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Changes in residential preferences for homes' attributes during the past 30 years: examples from two mid-sized Canadian cities

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Abstract

Changes in residential preferences for homes' attributes may predict increasing or decreasing demand for homes and neighbourhoods of residents. Residential preferences are measured experimentally as social utilities of 103 residents in 1985/1987, and 74 residents in 2020 for 12 generic attributes of homes in two mid-sized Canadian cities. Mean utilities for attributes' levels are different for six attributes between two study periods, while preferences for the other six attributes remained the same. One process of change in residential preferences through time is a resident's calculation or interpolation of a utility or price for a newly (un-)available type of home: such as differences between two attributes' levels of basement condition and home renovations, and neighbouring house type and repair. Another process is a resident's reassessment of the utility of an existing type of home: such as differences between four attributes' levels of ages, and ethnic group and education of neighbours, house age and exterior finish, and house type and size. Average differences in preferences occurred because respondents in 1985/1987 discriminated between these six attributes' levels, whereas respondents in 2020 evinced indifference between them. Changes in residents' utilities for attributes' levels through time, especially for their most preferred attributes' levels have theoretical, methodological and practical implications.

Keywords Residential preference · Conjoint measurement · Home attributes · Social utility · Recent movers · Inner-city neighbourhood

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Introduction

This study measures changes in residential preferences by comparing residents' utilities for 12 attributes of homes more than 30 years apart in two mid-sized Canadian cities, Saskatoon SK in 1985/1987, and Windsor, ON in 2020. Comparable residential utilities are quantitatively measured with similar methods for similar respondents for similar generic attributes of homes in each period. Comparisons are simple statistical ones between samples of respondents' mean utilities at one time or another. Average values with their 95% confidence intervals controlling for numbers of respondents will best represent each sample's preferences for attributes' levels—albeit unless averaging has inadvertently cancelled out individual differences in preferences and budget constraints. These comparisons may identify residents' persistent preferences for attributes of the types of homes and neighbourhoods moved into or from, versus their more changeable ones. Either way, (un-)changing utility for available homes' attributes may enable and constrain the choice of owning or renting an urban, suburban or rural home as much as personal economic or life course considerations in other studies (Booi and Boterman 2020; De Groot et al. 2013).

Residential preferences

A person's preferences in general are retrieved or activated from cognitive values for entities such as homes when making a choice; or they may be constructed or interpolated from other cognitive values at time of choice in unfamiliar environments (Warren et al. 2011). Preferences operate as cognitive orientations towards entities such as homes that a person may or may not be able to exercise in choices. Just because something is preferred does not guarantee it will be chosen. An early critical interpretation of this fluidity was for manipulated personal residential preferences when residents interact with the housing market and its societal environment such as while searching for a new home: "Households are not autonomous decision-making units and behavioural aspects of residential mobility are more realistically explained as a form of adaptive behaviour to the system of housing supply and allocation, which is, of course, dependent on the structure of the wider society" (Short 1978, p. 442). A more sustainable recent criticism is "residential preferences are a complex and sometimes inconsistent set of factors that are related to among other things the house itself …, its place … and how it provides access to amenities …, but also how it facilitates social interaction with friends and family. For each individual these preferences differ and also shift over time" (Booi and Boterman 2020, p. 96).

Residents' preferences may naturally fluctuate through time and space if they have changing social or economic values for liked and disliked homes; where a home is composed of attributes of its dwelling unit, the surrounding environment and its residents, and its accessibilities to destinations (e.g., Benjamin and Paaswell 1981; Knight and Menchik 1976; Phipps and Clark 1988). Residential preferences may also fluctuate if residents alternate between two potentially different cognitive

scales of value for the same attribute of a home. Two cognitive scales distinguish, respectively, between the attribute's usefulness in terms of social utilities, and its economic affordability in terms of property or rental prices (Judson et al. 2014; Phipps 1987; Quigley and Weinberg 1977; Weinberg et al. 1981). Changes in attributes' valuations may thus be caused by not only evolution in the needs, aspirations, budgets, and social environments of similar residents through time, but also shifts in their available housing alternatives and methods for evaluating these (Warren et al. 2011).

Two processes for residents' changing their preferences through time are hypothesized and applied in this study. One hypothesized process is a resident's calculation or interpolation of a utility or price for a newly (un-)available type of home. Another hypothesized process is a resident's reassessment of the utility of an existing type of home. Regardless, the cognitive and social reasons for these changes are not tested. Besides, few studies have theorized the cognitive values behind residential preferences and their differences from one person to another that may explain temporal changes in them (Coolen and Hoekstra 2001; Lindberg et al. 1989). For example, human values such as openness to change, conservation, self-enhancement, and self-transcendence may predict a choice of home such as that of a student after graduation if they explain differences in his or her student-housing preferences in conjunction with socio-demographics (Nijënstein et al. 2015). Similarly, a future housing choice may be predictable from a resident's evolving self-congruity between his or her self concept and a home's projected occupant image if this biases his or her social utilities for attributes (Sirgy et al. 2005). Furthermore, human values and self-congruity may impinge upon a resident's preferences after "correction" for personal and household social characteristics (Jansen 2012, p. 273). Residents may indeed have different scales of value for a home's social utility and its affordability depending on their gender (Darab et al. 2018), income and race/ethnicity (Clark 2009; Li et al. 2020), age and family composition (Booi and Boterman 2020; Jiang et al. 2020; Molin et al. 2001), and length of residence and knowledge of the housing market (De Vos et al. 2016).

Attributes of Canadian single-detached(-like) homes

Residents of mid-sized Canadian cities have long been hypothesized to have values or utilities for 12 generic attributes of conventional single-detached(-like) homes (Phipps 1987, 2018; Phipps and Clark 1988). These are not unique Canadian attributes of homes, as the same ones may still describe single-detached(-like) homes in Santa Monica, CA, USA, and Loughborough, LE, UK, with differently worded descriptors for levels of only one of the former's attributes and three of the latter's attributes (Phipps 1989). Canadian versions of these attributes (Table 1) are a dwelling unit's type and size, represented by x_1; its house age and exterior finish, x_2; its basement condition and home renovations, x_3; its lot size and garage, x_4; the neighbourhood's landscaping, x_5; the neighbouring homes' types and repair, x_6; the ages, ethnic group and education, and mobility of the resident's neighbours, x_7, x_8 and x_9, respectively; and the home's accessibilities to work and retail stores, schools, and parks or waterfront, x_{10}, x_{11} and x_{12}, respectively.

Table 1 Canadian homes' attributes' levels

Component	Attributes	Attributes' Levels in Windsor (possible additional wording in parentheses) and Saskatoon [possible alternate wording in square brackets]
Dwelling unit	House Type and Size	Bungalow or one-and-a-half storey house. [With less than 950 sq. ft floor space.] Two bedrooms
		Bungalow. [With 1050 sq. ft. floor space.] Three bedrooms
		Two-storey house. [With 1250 sq. ft. floor space.] Three-and-a-half bedrooms
		Two-storey house. [Split- or bi-level with 1400 sq. ft. floor space.] Four bedrooms
		Two-and-a-half storey house. [With 1700 sq. ft. floor space.] Four-and-a-half bedrooms
	House Age and Exterior Finish	Less than 5 years old. (Brick or stucco exterior finish.)
		Between 5 and 30 years old. (Vinyl or wooden siding exterior finish.)
		More than 30 years old. (Brick or stucco exterior finish.)
	Basement Condition and Home Renovations	No basement or a partial one. No [some] central air conditioning and outstanding features if it is newer; or no [some] central air conditioning and major renovations if it is older
		An unfinished or partly finished full basement. No central air conditioning and outstanding features if it is newer; or no central air conditioning and major renovations if it is older
		An unfinished or partly finished full basement. Some modern features including central air conditioning if it is newer; or some renovations, such as central air conditioning, new wiring, plumbing, windows and roof if it is older
		An insulated, completely finished full basement. Some modern features including central air conditioning if it is newer; or some renovations, such as central air conditioning, new wiring, plumbing, windows and roof if it is older
		An insulated, completely finished full basement. All modern features including central air conditioning if it is newer; or central air conditioning and extensive interior/exterior renovations if it is older
Neighbourhood	Lot size and Garage	Small, about 400 sq. m. or 30 ft by 120 ft., and so the house is close to neighbouring houses. (No front driveway or garage.)
		Medium, about 500 sq. m. or 55 ft. by 110 ft., and so the house (is separated from neighbouring houses) [has space for a driveway at its side]. (Single attached or detached front garage.)
		Large, about 700 sq. m. or 60 ft. by 125 ft., and so the house is separated from neighbouring houses. (Double attached or detached front garage.)
	Landscaping	Newly planted, with sparse shrubs and thin trees

