid industrialization. Its population tripled (from 100,723 to 324,880), and the labor force was segmented into progressively more specialized tasks in which the positions people held differed according to their age, gender, ethnic origin, and recency of immigration to the city. In the volume and timing of its waves of immigration, Montreal resembled other "seaboard cities" of North America, but its ethnic structure was distinctive. Surges of immigration brought three predominant groups of people to the city: rural French Canadians, Protestants from the British Isles, and Irish Catholics, each with distinct social characteristics. Residential segregation existed along both class and ethnic lines (Lewis 1991; Olson 1989), and the city’s unique social fabric helped construct a distinctive urban structure.

The duplex/triplex habitat created in the late nineteenth century forms an important component of the present housing stock, and Montreal has remained exceptional among Canadian cities in the size of its low-rent market, the high level of tenancy, and the frequency of household moves (Choko and Harris 1990; Lewis 1990). Because so much housing stock took the form of the "duplex," or double decker, it dictated that at least half the units would be tenant occupied. Whereas Hamilton and Toronto had owner-occupancy rates of around one-third (Katz, Doucet, and Stern 1982; Doucet 1972), rates were much lower in Montreal—only about one-sixth at the end of the century. Moving is an important adaptive strategy, and the rental market offers a degree of freedom to a household under a severe budget constraint. Therefore, in this study I not only try to shed new light on certain aspects of nineteenth-century society, but I also attempt to provide insights into a problem of continuing present-day interest: how households adapt their housing situation to accommodate changing needs and opportunities.

Expectations

From present-day behavior, we derive expectations against which we can evaluate the observed behavior of a nineteenth-century sample population. Mobility is a selective process. The modern literature indicates that some people are more likely to move than others and demonstrates great regularity in distances over which households move. Studies of modern household mobility have repeatedly pointed to homeownership, occupational status, age, and household size as important predictors of mobility. I will briefly review these factors one by one.

First of all, the literature consistently reports that homeowners move less often than renters (Morrow-Jones 1988; Rudel 1987; Bourne 1981; Michelson 1977; see also note 4). The transaction costs of owning are substantially higher than those of renting, and with ownership, attachment to home appears to grow stronger. Owner-occupiers are also more free to physically modify their dwellings to accommodate changing needs and aspirations (Tipple 1991) and are therefore less likely to move than renters.

Because people of higher socioeconomic status are more likely to be homeowners, they are likely to move less frequently. Household heads employed in higher-status occupations have a greater disposable income and a steadier income, as well as greater job stability, itself an incentive to remain in one location (Quigley and Weinberg 1977; Cain and Quigley 1975; Pickvance 1974). A few studies, however, such as Fredland (1974) and Brown (1975), discovered that mobility increased slightly with income. When they move, higher-status household heads are more likely to move greater distances (Bourne 1981).

Even though the modern literature reports that the number of people in the household affects the decision to move (Glick 1993; Moore and Rosenberg 1993; Morrow-Jones 1988; Clark, Deurloo, and Dieleman 1984), the relationship is ambiguous. Newman (1970) found mobility highest among singles and childless couples, but among families with children, mobility varied directly with size of family. Fredland (1974) reported that households with two to four members were the most mobile. Change in household size is perhaps a more intelligible indicator of mobility. A majority of moves among married couples can be attributed to life-cycle changes that make the size of the dwelling no longer compatible with the needs of the household. This type of housing adjustment usually requires only a short-distance move (Long 1988; Rossi 1955).

The most consistently reported result in modern mobility research is the inverse relationship between mobility and age of the household head (Glick 1993; Moore and Rosenberg 1993; Pickvance 1974; Rossi 1955). Increasing age brings occupational stability and, consequently, residential stability. Munro (1987) argued that this pattern may be a result of increasingly conservative behavior among older individuals. Older households are perhaps more attracted to the security and stability associated with home ownership and thus have a higher rate of persistence (Clark, Deurloo, and Dieleman 1984). Older households are also less likely than young ones to make housing adjustments to accommodate family growth. Long (1972) and Goodman (1976) both found that the effect of age is much stronger than life-cycle stage or household size on the likelihood of moving.

Those expectations are the most commonly reported in the literature of present-day moves and, as we shall see, also prove significant in explaining mobility in the nineteenth cen-
tury. In contrast to modern studies, in this study I attempted to understand the moving behavior of a society no longer accessible by interview or survey questionnaire. Therefore, before examining the findings, I address how the database was constructed.

**Sources and Operational Measures**

The sample population used for this research included over 1,000 families, approximately 400 French Canadian, 300 Irish Catholic, and 300 Protestant, drawn by surnames, to represent the three major cultural communities of nineteenth-century Montreal. The sample consisted of all persons bearing one of twelve surnames—one French, one Irish Catholic, and ten Protestant—derived from the birth cohort of 1859 (3,500 families), designed to achieve a certain sample size, and stratified to permit comparisons among three subgroups.6 The mobility analyses were based on subsets of the sample for a given five- or ten-year interval between 1861 and 1901 (see table 1).

Whereas most studies of nineteenth-century mobility relied on one basic source—typically the manuscript census or city directory—in this study I used record matching to reconstruct a suitable database.7 Information was compiled for all households and individuals with selected surnames from five censuses (1861, 1871, 1881, 1891, and 1901), nine tax rolls at five-year intervals (1861–1901), as well as parish registers of births, deaths, and marriages (1840–1920), and annual addresses from city directories (1860–1901). The sample population was compared with the entire set of households in the rental tax roll for Montreal in 1861, 1881, and 1901, to confirm that the three sub-samples, increasing at different rates, could be added together to provide a rough representation of the urban population. By matching records from four major sources, I was able to offset some limitations inherent in individual sources.

The decennial census, for example, is considered to be one of the most accurate and comprehensive sources of data available for studying social history (see Darroch and Soltow 1994; Steckel 1988; Harris 1986), but it is infrequent. Annual city directories are one of the most convenient sources in which local change can be traced; they list all household heads, classified alphabetically and by street address. Directories tend, however, to underestimate low-income residents and those who move often, thus giving poor coverage to areas with high tenancy rates and high proportions of immigrants (Harris 1986; Knights 1969). The Montreal directories understated the nineteenth-century Unitarian and Irish Catholic population; they did not fully report the occupations of women and lodgers (Olson 1989; Cross and Dudley 1972).

All births, deaths, and marriages in nineteenth-century Montreal were recorded with a parish and became part of the "civil registration." Although the parish registers (our third major source) rarely provided addresses, they did offer excellent control for persistence within the city at large (cf. Bouchard 1991).