Table 1 (continued)

Component	Attributes	Attributes' Levels in Windsor (possible additional wording in parentheses) and Saskatoon [possible alternate wording in square brackets]
	Neighbouring Home Types and Repair	Maturing, with lawns and some trees and shrubs
		Mature but overgrown and in need of replanting or pruning
		Very mature, with lawns, large trees and dense shrubs
		Almost all single-detached houses with owner-occupiers. (No houses in need of major repair.)
		Single- and semi-detached houses with mostly owners and some renters. (Some houses in need of major repair.)
		Includes some nearby modern walk-up rented-apartment or owned-condominium buildings. (Quite a few houses in need of major repair.)
		Includes some nearby high-rise rented-apartment or owned-condominium buildings. (No houses in need of major repair.)
Neighbours	Ages	Youthful single-person households [and mature families]. No children at home
		Middle-aged residents. Elementary school-aged children at home
		Middle-aged residents. Teenaged children at home
		Elderly residents [and older families]. With or without children at home
	Ethnic Group and Education	Working people with high-school education. Most are from same ethnic group as you
		Working people with high-school education. Most are from different ethnic groups than you
		Skilled and white-collar workers with high-school or technical-college education. Most from same ethnic group as you
		Skilled and white-collar workers with high-school or technical-college education. Most are from different ethnic groups than you
		Professional workers with university or college degree. Most are from same ethnic group as you
	Mobility	Few neighbours move each year
		Several neighbours move each year
		Lots of neighbours move each year
Accessibilities	Stores and Work Access	Within easy driving- or walking-access, up to (10) [15] min to major stores and/or work

Table 1 (continued)

Component	Attributes	Attributes' Levels in Windsor (possible additional wording in parentheses) and Saskatoon [possible alternate wording in square brackets]
		Not too far from major stores and/or work, up to (20) [30] min by car or bus
		Far from major stores and/or work, at least 30 [up to 60] min by car or bus
	Schools Access	Within 10 min walking to a school
		About 20 min walking or 10 min driving to a school
		Up to 25 to 30 min drive or bus ride to a school
	(Riverbank) [Parks] Access	(On the Detroit riverbank.) [Down the street to a neighbourhood park.]
		(About 10 min walking or a few blocks to the Detroit riverbank.) [Within 15 min walking or 5 min driving to a neighbourhood park.]
		Not conveniently close to (the Detroit riverbank.) [A park.]

The approach for (re-)confirming these attributes of houses and neighbourhoods, and their appropriate levels, was similar in two study areas: first, Multiple Listing Service (MLS) real estate catalogues of single-family homes for sale are examined to determine the attributes perceived by the local realtors to be important in discriminating between houses in the market. Second, these attributes are supplemented with neighbourhood-oriented ones derived from small-area data in the most recent national censuses. And finally, personal knowledge of the researcher and other housing professionals about local housing environments refine the selected sets of attributes. Selected attributes omit irresistibly preferred ones such as a crimefree or tidy neighbourhood, and rare ones such as an isolated or exotic location. They also do not portray the details of a home for which preferences may fluctuate even more than generic attributes in response to faddish marketing. Undescribed details include the dwelling unit's room layout and finishing except where implied in the condition of home; and marginal value-adding attributes such as presence of a fireplace, and more than one bathroom.

Otherwise, levels of lot size and garage, landscaping, and neighbouring home types and repair describe the conditions of the 20-or-so properties that are visible down the street. The neighbouring home types portray not only their types of owner or renter occupants but also the structural types of single-detached houses or apartment or condominium buildings. The generalized compositions of familiar neighbours are represented by their household members' ages, ethnic group and education, and mobility. These do not specify neighbours' personal characteristics that may influence a resident's feelings after knowing more about them (Boschman and van Ham 2015; Clark and Coulter 2015; Howley et al. 2015). Three accessibility attributes locate homes with respect to work and stores, schools, and the waterfront or parks. Distances and travel times represent those in relatively compact urban areas, within which most intra-city travel by car requires one half-hour or less. Farthest journeys to work and stores represent either a crosstown bus ride with transfers, or a car ride from outside the city. The farthest 25- to 30-min journey to a school is realistic for school-aged children who are bused to specialized out-of-neighbourhood academic programs.

Many studies of residential preferences, however, do not disaggregate homes or places into attributes when they ask residents about preferences for those homes or places; and there may be both theoretical and methodological reasons for this. A theoretical assumption of residents' mental disaggregation of a home into its attributes has implicit criticisms in at least three published reviews of residential mobility and migration literatures. For example, residents may evaluate homes in terms of their family's potential or actual social and psychological attachments, and not 'reflect' beyond those feelings to specific attributes. This practical consciousness rather than discursive consciousness in their decision making is analogous to that of migrants who are "more optimistic about being able to obtain work locally than objective conditions suggested" (Halfacree and Boyle 1993, p. 338). However, a response inspired by a "sympathetic" criticism of this consciousness in structuration theory is that residents will eventually know and work with the 'real' attributes of the home in accommodating their family (Storper 1985). Furthermore, residents may still evaluate the attributes of homes if they live in public or private housing with more

restricted housing options where "the actual choice may be based on some minor feature of the dwelling" (Short 1978, p. 441). Or if they as a "young [person] now move repeatedly in and out of the parental home during the protracted transition to adulthood" (Coulter et al. 2015, p. 2; Moos and Revington 2018).

A methodological reason for not measuring residents' preferences for attributes of homes or places may be the composition of analyzed secondary data, such as that used in at least four influential empirical studies (Booi and Boterman 2020; De Groot et al. 2011; Fuguitt and Brown 1990; Vasanen 2012). Each cited study has had a different substantive influence in the literature: Fuguitt and Brown (1990) interpret the 1970s migration turnaround as a product of changed residential preferences. De Groot et al. (2011) re-apply their innovative discrepancies between residents' desires to move home, intentions to move, and actual moves to observed moves into and out of Dutch cities (De Groot 2011). Vasanen (2012) restudies the relationship between residents' revealed and stated preferences by comparing recalled types of current or previous residential area with thirteen attitudinal statements in a questionnaire. And Booi and Boterman (2020) most recently illustrate these studies' methodology, first, with data for a survey question of, "Do you want to move outside a city or stay within a city?", having answer categories of, "prefer to stay in the city, prefer somewhere else in the country, prefer abroad, or no preference"; followed by a question: "When you move out of the city, where would you like to move to?", basically coded into suburban municipalities within a 20 km distance of the city or farther away. Second, these authors also illustrate other studies' hypotheses about unmeasured attributes that may or may not be observed attributes behind choices of or preferences for places: e.g., "we expect low-income households to prefer staying in the city, because of availability of social housing and the necessity to be near to the place of work" (Booi and Boterman 2020, p. 102); cf., "Preferences for rural living are often ascribed to the characteristics of rural areas such as peacefulness, space, greenness, and a slower pace of life" (De Groot et al. 2011, p. 129).