Of special importance for this study was the fourth source, the city of Montreal tax rolls. A rental tax assessment, also known as the water tax, was established in 1846 to raise funds for the waterworks. Montreal was one of the few cities in North America where tenants were directly assessed, and a list of both owners and tenants was recomposed annually. The city assessor recorded the name of the occupant, his (occasionally her) occupation, religion, whether the home was tenant or owner occupied, the assessed value of the building and land—for tenants a rental value, and for owner-occupiers an estimated market value for rent based on the floor area. The reliability of this source as a market appraisal of rental values has been confirmed in previous studies (Lewis 1990; Hanna and Olson 1983).8

The reconstitution of families was accomplished by collecting from parish registers in Montreal and its suburbs between 1840 and 1920 all the birth, marriage, and death records of individuals with the sample surnames. Those records were then matched against the full set of tax records at five-year intervals, to provide addresses for each household over time. Information on household composition was obtained from the manuscript census, and city directories were used to confirm addresses.9

No other city in nineteenth-century North America kept records of this caliber for three culturally distinct communities. For each couple, the date and place of marriage, the address and rental value of their successive dwelling places (and occasionally businesses), occupations, ethnicity, religion, mother tongue, ages, dates of birth of their children (and for each son or daughter, the death and/or marriage) are available. Marriage of a son created a new family in the sample, and to close the record on the original couple, the dates of death are noted. The sample population basically represents a diverse set of people and their children.

The sample can also be visualized as a complex group of movers and stayers. Consistent with earlier historical studies, mobility was measured here by its inverse: the propor-

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**TABLE 1**

Sample Sizes by Cultural Community: Number of Households in Tax Rolls and Censuses

<table>
<thead>
<tr>
<th>Year</th>
<th>French Canadian Tax roll</th>
<th>French Canadian Census</th>
<th>Irish Catholic Tax roll</th>
<th>Irish Catholic Census</th>
<th>Protestant Tax roll</th>
<th>Protestant Census</th>
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<tr>
<td>1861</td>
<td>88</td>
<td>100</td>
<td>42</td>
<td>52</td>
<td>49</td>
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<td>1881</td>
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<td>69</td>
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<td>1886</td>
<td>107</td>
<td>109</td>
<td>61</td>
<td>65</td>
<td>69</td>
<td>66</td>
</tr>
<tr>
<td>1891</td>
<td>127</td>
<td>142</td>
<td>73</td>
<td>81</td>
<td>67</td>
<td>62</td>
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<tr>
<td>1896</td>
<td>145</td>
<td>88</td>
<td>83</td>
<td>83</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>1901</td>
<td>173</td>
<td>174</td>
<td>89</td>
<td>82</td>
<td>104</td>
<td>113</td>
</tr>
</tbody>
</table>
tion of households persisting at the same location over a five-year interval. The choice of a five-year interval was consistent with recent conventions (U.S. and Canadian census practice) as well as historical research: people who stay five years show a strong tendency to stay longer. Even though the Montreal housing market is structured around an annual lease (historically beginning 1 May), and annual sources are available—the tax roll, the city directory—I selected a longer interval to minimize the uncertainties of dates of moves, and I used the annual records only to identify persons or corroborate their presence. It is in the matching process that the wealth of sources came into play. Similarly, I have not insisted upon the residence in the same dwelling unit but have confirmed persistence within the same "street segment" or block-face. Montreal is largely a duplex habitat, and this avoids certain ambiguities and confusions in recording the duplex residents, in renumbering streets, and in recording the dwelling "over the shop" or at the back of the lot.

To specify the length of a move and to differentiate local from long-distance moves or out-migration, I divided the city into two dozen districts, each a collection of street segments that were fairly homogeneous in socioeconomic characteristics. Moves within a district were usually less than 750 m. A move to an adjoining district, on average, was a distance of about 1 km, and a move to a nonadjoining district was assumed to have been more than 1 km from origin.

For the nineteenth-century sample population, to test hypotheses derived from the literature of present-day residential mobility, I cast all explanatory variables into categories (see figure 1). Ages were grouped into three categories based on the age of household head (30 years or younger, 31 to 49, 50 and older). Status, adapted from the often-used Katz (1972) classification, was aggregated into three categories. The two tenure categories were simply resident owners versus tenants, as reported in the municipal tax roll. Household size was divided into three categories (four members or fewer, five to six, seven or more), each representing approximately one-third of the sample. The cultural communities were the three most numerous in Montreal during this period: Protestants of British origin, Irish Catholics, and French Canadians. They could be sorted out by combining the census variable ethnic origin with language (English or French) and religious affiliation.

I was also concerned with the interrelationships. The variables discussed thus far were not entirely independent. When considering ethnicity, for example, I had no a priori reason to expect Catholics or Protestants to persist or move. In Montreal, one might hypothesize that English-speaking households (Protestant or Catholic) will show a greater propensity to move out of the city because they belong to a continental network of communications and economic opportunities. On the other hand, one might anticipate higher rates of persistence among Protestant families because they had, on average, higher incomes, higher-status occupations, and higher rates of homeownership (Bradbury 1993; Lewis 1990; Olson 1989).

To untangle these interrelationships, I attempted a multivariate model. In the field of urban studies, techniques have been developed to model present-day mobility (see Clark and Van Lierop 1986; Clark and Hosking 1986; Stillwell and Congdon 1991; Cadwallader 1992). The logit model employed here is a regression model used to specify the functional relationship between a dichotomous dependent variable and one or more categorical, or scaled, independent variables. I chose logit regression because the dependent variable, household persistence, is dichotomous; that is, whether a household persists or not, the proportion of times the household persists will be either one or zero. In actuality, we are observing a binomial random variable based on a sample size of one. If we have many such observations, it is possible, after using the logit transformation, to regress them against a set of independent variables to see the extent to which they explain residential mobility. In this particular case, I had about a thousand observations, which I regressed against five independent variables: age of household head, occupational status, tenure, ethnicity, and household size.

Findings

Overall household mobility in Montreal was high and consistent over the forty years of analysis (see table 2). By the end of five years, fewer than one-third of households remained at the same address: about two-fifths of Protestant households and one-quarter of French Canadian and Irish Catholics. By the end of ten years, household persistence had fallen to approximately 25, 15, and 15 percent, respec-
tively (figure 2, for example, displays the persistence curves for the 1886 cohort).

Out-migration was also high, for by the end of five years only two-thirds (67.5 percent) of the sample could still be found in the city (75.6 percent Protestant, 67.1 percent French Canadian, and 59.8 percent Irish Catholic); after ten years, only three-fifths (59.0 percent) remained in Montreal (69.0 percent Protestant, 57.3 percent French Canadian, and 52.0 percent Irish Catholic). Nevertheless, the ten-year rate of removal in Montreal (41 percent) seems to have been only two-thirds what Parkerson (1982) reported as the nineteenth-century North American average (62 percent). To validate any comparison of out-migration rates in different cities, one must compare the methods used to derive these rates. Burial records were used to correct rates of persistence for removals because of death; most previous studies, including those cited by Parkerson, did not account for such removals and, therefore, may have tended to inflate rates of migration and mobility. The problem is serious in any study of nineteenth-century populations, with their faster-paced life cycles and shorter life expectancies, over periods as long as a decade.