Hypothesized processes of changing residential preferences

This study therefore directly measures residents' residential preferences for attributes of homes and analyzes their changes through time. Two possible processes for changing preferences for these attributes of homes are clarified if $u_n^t(x_{ij})$ defines the nth resident's social utility for the jth level of the ith attribute of a home, and if $p_n^t(x_{ij})$ defines his or her economic willingness to pay for the attribute's level. In particular, one way of changing a preference from time $t-1$ to time t, $\Delta^{t-1}u_n^t(x_{ij})$, may occur after learning about an affordable newly available or unavailable jth level of an attribute of homes (Metcalfe 2001). For example, an attribute's new level may have an interpolated utility from familiar levels' unchanging utilities; an unavailable level may be removed from the utility function while not altering those familiar levels' values. Even if salient attributes of homes remain the same, a second way of changing a preference may occur with revised assignment of utility or value to an attribute by the use of a different u_n^t utility function or p_n^t price function, possibly with an adjusted budget constraint. These revised assignments may be responses to the

evolving needs and aspirations of residents for homes, their social environment for deciding about housing, and the complexity of these decisions for them (Abramsson and Andersson 2016; Warren et al. 2011).

In more detail, residential preferences may change when residents calculate or interpolate new utilities for previously unobserved jth levels of attributes of homes. They may especially learn to do this while periodically evaluating available homes on the market including those with new-fashioned attributes. They for example may assimilate single-detached(-like) homes' bigger livable floor spaces including extra bedrooms and bathrooms since the 1980s (Bruce and Kelly 2013); more owner-occupation of high-rise apartment buildings as opposed to rentals (Pfeiffer and Pearthree 2018); locations in more diversely populated neighbourhoods (Clark 2009); and farther than walking distances to workplaces, corner stores, schools, and small recreational parks (Bunting et al. 2007). Newly available levels of attributes may naturally be unaffordable for some residents. However, they may still calculate or interpolate utilities for unaffordable attributes' levels as well as affordable ones until they exercise their preferences in choosing an affordable new home. Operationally, unconstrained utilities will not be budget-constrained for filtering unaffordable attributes' levels from the utility function.

Newly available affordable attributes of homes may in particular gratify residents' evolving preferences for attainment of comfort, freedom, family, health, money, happiness, and pleasure as they progress through the life course (Biglieri and Hartt 2018; Jansen 2012; Lawton et al. 2013; Lindberg et al. 1987). Synchronously with this, however, residential preferences may also evolve if residents during the same stage of the life course have either upgraded or moderated their needs and aspirations through time (Darab et al. 2018; Opit et al. 2020; Rushton 1969). They for example may now demand a dwelling unit with separate bedrooms for children, a home office for adults, and a multiple-car garage (Filion et al. 1999). They may also be accustomed to living near diverse neighbours and high-density properties, or not (Evenson and Cancelli 2018; Ihlanfeldt and Scafidi 2004; Rashid 2018; Roe et al. 2005). They may have a private vehicle for each adult household member if everybody drives everywhere (Ralph 2018).

Residents nowadays may have this perception of reality if they construct preferences for homes within a social environment comprised of personal relationships and interactions with other individuals and institutions, some of whom have professional interests in housing (Desbarats 1983; Hogarth et al. 1980). For example, real estate professionals and mortgage lenders may be hired for providing information especially about the market for owner-occupied housing. Residential preferences may, therefore, be swayed by these information providers who inject their own unintended or intended biases into decisions by their provision of limited information, or by their display of limited sequences of numbers and/or types of housing alternatives (Levy et al. 2008; Palm 1976, 1982; Smith and Clark 1980; Smith and Mertz 1980).

Similarly, short-term adaptation to the complexity of decision-making during search for a new home may or may not translate into long-term revision of preferences for homes. Residential searchers in particular may switch between different forms of utility function in interaction with observed alternatives, such as when they

screen subsets of desirable or undesirable attributes with nonlinear noncompensatory utility functions (Payne 1976; Phipps 1983; Svenson 1979). Most wise decision-makers, however, will switch in the end to linear compensatory utility functions for evaluating all attributes of a few alternatives, as this study's respondents are assumed to do. That is, the nth respondent is assumed to behave as if summing the appropriate attributes' utilities for an overall valuation of a Jth home at time t, $U_n^t(X_J) = \sum_i w_{n,i} * u_n^t(x_{ij})$, after possibly weighting each ith attribute by its $w_{n,i}$ importance to him or her. Experimental measures of samples of respondents' unconstrained utilities for homes' attributes more than 30 years apart are described in the next section.

Experimental measurement of utilities for homes' attributes

Residents' utilities for homes were measured in three similar conjoint choice experiments in Saskatoon, SK in mid-1985, late-1986 and early-1987, and Windsor, ON in late-2019 and early-2020 (e.g., Marcucci et al. 2011; Rao 2014). These dates are more than 30 years apart, and that is their significance. The experiment for eliciting residential preferences in Saskatoon is the first stage in two versions of a human–computer simulation game of the residential choice process, as described in earlier studies (Phipps 1988, 1989; Phipps and Clark 1988). A respondent 'played' the simulation game at home on an IBM portable personal computer, with an experimenter present for 1 h or longer. The simulation game was computer-programmed from scratch; so too was the online project for eliciting residential preferences in Windsor via the internet. A participant was asked to budget up to one-half hour for browsing webpages in a modern internet browser, and without assistance of or motivation from an experimenter.

A respondent in the first stage of the simulation game indicated his or her desirability for 18 combinations of attributes' levels describing dwelling units, 15 neighbourhoods, 12 neighbours' compositions, and 10 accessibilities to work, schools and other facilities. A respondent in the online project rated 12 similarly composed homes. Fewer homes were displayed in the latter to assuage an unassisted respondent's suspicion of same or similar combinations of attributes' levels, while still being able to calibrate utilities' scales. Each home is represented in a first screen or tabbed display by levels of three attributes of the dwelling unit; in a second screen or tabbed display by three attributes' levels of the neighbourhood environment; and so on for three attributes' levels of the neighbours and three of the home's accessibilities. Combinations of attributes' levels for homes were programmed as realistic ones but comprehensive ones; and homes were displayed in random order (Bruch and Mare 2012).

A cosmetic difference between the simulation game and the online surveying project is the latter's automatic slideshow of stock photographs to portray idealized attributes' levels of each displayed home (Fig. 1). A more substantive difference is for slightly different displayed attributes' levels of local environments between the 1985 and 1987 experiments and the 2020 experiment, including the replacement of the attribute of access to a park with the more salient access to the riverbank

Fig. 1 Like or dislike of a home in the online surveying project

in Windsor's study neighbourhoods. Another substantive difference is in the subsequent scales of measured utilities because a Saskatoon home's desirability is rated on a linescale (Fig. 2); while a Windsor home is rated with between zero and five stars, at half-star increments with labels of totally (dis-)like it, very much (dis-)like it, quite (dis-)like it, somewhat (dis-)like it, and neither like nor dislike it (Fig. 1).
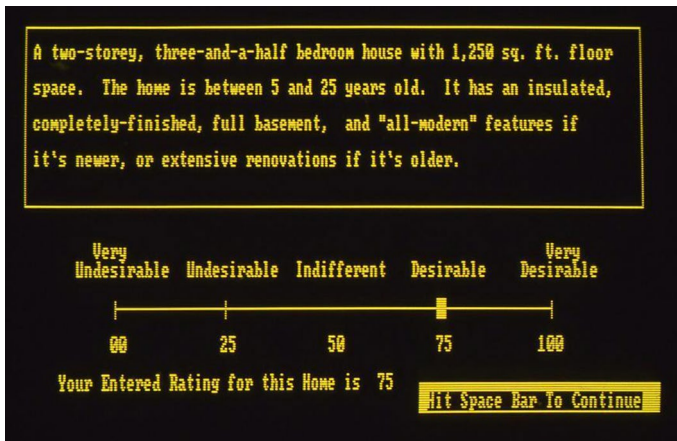
Fig. 2 Desirability of a dwelling unit in the simulation game

A respondent in the simulation game rated the desirability of each description by moving the cursor along a continuous 0-to-100 line-scale. The desirability scale was approximately 150 mm long, and labelled at the zero end by very undesirable, undesirable at the 25-point, indifferent at the 50-midpoint, and desirable and very desirable at the 75- and 100-points. This line-scale design was used consistently throughout the game, with different labels depending on the question. Ratings' data from the experiments will especially be the comparable when respondents utilized five labelled points on these line-scales.