All the anticipated relationships between household mobility and the explanatory variables were observed in the nineteenth-century sample. Homeowners moved less often than renters (see figure 3a). Persistence increased with rising occupational status of household head (see figure 3b). In every sample year, older couples had higher persistence rates than younger couples (see figure 3c). The largest households also had the highest rates of persistence (see figure 3d), whereas households that increased in size were more likely to move than households remaining the same or decreasing in size.

The continuity of results over the forty years suggests that recency of immigration to the city had little effect on the propensity to move. This consistency of behavior also suggests that households were rational decision makers; the decision to relocate was a logical response to changes in household characteristics—the same reasons usually attributed to present-day moves.

Although the expectations based on modern behavior appear valid, the explanatory variables, as noted, were not entirely independent of one another. The higher persistence among Protestants, for example, was associated with higher-status occupations (figure 4) as well as higher rates of ownership (see figure 5a), which were highly intercorrelated (see figure 5b). Thus, the impact of each variable on a household’s decision to move or stay can be determined only in a multivariate framework.

Thanks to the consistency of the results reported for five-year persistence over the forty-year study period, it proved feasible to collapse all the five-year persistence tests into a single large sample of persisters and nonpersisters. Over some greater time period or in some other city, this consistency might not have resulted, and sample sizes would have become much more constraining. Fortunately, this was not the case, and because of the substantial size of the total sample (965 observations), multivariate analysis could be performed with a considerable degree of confidence in the results.

All relationships, treated individually for the larger sample, appeared to be significant, as the chi-square statistics shown in table 3 reveal. All chi-square values were higher

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Household Persistence by Cultural Community (In Percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>French Catholic</td>
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<tr>
<td>Five-year interval</td>
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<tr>
<td>1861-1866</td>
<td>22.5</td>
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<tr>
<td>1866-1871</td>
<td>21.9</td>
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<tr>
<td>1871-1876</td>
<td>24.2</td>
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<tr>
<td>1876-1881</td>
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<td>1886-1891</td>
<td>30.6</td>
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<td>1891-1896</td>
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<td>1896-1901</td>
<td>28.6</td>
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<tr>
<td>Ten-year interval</td>
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<td>1861-1871</td>
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<td>1866-1871</td>
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<td>1886-1896</td>
<td>18.5</td>
</tr>
<tr>
<td>1891-1901</td>
<td>13.1</td>
</tr>
</tbody>
</table>

FIGURE 2
Household Persistence and Cultural Community

PROTESTANT
FRENCH CANADIAN
IRISH CATHOLIC
than 5.991 (the critical value of chi-square for 95 percent confidence and 2 degrees of freedom), and associated $p$ values were low (below .05); therefore, in each case, I rejected the null hypothesis that persistence is independent of the explanatory variable. Household size had a borderline effect, with a chi-square value of 5.209 and a $p$ value of .074, and could not be ruled out without further analysis.23

When the five variables were individually run through the logit model, they naturally produced similar results. The results from the simple regression models estimating persistence with a single independent variable are reprinted in table 4. The results of a logistic regression are evaluated in the same way as those of a linear regression. The estimated coefficients for most parameters (except for medium-sized and Irish Catholic households) were large relative to their standard errors, reflected in high $t$ ratios (greater than 2.0) and low $p$ values (less than .05), and therefore they appeared to be important predictors of persistence. The logit coefficient tells us how much the logit increases for a unit increase in the independent variable. The odds ratio is a more intuitively meaningful figure for each coefficient.24 Increasing occupational status appears to have had a positive effect on household persistence: the odds of persisting were increased by a multiplicative factor of 1.73 when a
The results of the simple logit regressions substantiated the findings of the bivariate analysis and were consistent with the chi-square statistics. Bivariate analyses suggested that all the proposed explanatory variables had the anticipated effects in terms of sign and apparent statistical significance. The relative strength of each effect, however, was yet to be determined. When persistence is modeled with two or more independent or explanatory variables, the strong correlation is apparent. The saturated model comprised all variables that, in the single independent variable models, showed $p$ values lower than .05 and odds-ratio confidence intervals greater than 1.00. Thus, this model included the following independent variables: ethnicity, occupational status, tenure, household size, and age of household head. Because household size had an insignificant effect on persistence when modeled with the other variables ($p$ values equal to .44 and .34 for medium and large households, respectively), it was removed from the model, and logit analysis was performed again with the four remaining independent variables. The output from this model can be seen in table 5, where the four remaining variables had significant effects on household persistence. Home ownership was a decidedly powerful determinant of household persistence, with owner-occupiers nearly five times (4.85) more likely to persist than tenants. Although age was highly correlated with other variables, it remained highly significant. Middle-aged households were 2.44 times more likely to persist than young households, and the oldest were 2.88 times more likely. Cultural background still remained a significant factor, as Protestants were 1.51 times more likely to persist, and Irish Catholic households were 1.43 times more likely to persist than French Canadian households. Occupational status had the weakest effect; indeed, the effect of being employed in a middle-status occupation appeared to be stronger than the effect of being employed in a high-status occupation. Although occupational status was highly correlated with the other variables, it remained an important variable.

Household persistence in nineteenth-century Montreal can therefore be predicted by the model:

$$
\log \left( \frac{P}{P_{0}} \right) = -2.071 + 0.266 \text{ High-status} + 0.500 \text{ Middle-status} + 0.357 \text{ Irish} + 0.414 \text{ Protestant} + 0.892 \text{ Middle-aged} + 1.057 \text{ Old} + 1.579 \text{ Owner-occupier}.
$$

As shown in table 5, deciles of risk were used to assess predictive performance, and they indicated a good fit. To assess whether the results were unduly influenced by a handful of unusual observations, I made an inspection of the leverage values (O'Brien 1992), as with the classic regression model. In this case, high-leverage observations accounted for only .5 percent of all observations, which was less than 5 percent (95 percent confidence), and the results indicated a good fit of the model to the data. These tests provide assurance that the proposed model is a good fit and that household persistence in nineteenth-century Montreal can be adequately predicted.
To discover which independent variables have the greatest explanatory effect on household persistence when compared with other variables, I generated a series of logit models, each successively excluding one variable from the four-variable saturated model, and then compared the effects of the exclusion on the model's log-likelihood ratio. The results shown in table 6 demonstrate that homeownership had the greatest explanatory effect compared with the other variables, as the log-likelihood ratio dropped to -615.837 when the tenure variable was removed. Age of household head was the second most powerful predictor, and occupational status and ethnicity had the weakest explanatory powers. Nevertheless, all variables remained significant.