A respondent's utilities for attributes' levels of homes were calculated during each experiment. His or her conjoint rating data in the simulation game were decomposed by a compiled redimensioned version of the non-metric WADDALS conjoint scaling program, written in Fortran for originally executing on a mainframe computer (Takane et al. 1980). The experimenter's presence helped to divert attention from the program's delayed turnaround time for calculating utilities from ratings on the portable PC. Under the assumption no delay is tolerated in an online survey, a respondent's conjoint rating data in the online project were analyzed with three functional procedures written in JavaScript for calculating intercept and slope coefficients of a multiple linear regression (Rosetta Code 2020). While using dummy independent variables for attributes' displayed levels, utilities were calculated for predicting the like or dislike of each displayed home; and the prediction was instantaneously displayed beside the observed like or dislike of it.

Coincidentally, the answer of approximately three-quarters of 69 Windsor-respondents to a question in the online project was for similar predicted and observed likes and dislikes of homes; 17% answered with inaccurate predictions; and 3%, either too low or too high predictions. In fact, observed likes or dislikes of displayed homes are quite well predicted by utilities of attributes of the dwelling unit, neighbourhood environment, neighbours, or accessibilities calculated from multiple regression coefficients: Simple correlations average more than 0.87

between respondents' observed and predicted values (Table 2). In comparison, "weak" predictions of Saskatoon-respondents' corresponding utilities are measured by a less interpretable stress index for the WADDALS program (Phipps and Clark 1988, p. 257). Respondents could inspect their calculated utilities as points on curves in displayed graphs at the end of each experiment. Utilities in the online project could be inspected as points on static curves after transmitting the locally stored data and signing out of the project. Plotted points on an interactive graph in the simulation game could be adjusted up or down for higher or lower utility than originally scaled for an attribute's level. These rescaled utilities were utilized for the game's remaining stages, and they are the analyzed ones in this study.

Samples of residents

Thirty-three residents in Saskatoon participated in the first version of the human–computer simulation game of the residential choice process in mid-1985; and 70 different residents in the same city participated in its second version in late-1986 and early-1987 (Table 1). The first Saskatoon sample is included even though it is "probably the least representative inner-urban sample: most surveyed households were relatively high-income, university-educated, and in the youthful or the mature stages of the family life cycle, with children at home" (Phipps and Clark 1988, p. 257). In comparison, 70 residents in the second Saskatoon sample were recruited by means of 280 letters of invitation to newly listed owner-occupants in the annual city directory. Almost all respondents are owner-occupiers; most lived for 5 years or less at their current address, and are less than 40 years old, with live-in children; and more have managerial or professional occupations (Table 3).

In general, equal numbers of respondents in Windsor are self-identified male or female, whereas almost two-thirds of them are women in Saskatoon. Otherwise, Windsor respondents most frequently are aged less than 40 years old, or 55 years old and older; they are either in cohabiting partnerships or unattached individuals, who have lived in the current home for 5 years or less, or more than 5 years; and the occupation(s) of their primary wage earner(s) is(are) managerial or professional, retired, student, or administrative professional or office worker. However, more than one-half of Saskatoon respondents have children at home, and managerial or professional occupations; whereas approximately one-third of Windsor respondents have each of these. Respondents' combinations of personal characteristics are also possibly related to varying housing budgets (Table 3). For example, most respondents' numeric price ranges measured in dollars in 1987 and in classified dollar ranges in 2020 are in the middle range of their respective observed sold houses' prices, after more than doubling at a slightly higher rate than the consumer price index for shelter in Canada. Most Windsor respondents also have a familiarity with the local housing market, as more than two-thirds knew a neighbour who listed a house or property for sale during the past 2 years, or did this themselves.

Residents of Saskatoon's core neighbourhoods were targeted in the first sample. Similarly, the third sample's residents were targeted as living in Windsor's four inner-city neighbourhoods of Glengarry, Wellington-Crawford,

Table 2 Comparisons of observed and predicted utilities for homes

Component	Saskatoon, SK				Windsor, ON				Comparison of mean utilities		
	1985		1987		2020				2020 and 1987	2020 and 1985	1987 and 1985
	Number of respondents	Mean WADDALS Stress index	Number of respondents	Mean WADDALS Stress index	Number of respondents	Comparison of Observed and Predicted likes or dislikes of homes Mean correlation coefficient	Home's attribute	Number of attribute's levels	Correlation coefficient	Correlation coefficient	Correlation coefficient
Dwelling unit	33	0.39	70	0.48	68	0.97	House type and size	5	0.66	0.38	0.83
							House age and exterior finish	3	0.41	0.36	− 0.7
							Basement condition and home renovations	5	0.85	0.93	0.97
Neighbourhood environment	33	0.41	70	0.54	54	0.92	Lot size and garage	3	1	0.93	0.96
							Landscaping	4	0.94	0.92	0.97
							Neighbouring home types and repair	4	0.79	0.64	0.98

Table 2 (continued)

Component	Saskatoon, SK						Windsor, ON					Comparison of mean utilities		
	1985		1987				2020			Home's attribute	Number of attribute's levels	2020 and 1987	2020 and 1985	1987 and 1985
	Number of respondents	Mean WADDALS Stress index	Number of respondents	Mean WADDALS Stress index			Number of respondents	Comparison of Observed and Predicted likes or dislikes of homes — Mean correlation coefficient				Correlation coefficient	Correlation coefficient	Correlation coefficient
Neighbours	33	0.42	70	0.48			54	0.92		Ages of neighbours	4	− 0.04	0.75	0.54
										Ethnic group and education of neighbours	5	0.86	0.88	0.9
										Mobility of neighbours	3	0.95	0.93	1
Accessibilities	33	0.56	70	0.64			57	0.87		Stores and work access	3	0.96	0.97	1
										Schools access	3	0.91	0.97	0.98
										Riverbank or parks access	3	0.98	0.98	1

Table 3 Summary characteristics of samples of residents

Characteristic	Response[b]	1985 Saskatoon respondents		1987 Saskatoon respondents		2020 Windsor respondents		Comparison[c]	2016 GWCUS DAs (%)
Gender	Male	17	52%	26		36	37%	=	52
	Female	16	48%	44		37	63%	=	48
	Total	33		70		73			
Age	Less than [36](40) years old	16	48%	38		27	54%	=	51
	(55 years old and older)					26	39%	=	29
	Total	33		70		67			
Relationship between adult members of household	(Unattached individual or cohabitant with other unattached individuals)					23	34%	-	66
	Family with live-in children	20	60%	49		20	70%		43
	(Cohabiting partnership)					17	25%	=	34
	Total	33		70		67			
Owner or renter of current home	Owner	33	100%	60		46	86%	+	26
	Total	33		70		71			
Length of current residence	Five years or less	21	64%	51		37	73%	=	61
	Total	33		70		73			

Table 3 (continued)

Characteristic	Response[b]	1985 Saskatoon respondents	1987 Saskatoon respondents	2020 Windsor respondents	Comparison[c]	2016 GWCUS DAs (%)
Occupation(s) of wage-earner(s) in household[a]	Managerial or professional	17 50%	37 53%	23 28%	=	24
	(Retired)			18 22%	+	7
	(Student)			10 12%	=	7
	Administrative professional or office worker	14 41%	17 24%	9 11%	=	14
	Total	33	70	82		

[a]This characteristic's total number of respondents may include multiple wage-earners in a household

[b]Windsor's possible new description of a characteristic is in parentheses, and Saskatoon's possible former description is in square brackets; and a blank cell for an unmeasured characteristic of Saskatoon respondents

[c]In a comparison between a Windsor sample proportion and a GWCUS DAs population proportion: an equals sign indicates the sample proportion is not significantly different from the population proportion, as the latter is between the lower and upper bounds of the 95% confidence interval of the sample proportion. A plus sign indicates the sample proportion is significantly greater than the population proportion as the latter is below the 95% CI's lower bound; and a negative sign, less than the population proportion as the latter is above the 95% CI's upper bound

University, and Sandwich (GWCUS), and surrounding areas. This is where Canada Post three-times delivered 5000 recruitment flyers to single-detached houses, duplexes, and row houses. Saskatoon respondents resembled mature traditional affluent families who recently moved into or might be moving out the current owned home, though their representativeness of movers or other households was not statistically established at the time. Meanwhile, Windsor respondents and their households have statistically more representative personal characteristics of all residents of dissemination areas encompassing the four GWCUS neighbourhoods in the most recent national census of 2016 (Table 3).