The results of the multivariate analysis were, on the whole, consistent with findings for modern household mobility, and they confirmed the observations of other historians who have found that "homeowning slows residential mobility and that occupational level (and, implicitly, income and social status) fails to discriminate well..." (Tobey, Wetherell, and Brigham 1990, 1409).

| TABLE 3 | Five-year Household Persistence Rates for Various Subgroups, 1861–1901 |
|-------------------------------|-----------------|---|
| Subgroup                     | Percentage     |
| Tenure                       |                 |
| Owners                      | 64.1            |
| Tenants                      | 23.7            |
| Chi-square (1 df): 194.881   | p value: .000  |
| Age of household head        |                 |
| Young                        | 19.7            |
| Middle                       | 42.8            |
| Old                          | 47.7            |
| Chi-square (2 df): 42.490    | p value: .000  |
| Occupational status          |                 |
| Low status                   | 21.7            |
| Middle status                | 32.3            |
| High status                  | 39.7            |
| Chi-square (2 df): 29.914    | p value: .000  |
| Household size               |                 |
| Small                        | 33.3            |
| Medium                       | 37.2            |
| Large                        | 43.3            |
| Chi-square (2 df): 5.209     | p value: .074  |
| Ethnicity                    |                 |
| French                       | 27.6            |
| Irish Catholic               | 29.7            |
| Protestant                   | 37.5            |
| Chi-square (2 df): 14.493    | p value: .001  |

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TABLE 4  
Output of Logit Analysis Estimating Persistence with Single Independent Variable Models

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Reference group</th>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>t ratio</th>
<th>p value</th>
<th>Odds ratio</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure</td>
<td>Tenants</td>
<td>Owners</td>
<td>1.747</td>
<td>0.133</td>
<td>13.089</td>
<td>0.000</td>
<td>5.739</td>
<td>7.455-4.418</td>
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<tr>
<td>Status</td>
<td>Low status</td>
<td>Middle status</td>
<td>0.548</td>
<td>0.146</td>
<td>3.748</td>
<td>0.000</td>
<td>1.730</td>
<td>2.304-1.299</td>
</tr>
<tr>
<td></td>
<td>Low status</td>
<td>High status</td>
<td>0.868</td>
<td>0.161</td>
<td>5.401</td>
<td>0.000</td>
<td>2.382</td>
<td>3.264-1.739</td>
</tr>
<tr>
<td>Size</td>
<td>Small</td>
<td>Medium</td>
<td>0.168</td>
<td>0.189</td>
<td>0.866</td>
<td>0.376</td>
<td>1.182</td>
<td>1.713-0.816</td>
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<tr>
<td></td>
<td>Small</td>
<td>Large</td>
<td>0.424</td>
<td>0.187</td>
<td>2.271</td>
<td>.023</td>
<td>1.528</td>
<td>2.204-1.060</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>French Canadian</td>
<td>Irish Catholic</td>
<td>0.103</td>
<td>0.129</td>
<td>0.799</td>
<td>0.424</td>
<td>1.108</td>
<td>1.426-0.861</td>
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<tr>
<td></td>
<td>French Canadian</td>
<td>Protestant</td>
<td>0.456</td>
<td>0.123</td>
<td>3.698</td>
<td>.000</td>
<td>1.578</td>
<td>2.009-1.239</td>
</tr>
<tr>
<td>Age</td>
<td>Young</td>
<td>Middle Age</td>
<td>1.116</td>
<td>0.206</td>
<td>5.416</td>
<td>.000</td>
<td>3.052</td>
<td>4.571-2.038</td>
</tr>
<tr>
<td></td>
<td>Young</td>
<td>Old</td>
<td>1.315</td>
<td>0.212</td>
<td>6.218</td>
<td>.000</td>
<td>3.727</td>
<td>5.641-2.462</td>
</tr>
</tbody>
</table>

TABLE 5  
Output of Logit Analysis Estimating Persistence with Four Independent Variables

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>t ratio</th>
<th>p value</th>
<th>Odds ratio</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.071</td>
<td>0.255</td>
<td>-8.128</td>
<td>.000</td>
<td>1.305</td>
<td>2.046-0.833</td>
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<tr>
<td>High status</td>
<td>0.266</td>
<td>0.229</td>
<td>1.161</td>
<td>.246</td>
<td>1.648</td>
<td>2.430-1.118</td>
</tr>
<tr>
<td>Middle status</td>
<td>0.500</td>
<td>0.198</td>
<td>2.523</td>
<td>.012</td>
<td>1.429</td>
<td>2.049-0.996</td>
</tr>
<tr>
<td>Irish Catholic</td>
<td>0.357</td>
<td>0.184</td>
<td>1.938</td>
<td>.052</td>
<td>1.512</td>
<td>2.147-1.065</td>
</tr>
<tr>
<td>Protestant</td>
<td>0.414</td>
<td>0.179</td>
<td>2.311</td>
<td>.021</td>
<td>1.512</td>
<td>2.147-1.065</td>
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<tr>
<td>Middle age</td>
<td>0.892</td>
<td>0.219</td>
<td>4.075</td>
<td>.000</td>
<td>2.441</td>
<td>3.749-1.589</td>
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<tr>
<td>Oldest</td>
<td>1.057</td>
<td>0.233</td>
<td>4.538</td>
<td>.000</td>
<td>2.877</td>
<td>4.540-1.823</td>
</tr>
<tr>
<td>Owner</td>
<td>1.579</td>
<td>0.185</td>
<td>8.549</td>
<td>.000</td>
<td>4.852</td>
<td>6.970-3.378</td>
</tr>
</tbody>
</table>

Log-likelihood = LL(N) = -575.694  
Log-likelihood of constants-only model = LL(0) = -652.189  
2*([LL(N)] - [LL(0)]) = 152.990

Deciles of risk

<table>
<thead>
<tr>
<th>Category</th>
<th>.100</th>
<th>.200</th>
<th>.300</th>
<th>.400</th>
<th>.500</th>
<th>.600</th>
<th>.700</th>
<th>.800</th>
<th>.900</th>
<th>1.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Observed</td>
<td>.000</td>
<td>24.000</td>
<td>21.000</td>
<td>109.000</td>
<td>89.000</td>
<td>6.000</td>
<td>23.000</td>
<td>105.000</td>
<td>16.000</td>
<td>.000</td>
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<tr>
<td>Expected</td>
<td>.000</td>
<td>22.040</td>
<td>28.387</td>
<td>106.442</td>
<td>87.063</td>
<td>5.709</td>
<td>21.505</td>
<td>105.627</td>
<td>16.225</td>
<td>.000</td>
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<tr>
<td>Reference</td>
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<tr>
<td>Observed</td>
<td>.000</td>
<td>117.000</td>
<td>91.000</td>
<td>198.000</td>
<td>112.000</td>
<td>5.000</td>
<td>9.000</td>
<td>36.000</td>
<td>4.000</td>
<td>.000</td>
</tr>
<tr>
<td>Expected</td>
<td>.000</td>
<td>118.960</td>
<td>83.613</td>
<td>200.558</td>
<td>113.937</td>
<td>5.290</td>
<td>10.495</td>
<td>35.373</td>
<td>3.775</td>
<td>.000</td>
</tr>
</tbody>
</table>

Average probability | .000 | .156 | .253 | .347 | .433 | .519 | .672 | .749 | .811 | .000 |

Note: Independent variables—ethnicity, occupational status, tenure, and age of household head.