Note that a dissemination area is the smallest geographic area for census data about residents and their properties since 2001 (Statistics Canada 2016). A dissemination area in this part of metropolitan Windsor has mostly rectangular shape; an approximately one-half kilometre by one-quarter kilometre area; and boundaries aligned with a grid street pattern. If comparing the online project's respondents with all residents of 43 dissemination areas, their proportions within 95% confidence intervals are not statistically significantly different from those of all residents' gender, ages, marital status, length of residence, and occupation(s) of wage earner(s) in the household (Table 3). The surveying of residents of conventional houses and not apartment buildings may explain their two significantly different higher proportions with owner tenure and lower proportions with unattached relationships with cohabitants. Note that comparisons of respondents' proportion of families with live-in children, and proportion who are retired or students, are complicated by the census's different denominator for proportion of couples with children at home, and its catchall occupation not applicable, respectively.

Parenthetically, differences between the sites of the experiments in two mid-sized Canadian cities, and in the mid-1980s and 2020, fade into the background if Saskatoon respondents' personal characteristics are only somewhat different from those of a third sample of 74 residents who participated in the online project in Windsor, ON. Respondents with mostly similar personal and household characteristics thereby represent members of a paired sample as credibly as possible so far apart in time. Indeed, Saskatoon, SK and Windsor, ON were similar mid-sized cities during the late 1980s, even though they are 2500 km apart. They each had a population of approximately 190,000, though this does not include Windsor's surrounding half-as-large-again metropolitan area. Their economies were dominated by blue-collar private sector jobs in resource extraction of potash and agricultural processing in Saskatoon and automotive manufacturing and assembly in Windsor, and white-collar public sector jobs in a university and hospitals in both. Approximately, three-quarters of their housing stocks in 1986 were single-detached and semi-detached homes like those displayed in the experiments. Their affordable house sale prices in 1986 predicted by the hedonic housing price models had examples of approximately $54,000 in the City of Saskatoon, and $36,000 in inner city Windsor for a three-bedroom bungalow with all other average dwelling unit, neighbourhood and accessibility characteristics.

Residential utilities

Methods

Saskatonians' mean residential utilities are calculated for all 33 respondents in 1985 and 70 respondents in 1987 who have no missing data. Some Windsorites have missing data in the online surveying project, sans experimenter for assistance and motivation. Their mean utilities are calculated for 68 respondents with no missing data for the dwelling unit, 54 for each of the neighbourhood environment and the neighbours, and 57 for accessibilities (Table 2). Mean utilities with their 95% confidence intervals for each residential attribute are displayed on vertical *Y*-axes of graphs. Graphs have two vertical *Y*-axes for different scales of measured utilities in two cities' experiments. Single horizontal *X*-axes have levels of an attribute in Windsor, with its possible new wording there in parentheses, and Saskatoon's possible alternate wording in square brackets. The connected plotted points in a figure produce an average utility curve for an attribute's levels in one city or the other. These mean utilities and 95% confidence intervals are visually and statistically compared for describing the differences between preferences for attributes' levels through time. Simple correlation between each attribute's up-to-five mean utilities of Windsorites in 2020 and Saskatonians in 1987 or 1985 classifies two patterns of differences between preferences for six attributes, as well as no differences between preferences for six remaining attributes.

Indifference between four attributes' levels

The first pattern of differences between respondents' preferences through time is evident for four attributes' levels of neighbours' ages and their ethnic group and education, house age and exterior finish, and house type and size. Three of four attributes have the most differences, as their correlations below 0.66 are weakest between respondents' mean utilities for attributes' levels in 1987 and 2020; the fourth attribute's correlation is higher at 0.86. The inferred pattern of differences from respective non-overlapping and overlapping 95% confidence intervals, is for Saskatonians in 1985 and 1987 to have discriminated between levels of each attribute with their significantly higher or lower mean utilities, whereas Windsorites in 2020 had statistically similar mean utilities for attributes' levels.

In particular, Windsorites in 2020 were indifferent about their neighbours' ages and ethnic group and education—or they averaged indifference if they had compensatory individually different preferences for them. Either way, Saskatonians in 1985 and 1987 had distinct preferences for neighbours with younger-aged children, and neighbours from the same ethnic group as them. For example, they had statistically significantly higher mean utilities for middle-aged residents who probably similarly to them have elementary school-aged children at home. On the other hand, they had statistically significantly lower mean utilities for neighbours who are middle-aged residents with teenaged children at home (Fig. 3). Long since forgotten is how

teenagers could be out and about at all hours of the day and night during the mid-1980s, at the end of an era before modern video games began being played inside the home.

A similar pattern of significantly different mean utilities describes Saskatonians' distinct preferences in 1987 for neighbours from either the same ethnic group as them or different ethnic groups than them. This for example applies when their neighbours are skilled and white-collar workers with high-school or technical college education, or professional workers with a university or college degree (Fig. 4). In contrast, Windsorites in 2020 had almost equal mean utilities and thus similar preferences for neighbours with same or different types of ethnic group and education. Recent respondents' indiscriminatory preferences may thus have assimilated their probably more diverse neighbours unless these are artifacts of their compensatory individual differences in preferences.

Indifference or compensatory individually different preferences for an attribute's levels also explain Windsorites' almost equivalent mean utilities for houses of any age and exterior finish. In contrast, Saskatonians' mean utilities in 1987 statistically significantly declined from that for houses less than 5 years old, to that for houses more than 30 years old—and similarly for Saskatonians in 1985, except their highest mean utility was for a house more than 30 years old (Fig. 5). Note despite this attribute's embellishment with a type of exterior finish in Windsor, a brick or stucco exterior finish neither adds to nor subtracts from the similar preferences for a less-than-5-years-old home and a more-than-30-years-old home.

Last, individual difference in preferences rather than indifference about types and sizes of houses more plausibly explains Windsorites' statistically similar mean utilities with overlapping 95% confidence intervals for this vital attribute's levels. Statistically, this attribute's mean utilities similarly to the others have wider 95% confidence intervals in 2020 than in 1987 for comparable numbers of residents. Substantively, Windsorites' stable preferences differ from those of Saskatonians in 1987 who had strong negative mean utilities for their least preferred bungalow or one-and-a-half storey with two bedrooms; and those of Saskatonians in 1985 who additionally had low mean utilities for a three-bedroom bungalow (Fig. 6). Otherwise, Saskatonians similarly to Windsorites had relatively uniform higher mean utilities for remaining larger homes.

Single differences between two attributes' levels

The first pattern of recent indifference between four attributes' levels may therefore in reality be caused by compensation between respondents' individual differences in preferences for those levels. No doubt, respondents in 2020 evaluated the utilities of existing homes' attributes' levels differently than in 1987; they however did not calculate or interpolate utilities for 'new' levels of four attributes. This latter second pattern is evident in differences between mean utilities of two attributes' levels of basement condition and home renovations, and neighbouring home types and repair in 1985/1987 and 2020. Respondents' reassessments of

Fig. 3 Ages of neighbours utility functions in 1985, 1987 and 2020

single levels of two attributes translate into strong but imperfect positive correlation coefficients of 0.85 and 0.79 between different years' mean utilities.

For example, Windsorites in 2020 had highest mean utilities for not only an unfinished or partly finished full basement, but also an insulated completely-finished full basement, plus some or all modern features etc.; while they had significantly lower mean utilities for an unfinished or partly finished basement, or a partial one or no basement, and no central air conditioning and outstanding features or major renovations etc. (Fig. 7). In comparison, Saskatonians in 1985 and 1987 had similarly low mean utilities for no basement or a partial one, and statistically
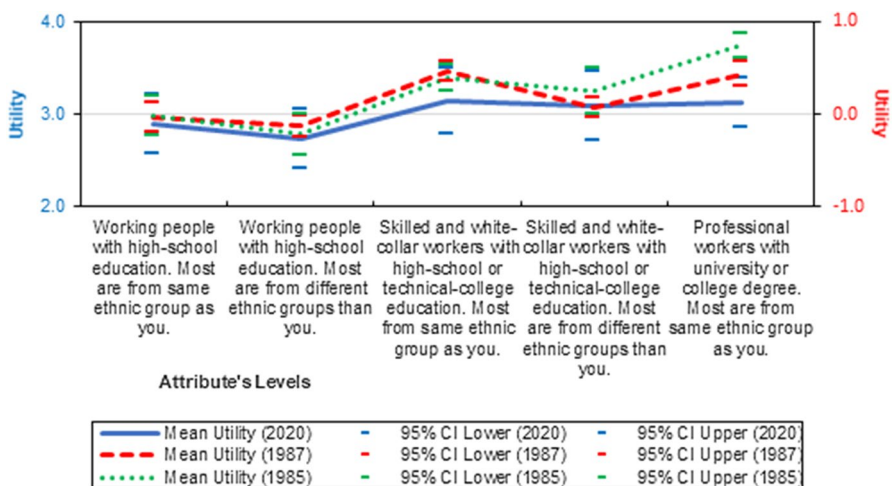
Fig. 4 Ethnic group and education of neighbours utility functions in 1985, 1987 and 2020

significantly higher ones for an unfinished or partly finished one; but they had significantly highest ones for an insulated completely finished full basement. In short, residents then as now prefer a full basement, but they now have a depreciated interpretation of older basement finishing by a former resident. They, however, agree about the preferability of home renovations such air conditioning, new wiring, plumbing, windows, and roof as improved attributes of a home.

A second attribute of neighbouring home types and repair has significant differences between a single level's mean utilities in 1985/1987 and 2020, as if residents are reconsidering the desirability of living near some types of neighbouring homes but not other types. Saskatonians' statistically-significantly lowest preference in 1985 and 1987 was for neighbouring home types that include some nearby high-rise rented-apartment or owned-condominium buildings (Fig. 8). In contrast, Windsorites' average utility was higher for that level of neighbouring home type when there are no houses in need of repair. It was particularly higher than where neighbouring homes include some nearby modern walk-up rented-apartment or owned-condominium buildings, and quite a few houses in need of repair. Therefore, while the enduring statistically-significantly highest preference is for neighbouring single-detached houses with owner-occupiers, the lowest preference may have shifted from high-rise apartment buildings to low-rise walk-up ones. High-rise apartment buildings may now in effect be new types of neighbouring housing if owners are residents; volumes of traffic are accommodated on the street and off it in parking lots; and exterior surroundings complement a lower density residential environment.
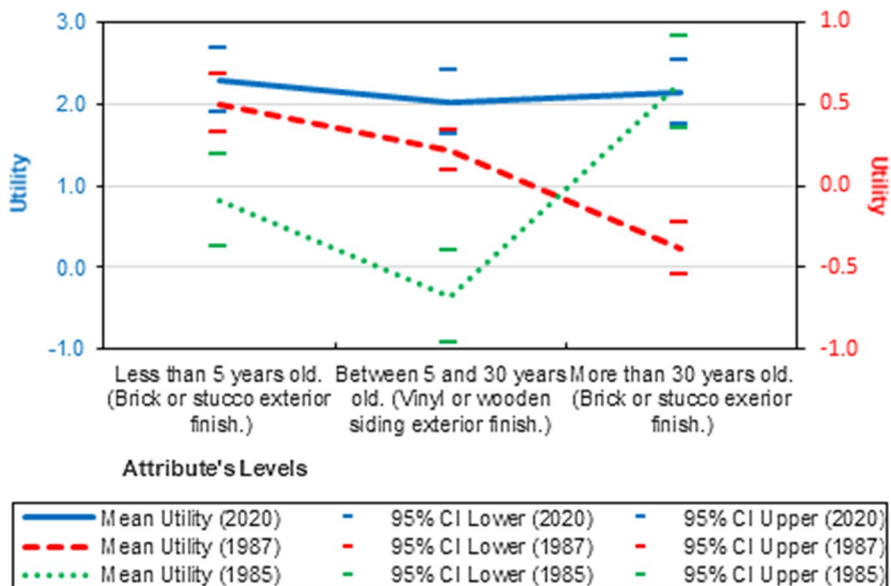

Fig. 5 House age and exterior finish utility functions in 1985, 1987 and 2020
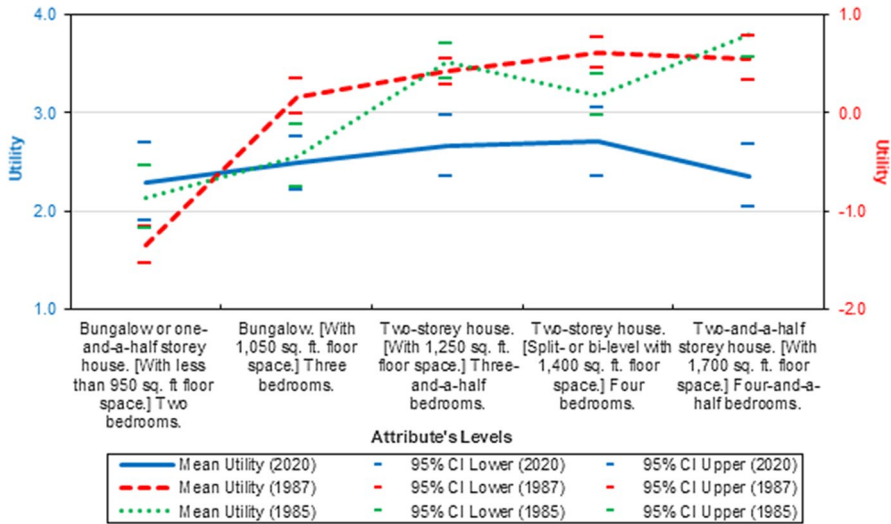
Fig. 6 House type and size utility functions in 1985, 1987 and 2020