Discussion

Nineteenth-century mobility behavior mirrored twentieth-century behavior in several respects. Each of the explanatory variables chosen for further analysis had the effects anticipated in the literature of modern moves. However, other factors that affected household mobility in the nineteenth century, such as workplace accessibility and kinship relations, are not often discussed in the modern literature. The database used in the present study offers some additional clues to the logic of moves. First, spatial patterns of moves were analyzed, followed by variations in household composition, to highlight differences between nineteenth- and twentieth-century societies and to raise the fundamental question of the importance of mobility to working-class families.

Almost one-third of households in the sample disappeared from analysis in any five-year period. Disappearances may have resulted from out-migration, the restructuring of households, deaths, or the complications of record...
rates of household persistence appeared weak and even ambiguous, socioeconomic status was a powerful element in residential pattern (see Olson and Hanna 1990; Lewis 1991), and the location of employment played a major role in the decision to move.\textsuperscript{32} As shown in studies of contemporary mobility, a change in employment may result in a change in income and create dissatisfaction with the housing unit as well as workplace accessibility.\textsuperscript{33} Longer-distance moves often result from job changes, undertaken primarily for economic advancement (Bourne 1981). In nineteenth-century Montreal, the residential history of two Protestant employees of the Grand Trunk Railway—one blue-collar, one white-collar—illustrated the complex relationship between occupation and dwelling experience. The machinist and his wife made several moves during their lifetime together, always staying within walking distance (1 km) of the railway shops and within 1/2 km of their previous dwelling. Meanwhile, their white-collar counterparts made fewer moves, but over greater distances, to increasingly more affluent neighborhoods. Stability of employment led to social advancement and a budget that could accommodate tram fare to live farther away from the office. The mobility behavior of an Irish Catholic policeman in the sample also revealed the importance of proximity between workplace and residence. In his seventeen years on the force (1874–91), his family made nine moves. Half the moves appeared to result from his reassignment to a new beat, and each new residence was within a block or two of the new police station.

Although household size appeared to be insignificant when considered in the multivariate analysis, the effect of a change in household size remained important.\textsuperscript{34} The addition of a new member to the household often created a need for more space, best satisfied by a move to a larger dwelling. A decrease in household size appeared less likely to trigger a

### Table 6

<table>
<thead>
<tr>
<th>Model scenario</th>
<th>( \text{LL}(0) )</th>
<th>( \text{LL}(N) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure removed</td>
<td>-652.189</td>
<td>-615.837</td>
</tr>
<tr>
<td>Age removed</td>
<td>-652.189</td>
<td>-587.586</td>
</tr>
<tr>
<td>Status removed</td>
<td>-652.189</td>
<td>-579.196</td>
</tr>
<tr>
<td>Ethnicity removed</td>
<td>-652.189</td>
<td>-579.048</td>
</tr>
<tr>
<td>Saturated model (No removals)</td>
<td>-652.189</td>
<td>-575.694</td>
</tr>
</tbody>
</table>

Matching.\textsuperscript{30} Out-migration was exaggerated in previous studies that failed to account for the significance of these last three factors. The findings suggest that at least one in ten disappearances over ten years can be attributed to death. That elusive group often known as the removal category will be discussed later; however, their geographical destinations are beyond observation. The moves of a set of households under continuous observation for five years (or more) in Montreal was the prime objective of the research. Of those surviving households who remained in Montreal and were identified, more than one-half of French and three-fifths of Protestant and Irish Catholic households remained within the same street segment and in most cases the same dwelling. What happened to the half of French households and the two-fifths of Irish and Protestant households who did not stay within the same block? Again, the behavior of the nineteenth-century sample resembled modern behavior: most moves were over short distances, and more moves were made within neighborhoods than between neighborhoods (see figure 6).\textsuperscript{31} The trend from 1860 to 1900 was for more people to stay within the same district, partly because districts were developed and became more densely populated by the end of the century, leaving households a greater array of housing options within their own neighborhood. At the same time, more households tended to make long-distance moves. The population of Montreal increased rapidly during this period, and the city pushed its limits farther into the countryside (see figure 7 for the location, by districts, of sample households in each of the three major cultural communities in 1861, 1881, and 1901). Ethnic residential segregation remained strong over the forty years. A population flow eastward, westward, and especially northward is apparent; an ever-larger "hole in the doughnut" as the central business district became less populated, the wealthy extended their low-density territory, and more land was allotted to railway yards. Developments of electric tramways in 1892 meant that salaried workers could live farther away from their place of employment and were no longer restricted to walking distance (about 2 km).

Although the statistical effect of occupational status on rates of household persistence appeared weak and even ambiguous, socioeconomic status was a powerful element...
FIGURE 7
Location of Sample Households by Cultural Community in Montreal, 1861, 1881, and 1901

PROTESTANT HOUSEHOLDS 1861

IRISH CATHOLIC HOUSEHOLDS 1861

FRENCH HOUSEHOLDS 1861

PROTESTANT HOUSEHOLDS 1881

IRISH CATHOLIC HOUSEHOLDS 1881

FRENCH HOUSEHOLDS 1881

PROTESTANT HOUSEHOLDS 1901

IRISH CATHOLIC HOUSEHOLDS 1901

FRENCH HOUSEHOLDS 1901

NUMBER OF HOUSEHOLDS

- 1
- 2
- 3 to 4
- 5 to 8
- 9 to 16
- > 16
move. When grown children left to form their own households, the space requirement of the initial household shrank somewhat, but not back to its original level. The older couple now had more possessions and had developed a lifestyle they wanted to maintain. More important, it was necessary to maintain extra space in case grown children or grandchildren returned to stay. Older households in nineteenth-century Montreal were likely to have living with them at least one adult child who contributed to the family income and thus helped create an improved standard of housing. In addition to their own children, older couples may have taken in boarders to help pay the rent or supplement retirement savings (see Lauzon 1992; Bradbury 1993).