No differences between six attributes' levels

In sum, the one pattern of apparent indifference between four attributes' levels may have superseded unanimous discrimination between the levels, for example, if residents for personal or social reasons are reassessing their utilities for existing homes' attributes through time. The other pattern of differences in preferences between two attributes' specific levels may have occurred if residents are calculating or interpolating utilities for reinterpreted 'new' types of basements in homes and neighbouring homes. In contrast, no differences in preferences between 1985 or 1987 and 2020 are inferred from mean utilities of six remaining attributes of accessibilities to stores and work, schools, and riverbank or parks, mobility of neighbours, lot size and garage, and landscaping. Respondents who may or may not have imposed their budget constraint on choices of attributes' levels, preferred the near facilities and amenities rather than farther away ones; stable neighbours rather than mobile ones; a larger lot rather than a smaller one and no front driveway or garage; and mature landscaping rather than newly planted landscaping with sparse shrubs and thin trees. These six attributes have almost perfect positive correlation coefficients above 0.9 between mean utilities for their levels in not only 2020 and 1987 but also 1987 and 1985. Their statistical similarities incidentally reassure about calibration of commensurable utility functions by non-metric scaling and metric multiple regression methods from conjoint choice data in three experiments.
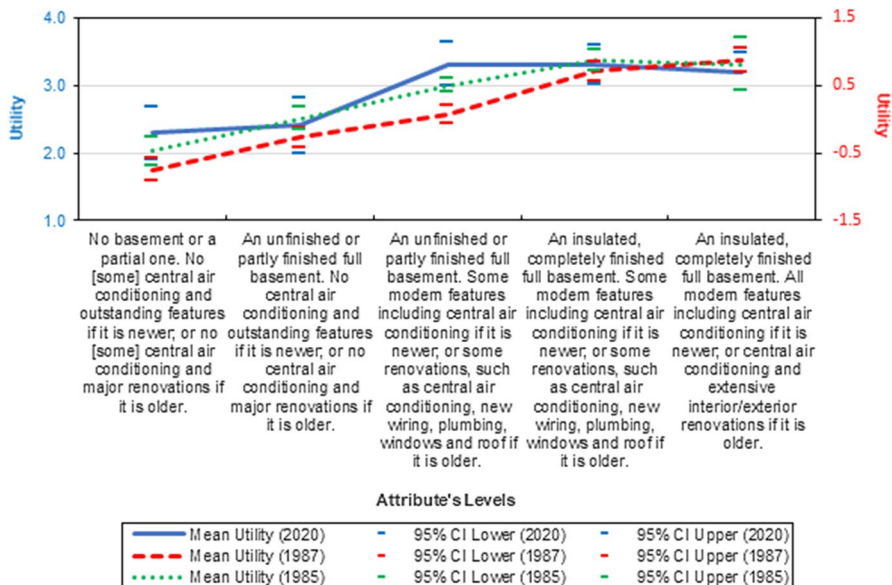
Fig. 7 Basement condition and home renovations utility functions in 1985, 1987 and 2020

Conclusion

Residents' preferences are on average different now than 30 years ago for 6 of 12 generic attributes of single-detached(-like) homes in two mid-sized Canadian cities, while their preferences for 6 remaining attributes have stayed the same. Residential preferences for attributes' levels were measured in the form of social and

Fig. 8 Neighbouring home types and repair utility functions in 1985, 1987 and 2020

environmental utilities in two similar conjoint-choice experiments, first for 103 respondents in Saskatoon SK in 1985 and 1987, and subsequently for up to 74 respondents in Windsor, ON in 2020. These respondents have mostly similar personal and household characteristics, thereby representing members of a paired sample through time. Comparison of respondents' changing residential preferences with other studies in the literature is next, except for the few studies directly measuring residents' preferences for attributes of homes that have already been mentioned. For sure, this study's results apply to attributes of Canadian single-detached homes, but they may be generalized for previously-specified generic attributes of corresponding American and British homes (Phipps 1989).

In Canada, this study's practical contribution for housing providers and vendors is how changes in residential preferences during the past more than 30 years have translated into changes in the most frequently most preferred attributes' levels of single-detached homes. First, residents now most frequently prefer three attributes' different levels; second, fewer of them now prefer all 12 attributes' most frequently most preferred levels. For example, the most frequently most preferred house type and size by 28% of respondents in Windsor in 2020 was a two-storey house with (1250 sq. ft. floor space) and three-and-a-half bedrooms; whereas it was a two-and-a-half storey house with (1700 sq. ft. floor space) and four-and-a-half bedrooms for 46% of respondents in Saskatoon in 1987. (Saskatoon's alternate wording is in square brackets.) Also, 31% of Windsorites most preferred an insulated completely finished full basement and some modern features etc. if it is newer or some renovations etc. if it is older; whereas 61% of Saskatonians most preferred an insulated completely finished full basement and all modern features including central air conditioning if it is newer or central air conditioning and extensive interior/exterior renovations if it is older. And, neighbours who are skilled and white-collar workers with high-school or technical-college education were most preferred by 31% of Windsorites if most are from different ethnic groups than them, and by 37% of Saskatonians if most are from the same ethnic group as them.

Otherwise, 54% of Windsorites and 80% of Saskatonians on average most frequently most preferred nine remaining attributes' same levels: A single-detached home less than 5 years old (with brick or stucco exterior finish). (Windsor's additional wording is in parentheses.) With a large 700 sq. m/60 ft. by 125 ft. lot and so the house is quite separated from neighbouring houses (for a double attached or detached front garage); very mature landscaping with lawns, large trees and dense shrubs; and surrounding almost all single-detached homes with owner-occupiers (and no houses in need of major repair). With neighbours who are middle-aged residents with elementary school-aged children at home; and few of whom move each year. With a location within easy driving- or walking-access up to (10) [15] min to major stores and/or work; within 10 min walking to a school; and (on the Detroit riverbank) [down the street to a neighbourhood park].

These changes in most preferred attributes' levels of single detached homes, and the increasing diversity of most preferred attributes corroborate Canadians' changing residential preferences especially from two processes of change for six attributes in this study. A first hypothesized process of change in residential preferences is by means of residents' calculating or interpolating utilities for new

types of homes. Respondents did not observe new types of homes in this study, as displayed descriptions were composed of virtually the same 12 generic attributes in 1985, 1987 and 2020. They, however, may have reinterpreted two attributes' single levels of basement condition and home renovations, and neighbouring home type and repair when assigning utilities to them. For example, respondents in 2020 were less confident about former residents' finishing of a full basement, as if they anticipated the removal and reconstruction of this aftermarket improvement of a home. Respondents in 2020 had also adapted to high-rise apartment buildings as neighbouring types of homes, and now preferred them more than low-rise walk-up types.

A second hypothesized process of change in residential preferences assumes residents' reassessments of attributes of existing homes, represented by their different utilities for attributes' levels through time. For example, respondents in 1987 unanimously discriminated between their utilities for attributes' levels of ages and ethnic group and education of neighbours, house age and exterior finish, and house type and size. In comparison, respondents in 2020 reassessed these attributes' levels so they evinced indifference between them. Recent indifference between these attributes' levels would augur well for residency in inner-city neighbourhoods such as those of respondents in Windsor. These neighbourhoods are where not only neighbours but also their homes may have more social and economic diversity than elsewhere—and truly indifferent residents should not be stressed by these. An alternate interpretation of their apparent indifference, especially of the attribute's levels of house type and size, however, is as an artifact of their compensatory individual differences in preferences. In other words, recent residential preferences for these four attributes may indeed be different from those 30 years ago, except that calculations of sample mean utilities are not revealing subsamples' opposing individually different preferences for attributes' levels. Methodologically, calculated mean unconstrained utilities may have obscured respondents' individually different preferences.

Besides, respondents' most frequently most preferred attributes may be for unaffordable rarely occurring large new homes in socially and environmentally mature neighbourhoods near to facilities and amenities. For example, preferred levels of five attributes may particularly be subject to budget constraints if respondents cannot afford the near accessibilities to facilities and amenities, large dwelling unit or lot size and attached garage, and mature neighbourhood landscaping. Theoretically, therefore, this study's unconstrained utilities for at least six attributes with unchanged unconstrained preferences between 1985/1987 and 2020 may also have discounted respondents' unmeasured budget constraints. The hypothesized processes of change in preferences will be retested in future research with budget-constrained utilities for attributes of single-detached(-like) homes, as well as for respondents with similar individual differences in their preferences.

Declarations

Conflict of interest None.

Ethical approval Online surveying in 2020 has University of Windsor Research Ethics Boards approval. Corresponding research ethics review did not exist in 1985 or 1987.