In the nineteenth century, the average family life cycle ran at a much faster pace. A couple who lived twenty-five years after marriage might easily have experienced a dozen births and half a dozen deaths (Olson and Thornton 1992). Significant numbers of moves were triggered by vital events. In all cases of “removal” at the end of five years, at least 6 percent are explained by the death of both husband and wife, and almost one-third involved the death of one partner. A widow faced an affordability crisis, whereas a widower faced a crisis of household management. Household persistence rates were low among the recently widowed, regardless of gender. Only one-fifth (21.4 percent) of newly widowed women in the sample were at the same address five years after the deaths of their husbands. Meanwhile, even fewer husbands (16.4 percent) were found at the same address five years after the deaths of their wives. Among surviving couples, persistence rates reached one-third.

Not only was widowhood a cause of shrinking households, but it also often implied a shrinking income. Many working-class women outlived their husbands and turned to their children for financial and emotional support (see Thornton and Olson forthcoming). Cohabitation among relatives was one of the most common coping strategies. Sharing household responsibilities, a stove, or a privy was best regulated in a family setting (see Bradbury 1993; Lauzon 1992; Gilliland and Olson forthcoming).

Migration to, and mobility within, Montreal was not based solely on the experience of a “permanent floating proletariat” of young men, but rather that of couples, groups of siblings, or entire families. Kinship networks played a crucial role in the adjustment to new environments, whether it was the transition from farm to city (see Bouchard 1991; Gagnon 1988; Hareven 1975), or from one block to the next (Bradbury 1993). Knowledge and social networks were reinforced by lifetimes of neighboring and kinship. Nineteenth-century household behavior differed from present-day household behavior for two primary reasons: the fast-paced life cycle and the extent of kinship dependency.

To predict mobility, one must keep in mind that not all nineteenth-century moves were voluntary. Involuntary moves were triggered by events beyond the control of the household. Eviction by public or private action and destruction of the housing unit (such as by fire) were the primary causes of involuntary moves. Nineteenth-century social reformer Herbert Ames (1972) observed that more than 10 percent of households in the low-rent “City Below the Hill” had left their former abodes within a two-month period during the autumn of 1896 because they were unable to satisfy the claims of the landlord, “one of the sad features of poverty’s lot” (74). Forced moves often meant doubling-up with parents or siblings or staying in a boardinghouse.

Having confirmed that home ownership was indeed associated with residential persistence, I now raise the question of how attitudes and policies toward home ownership can manipulate mobility. Governments have long been active in designing programs to promote home ownership. Tobey, Wetherell, and Brigham (1990) suggested that it was the housing policies of the Federal Housing Administration and other New Deal agencies that brought about the sharp decline in mobility in the United States after World War II. In the late-nineteenth century, ownership was perceived by philanthropists and industrialists as a means of constraining and manipulating a workforce. Whether home ownership induces work discipline and job stability, or vice versa, has been the focus of debate among housing researchers (see Doucet and Weaver 1991; Pratt 1989). Friedrich Engels (1872, 18) warned: “For our workers in the big cities freedom of movement is the first condition of their existence, and land ownership could only be a hindrance to them. Give them their own houses, chain them once again to the soil and you break their power of resistance to the wage cutting of the factory owners.”

Contemporary observers of the nineteenth-century city assumed that a transient population was uncontrollable and potentially dangerous; a community could not be created out of constantly changing ingredients (Dennis 1984). The Montreal study has shown, however, that the majority of movers did not merely “float” through the city but relocated short distances away, usually within a street or two of their former homes. The ingredients of the community were not changed, merely stirred.

Although a few modern studies (Pratt 1989; Aitken 1987; Kemeny 1981) have asserted the advantages of rental status for low-income people, most government housing policies still favor homeownership. It has been argued that these policies depend on sustaining the myths concerning the superiority of homeownership (Rohe and Stegman 1994; Kemeny 1981). In North America, homeownership is a primary indicator of personal achievement and social status. It is the tenure to which most North Americans have aspired and toward which they have been encouraged to aspire (Choko and Harris 1990; Doucet and Weaver 1991). I have argued elsewhere (Gilliland and Olson forthcoming) that the Irish in Montreal, with a rate of homeownership lower than the French, nevertheless made greater progress toward improved housing: larger dwellings, less crowding, and an evident preference for streets of low or moderate density.
For low-income households, moving was an adaptive strategy, and the rental market offered a degree of freedom. Under late-nineteenth-century conditions, such as higher death rates and higher fertility, flexibility was more important than it has been in the twentieth century. In the “walking city” of the late nineteenth century, changes in jobs, or in sites of work (as on construction sites), required residential adaptations. Extended families, providing for their members the critical safety net with respect to sickness and layoffs, needed great resilience in their composition and therefore potential for relocation.

Conclusion

Although slightly more mobile (one-third persistence over five years versus one-half today), the nineteenth-century mover resembled the present-day mover in several ways. Persisting households were more likely to be homeowners, older, high status, and Protestant; most moves, past or present, were decisive strategies of coping. Nineteenth-century society differed from today’s in the faster-paced life cycle and the level of kinship dependency; this difference may be the cause of the higher rates of mobility.

I have argued against the old notion that nineteenth-century urban society was merely a transient, floating population. With richer sources, firmer hypotheses, and multivariate analysis, I have uncovered relationships that suggest an important core of stable residents and stable neighborhood structures founded on extended family networks. The work points to the critical nature of decision making and reminds us that tenancy and mobility of households are rational, orderly, and responsive forms of behavior.

NOTES

Financial support was provided by the Canada Mortgage and Housing Corporation and the “Montreal in Miniature” research project directed by Dr. Sherry Olson and funded by the Social Science and Humanities Research Council of Canada. I am grateful for suggestions provided by Professor Gordon Ewing (McGill University) and the editor and anonymous reviewers of Historical Methods.

1. Most of this historical research studied residential mobility as one element in a broader study of social mobility. Among the most noteworthy works of this genre are Thornicroft (1964, 1973); Blumin (1969); Sennett (1970); Worthman (1971); Knights (1971); Chudacoff (1972); Katz (1975); Weber (1976); Katz, Doucet, and Stern (1982).

2. Most findings corroborated this claim. For example, in a review of published data from record-linkage studies of sixty-eight different communities, Parkinson (1982) found the average rate of nonpersistance to be 62 percent.

3. Although there is no shortage of historical studies of intra-urban mobility, most have been concerned only with determining rates of mobility rather than explanations for the mobility. Because the sources and methods have limitations, however, mobility rates are often suspect. Furthermore, the variation in procedures used by different authors makes it extremely difficult, and perhaps imprudent, to compare rates between cities. A few of the more exceptional historical studies of intra-urban mobility include Tobey, Wetherell, and Brigham (1990); Dennis (1984); Burstein (1981); Doucet (1972); and Chudacoff (1972).

4. Comprehensive reviews of contemporary mobility theory can be found in Moore and Rosenberg (1993); Glick (1993); Long (1988); Cadwallader (1986); Clark (1982); Golledge (1980); and Clark and Moore (1980); Short (1978); Quigley and Weinberg (1977); Brown and Moore (1970); and Simmons (1968).

5. The most notable influxes of French Canadians came in the 1850s and 1880s, although migrants from the countryside continually flocked to Montreal. Fleeing the Great Famine in their homeland, Irish Catholics came on the “death ships” in the summers of 1847 and 1849. After 1849, Irish Catholics continued to emigrate to the United States, but because of shipping regulations and costs of passage they did not come to Montreal (see Thornton and Olson 1993; Mackay 1990). Protestant immigration was less significant, and by mid-century only a small minority in Montreal were foreign-born. By 1891, “other” ethnic groups in Montreal represented only 2 percent of the population and only 4 percent by 1901.

6. Further discussion of the sampling procedure can be found in Thornton and Olson (1991) and Gilliland and Olson (forthcoming). The database was partially assembled by Professors Sherry Olson (McGill University) and Patricia Thornton (Concordia University) to study other aspects of demographic behavior in Montreal over the half-century from 1850 to 1900; it was expanded for a study of household mobility. We hope to make the database available to the public at some future date.

7. A few historical mobility studies have used other unusual data sources such as utility billing records (Tobey, Wetherell and Brigham 1990); however, life-history approaches, which link together data from multiple sources, are still the exception (see Widdis 1992).

8. This source is complete for the city of Montreal from 1861 and progressively for all the suburbs by 1886. About 10 percent of households in the suburban area for the years 1861–76 may be missing. The effect is probably minor, for these households were almost exclusively of low-status groups and French Canadians, otherwise well represented in the samples.

9. Problems arose when households with identical names were being traced. For example (hypothetical), the different Joseph Tremblays and Patrick O’Neills who might have appeared in the database. Such a problem was especially evident with the smaller Irish Catholic population, where only one surname was used to compile the sample, a few “first” names were popular, and geographical concentration was intense. Several laborers named Pat O’Neill might have been living within a few blocks of one another. Family reconstitution from parish records permitted a substantial array of matching variables—in addition to name of household head—as occupation, age, names of spouse and children. Because of the wealth of available sources, the matches were performed with a great deal more information than is usual in mobility studies, and therefore the matches were more secure than those of studies that rely on name alone to make links. Over 70 percent of families who appeared in the parish records could also be found in the census, and 70 percent in the tax roll (see Olson, Thornton, and Thach 1989). It was fairly easy to find the first 70 percent of the sample and considerably more difficult to find the remaining individuals. Tax-roll entries were accurately matched with those in the census and the city directory about 90 percent of the time. The illegible handwriting of certain enumerators caused a large share of the missing records as well as underenumeration in the source.

10. In mobility studies, this phenomenon is known as cumulative inertia. Households who remained for a long time appeared to become attached to a specific location or home, whereas recent immigrants were more likely to move again soon.

11. For further explanation of the system of coding by street segments, see Hanna and Olson (1983), or Olson (1989).

12. A move within a district could have been anywhere in length between a few feet down a street, to 3 km (the farthest possible move within the largest district). A move to an adjoining district could have been anywhere in length from 50 feet across a boundary road to 3.5 km (the longest possible move between two districts). Moves to a nonadjacent district could have been anywhere from one-sixth of a km (the shortest possible distance between two districts) to 10 km—the width of the city in 1901.

13. Mean household size, in both sample and census population, fell from six persons in 1861 to five persons in 1871 and remained at that level until 1901.

14. Protestants of Irish origin were included in the “Protestant” category and not with the Irish Catholics. Religious affiliation was reported in our census records, as well as baptisms, marriage, deaths, and property tax rolls (for school support). Although Irish Catholics and Irish Protestants did not intermarry (Olson 1983), in nineteenth-century Montreal was strongly segmented by church-related institutions, including the schools and recreational associations (see Young and Dickinson 1988; Linteau 1992; Robert 1994). Other demographic characteristics, such as infant
mortality and fertility behavior, also indicate that Irish Protestants were more like other Protestants from England, Scotland, and Wales than their Catholic counterparts (see Thornton and Olson 1991).

15. In the field of urban geography, transportation analysts have most frequently used the logit model to examine the choices that commuters make between alternative modes of travel (see Ben-Akiva and Lerman 1985). For a comprehensive discussion of the methodology of logit models, see Coughlin and Hosking (1986, 448–66), O’Brien (1992, 232–86), or Wrigley (1985).

16. Studies show decennial rates of "intra-city" persistence as high as 71 percent in Indianapolis between 1880 and 1890 (Barrows 1981), and as low as 16 percent in South Bend between 1860 and 1870 (Easington 1975).

17. About 6 percent of removals were excluded from the five-year analysis because of death, and 10 percent from the ten-year analysis. Because of the dificulties of recording match, a small percentage of deaths were missed (about 1–2 percent), and therefore actual persistence may be slightly higher than reported. The analysis may be missing some records because a small number of individuals, primarily French Canadian, may have been buried in their parish of origin outside Montreal (see Bouchard 1991).

18. Notable exceptions are the study of Buffalo and Hamilton by Katz, Doucet, and Stern (1982), who used death records, and Knight’s (1971) study of Boston, where removal because of death was estimated from a formula based on annual death rates in the city. The obstacles to comparing persistence rates in different cities include not only the variations in methods used, but also contextual differences in city size, housing stock, and economic situation (Galenson and Levy 1986).

19. A household was considered to be increasing or decreasing if a change was registered, adding or subtracting at least two members. Ten-year persistence rates over the forty-year study period averaged 23.6, 27.2, and 35.5 percent for increasing, stable, and decreasing households, respectively, but results were inconsistent from decade to decade.

20. Moreover, there was not a high rate of arrival of immigrants after 1861 (see Linteau 1992; Linteau, Durocher, and Robert 1979).

21. Owner-occupancy rates averaged 16.2, 19.0, and 20.4 percent over the study period, whereas rates for "new households" persisting at least five years were equal to 20.1 percent, and equal to 23.4 percent and 25.5 percent for households persisting ten and fifteen years, respectively. Owner-occupancy rates increased with length of residence in the city. It is unclear, however, whether persistence in the city led to homeownership or whether homeownership caused a household to persist. It might eventually be possible to disentangle this complex relationship by comparing rates of mobility for tenants just before they become owners, with the rate tenants who did not become owners, and the rate for ex-tenants just after they became owners; however, because of the current nature of our sample and the choice of five-year intervals, the current study is too coarse to accomplish such an analysis over five-year intervals restricted the number of cases available for an analysis that sought to compare mobility (or persistence) for tenants just before they become owners (P1), with tenants who did not become owners (P2), and for ex-tenants just after they become owners (P3). The number of tenants who became homeowners was small to begin with, and to calculate P1 and P3 one needs households that we could trace as tenants for at least two consecutive intervals, or ten years, before their first appearance as owners, and for at least one interval, or five years, after first becoming owners. Although based on only twenty-three households, such an analysis was suggestive. Persistence rates for tenants just before they became owners (P1) was 39 percent, and rates for ex-tenants just after they became owners (P3) was 74 percent. Rates for tenants who did not become owners (P2) was about one-quarter. Therefore, because P1 was only slightly higher than P2, but significantly lower than P3, the results seem to suggest that the effect was with ownership. That P1 was slightly higher than P2, and that P3 (74 percent) was slightly higher than the average persistence rate for all owner-occupants (about two-thirds), was not at all startling, given the tendency toward "cumulative inertia." Those observations were based on a more stable group of households, those that had existed in the city for at least fifteen years; previous research suggested that their rates of persistence were likely to be slightly higher. Montreal was probably not the appropriate venue for this experiment, given its extremely low rates of owner-occupancy compared with those of other North American cities (see Choko and Harris 1990, for a good discussion of this subject). Approximately 15 percent of those in any year were owners, who were predominantly upper-class Protestants.

22. The same couple may appear more than once in the data set, but it may have a different household size, fall into a different category of age, occupational status, or tenure. The total sample contained 1,737 observations, but only 1,004 distinct households. Any household record missing an entry for just one explanatory variable was excluded from the multivariate analysis, and, therefore, persistence was modeled on an even smaller set (965 cases) but a more complete set of observations. In almost every case, exclusions were due to a lack of definite information on household size, primarily owing to the infrequency of the census (ten-year intervals) and the small possibility that a birth or death record was missing. Growth of the sample means that results are weighted toward the latter part of the century.

23. Marital status, tested both as a three-category independent variable (single, married, widowed) and with two categories (single versus married), was removed from the model because the findings were inconsistent over the forty-year period. It proved to be a poor predictor (p values of .262 and .226 for the three- and two-category variable, respectively), consistent with the modern literature, thus suggesting that age and size are better predictors of mobility.

24. The odds of the response is given by the formula p/(1–p), where p is the probability of response, and the odds ratio is the multiplicative factor by which the odds change when the independent variable increases by one unit. Probability statistics and odds ratios are calculated for each response category relative to the dummy reference group: for Irish Catholics and Protestants relative to French Canadians; for high and medium status relative to low status; for owners relative to tenants; for large and medium-sized households relative to small ones; and for middle-aged and older families relative to young families. Upward-and lower-confidence limits are set at 95 percent. If the lower bound is greater than 1, then the variable is significant (see Steinberg and Colla 1991).

25. Observed totals are everywhere close to expected totals, response totals gradually get higher, and reference totals gradually get lower as the probability approaches 1, thus indicating a good fit. The deciles-of-risk table is produced by partitioning the sample into ten evenly spaced probability groupings from 0 to 1. The row labeled "category" gives the end points of the cells defined within each decile. With each cell is a breakdown of the observed and expected Os (References) and Is (Responses). For further discussion, see O’Brien (1992), Steinberg and Colla (1991), Hosmer and Lemeshow (1989), or Pregibon (1981).

26. High leverage is defined as a value greater than twice the number of parameters divided by the number of cases (3 x 8 / 965 = 0.017). In this case, only 5 observations out of 965 (.52 percent), exceed 0.017, affecting the model’s fit.

27. The model currently tells us which subcategory of each independent variable has the greatest effect relative to other subcategories. The higher the logit coefficient, the greater the effect. The effect of owning one’s home, for example (estimate = 1.579), is stronger compared with rental tenure than the effect of being high social status (estimate = 0.266) in comparison with low status.

28. When removed from the model, the independent variable with the greatest explanatory effect on persistence will cause the greatest decrease in the log-likelihood of the given model, and LL(0) is the log-likelihood of the constants-only model, one can determine variable significance. For example, for ethnicity (the variable with the weakest explanatory power), the calculation is 2(–575.694) = (–652.189) – (–652.189) = 152.990 = 146.281 = 6.709. Because 6.709 > 5.991 (95 percent confidence with 2 degrees of freedom), the variable is marginally significant. With the same method, the other three variables also appear to be significant.

30. For the most part, any complications are caused by what is missing from official records, not with the system of linkage itself.

31. For each decade, the values represent the percentages of households that moved to another street segment in the same district, in an adjoining district, or in a district farther away. Each is shown as a percentage of all within-city movers.

32. Exact location of employment was available only for a small number of households in the sample (typically for merchants whose business addresses were recorded in the city directory or tax roll), and so this factor could not be adequately appraised.

33. Although occupational titles were available for every household as reported in the census, city directories, and tax rolls, it is difficult to accu-
rately measure occupational change. The problem, as Katz (1972, 70) noted, "was interpreting those [changed] titles; in which case did it signify a change of job, and in which case was it merely a use of an equivalent title?" In nineteenth-century Montreal, people often used different terms to describe the same job at different times: thus we have accountant-bookkeeper-cashier, or trader-dealer-grocer-merchant-storekeeper. Whereas some variations suggest a degree of vertical mobility—for example, shop clerk to grocer, grocer to dealer, and dealer to merchant—it is possible that the change in title results from differences in reporting from year to year. This problem is compounded in a bilingual city (e.g., printer-typographer-gruveur). The use of a three-category occupational stratification scheme eliminated some ambiguities, but too few cases of vertical mobility between status categories were witnessed in the sample to incorporate an occupational-change variable in the model with confidence in the results.

34. Households that increased in size over a ten-year period were the least likely to persist, whereas households that decreased in size were most likely to persist (see note 15). These results, however, were inconsistent from decade to decade. Change in household size could be reliably measured only for those households that remained in Montreal and for which a census record was available; the analysis was therefore based on a considerably smaller sample. Also, because reliable five-year persistence rates were not available, "change in household size" was not included in the multivariate model. Nevertheless, if it were included, like "household size," it would probably be highly correlated with other variables such as age of household head.

35. Examination of a sample of fifteen hundred laborers gathered from the 1901 census demonstrated that the annual wage of a laboring household head did not change with age. On average, a 55-year-old laborer earned no more than a twenty-year-old laborer. Total family income, however, was higher for the older age group because children or lodgers were contributing to household earnings. Wealthy families ran larger and were much more likely to have hangers-on.

36. Massive conflagrations in the summers of 1850 and 1852 wiped out almost one-fifth of the city's housing stock (Hanna 1986). Involuntary moves were not entirely random. The poor were always hardest hit, as their homes were usually built out of wood.

37. The findings for Ames's study area also suggested a high mobility rate. Only one-quarter of sample households (eight out of thirty) residing in this area in 1896 were at the same address five years later.

REFERENCES


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