References

Abramsson M, Andersson E (2016) Changing preferences with ageing: housing choices and housing plans of older people. Hous Theory Soc 33(2):217–241. https://doi.org/10.1080/14036096.2015.1104385

Benjamin J, Paaswell RE (1981) A psychometric analysis of residential location. Socio-econ Plan Sci 15(6):305–319

Biglieri S, Hartt M (2018) Identifying built barriers: where do our most vulnerable older adults live in Ontario's mid-sized cities? In: Flatt J (ed) Mid-sized cities research series. Evergreen, Waterloo, pp 97–108. http://orca.cf.ac.uk/115449/1/FULLSeries_Fleck_Evergreen-Mid-sized%20Cities-Series%20Design-WEB.pdf. Accessed 8 Apr 2021

Booi H, Boterman WR (2020) Changing patterns in residential preferences for urban or suburban living of city dwellers. J Hous Built Environ 35:93–123. https://doi.org/10.1007/s10901-019-09678-8

Boschman S, van Ham M (2015) Neighbourhood selection of non-Western ethnic minorities: testing the own-group effects hypothesis using a conditional logit model. Environ Plan A 47(5):1155–1174. https://doi.org/10.1177/0308518X15592300

Bruce M, Kelly SJ (2013) Expectations, identity and affordability: the housing dreams of Australia's Generation Y. Hous Theory Soc 30(4):416–432. https://doi.org/10.1080/14036096.2013.767279

Bruch EE, Mare RD (2012) Methodological issues in the analysis of residential preferences, residential mobility, and neighborhood change. Sociol Methodol 42(1):103–154. https://doi.org/10.1177/0081175012444105

Bunting T, Filion P, Hoernig H, Seasons ML, Lederer J (2007) Density, size, dispersion: towards understanding the structural dynamics of mid-size cities. Can J Urban Res 16(2):27–52

Clark WAV (2009) Changing residential preferences across income, education, and age: findings from the multi-city study of urban inequality. Urban Aff Rev 44(3):334–355. https://doi.org/10.1177/1078087408321497

Clark WAV, Coulter R (2015) Who wants to move? The role of neighbourhood change. Environ Plan A 47(12):2683–2709. https://doi.org/10.1177/0308518X15615367

Coolen H, Hoekstra J (2001) Values as determinants of preferences for housing attributes. J Hous Built Environ 16(3–4):285–306. https://doi.org/10.1023/A:1012587323814

Coulter R, van Ham M, Findlay AM (2015) Re-thinking residential mobility: linking lives through time and space. Prog Hum Geogr 40(3):352–374. https://doi.org/10.1177/0309132515575417

Darab S, Hartman Y, Holdsworth L (2018) What women want: single older women and their housing preferences. Hous Stud 33(4):525–543. https://doi.org/10.1080/02673037.2017.1359501

De Groot C (2011) Chapter 7: discussion and conclusion. In: De Groot C (ed) Intentions to move, residential preferences and mobility behavior: a longitudinal perspective. Ipskamp Drukkers BV, Enschede, pp 159–173

De Groot C, Daalhuizen F, van Ham M, Mulder CH (2011) Chapter 6: once an outsider, always an outsider? The accessibility of the Dutch rural housing market among locals and non-locals. In: De

Groot C (ed) Intentions to move, residential preferences and mobility behavior: a longitudinal perspective. Ipskamp Drukkers BV, Enschede, pp 127–157

De Groot C, Manting D, Mulder CH (2013) Longitudinal analysis of the formation and realisation of preferences to move into homeownership in the Netherlands. J Hous Built Environ 28:469–488. https://doi.org/10.1007/s10901-012-9320-7

De Vos J, Van Acker V, Witlox F (2016) Urban sprawl: neighbourhood dissatisfaction and urban preferences. Some evidence from Flanders. Urban Geogr 37(6):839–862. https://doi.org/10.1080/02723638.2015.1118955

Desbarats J (1983) Spatial choice and constraints on behavior. Ann Assoc Am Geogr 73:340–357

Evenson J, Cancelli A (2018) Visualizing density and the drivers of complete communities. In: Flatt J (ed) Mid-sized cities research series. Evergreen, Waterloo, pp 133–141. http://orca.cf.ac.uk/115449/1/FULLSeries_Fleck_Evergreen-Mid-sized%20Cities-Series%20Design-WEB.pdf. Accessed 8 Apr 2021

Filion P, Bunting T, Warriner K (1999) The entrenchment of urban dispersion: residential preferences and location patterns in the dispersed city. Urban Stud 36(8):1317–1347. https://doi.org/10.1080/0042098993015

Fuguitt GV, Brown DL (1990) Residential preferences and population redistribution: 1972–1988. Demography 27(4):589–600. https://doi.org/10.2307/2061572

Halfacree KH, Boyle PJ (1993) The challenge facing migration research: the case for a biographical approach. Prog Hum Geogr 17(3):333–348. https://doi.org/10.1177/030913259301700303

Hogarth RM, Michaud C, Mery J-L (1980) Decision behavior in urban development: a methodological approach and substantive considerations. Acta Psychol 45:95–117

Howley P, O'Neill S, Atkinson R (2015) Who needs good neighbors? Environ Plan A 47(4):939–956. https://doi.org/10.1068/a140214p

Ihlanfeldt KR, Scafidi B (2004) Whites' neighbourhood racial preferences and neighbourhood racial composition in the United States: evidence from the multi-city study of urban inequality. Hous Stud 19(3):325–359

Jansen SJT (2012) What is the worth of values in guiding residential preferences and choices. J Hous Built Environ 27(3):273–300

Jiang W, Feng T, Timmermans HJ (2020) Latent class path model of intention to move house. Socio-econ Plan Sci 70:100743. https://doi.org/10.1016/j.seps.2019.100743

Judson EP, Iyer-Raniga U, Horne R (2014) Greening heritage housing: understanding homeowners' renovation practices in Australia. J Hous Built Environ 29(1):61–78. https://doi.org/10.1007/s10901-013-9340-y

Knight RL, Menchik MD (1976) Conjoint preference estimation for residential land use policy evaluation. In: Gollege RG, Rushton G (eds) Spatial choice and spatial behavior. Ohio State University Press, Columbus, pp 135–155

Lawton P, Murphy E, Redmond D (2013) Residential preferences of the 'creative class.' Cities 31:47–56. https://doi.org/10.1016/j.cities.2012.04.002

Levy D, Murphy L, Lee CKC (2008) Influences and emotions: exploring family decision-making processes when buying a house. Hous Stud 23(2):271–289

Li J, Auchincloss AH, Rodriguez DA, Moore KA, Diez Roux AV, Sánchez BN (2020) Built and social environments and concordance between neighborhood characteristics and preferences. J Urban Health 97:62–77. https://doi.org/10.1007/s11524-019-00397-7

Lindberg E, Gärling T, Montgomery H (1989) Belief-values structures as determinants of consumer behavior: a study of housing preferences and choices. J Consum Policy 12:119–137

Lindberg E, Gärling T, Montgomery H, Waara R (1987) People's evaluation of housing attributes: a study of underlying beliefs and values. Scand Hous Plan Res 4:81–103

Marcucci E, Stathopoulos A, Rotaris L, Danielis R (2011) Comparing single and joint preferences: a choice experiment on residential location in three-member households. Environ Plan A 43(5):1209–1225

Metcalfe JS (2001) Consumption, preferences, and the evolutionary agenda. J Evol Econ 11(1):37–58. https://doi.org/10.1007/PL00003855

Molin EJ, Oppewal H, Timmermans HJ (2001) Analyzing heterogeneity in conjoint estimates of residential preferences. J Hous Built Environ 16:267–284. https://doi.org/10.1023/A:1012539415696

Moos M, Revington N (2018) Will Millennials remain in the city? Residential mobility in post-industrial, post-modern, post-suburban America. In: Moos M, Pfeiffer D, Vinodrai T (eds) The Millennial city: trends, implications, and prospects for urban planning. Routledge, New York, pp 183–199

Nijënstein S, Haans A, Kemperman AD, Borgers AW (2015) Beyond demographics: human value orientation as a predictor of heterogeneity in student housing preferences. J Hous Built Environ 30:199–217. https://doi.org/10.1007/s10901-014-9402-9

Opit S, Witten K, Robin K (2020) Housing pathways, aspirations and preferences of young adults within increasing urban density. Hous Stud 35(1):123–142. https://doi.org/10.1080/02673037.2019.1584662

Palm R (1976) Real estate agents and geographical information. Geogr Rev 66:266–280

Palm R (1982) Homebuyer response to information content. In: Clark WAV (ed) Modelling housing market search. St. Martin's Press, New York, pp 187–208

Payne JW (1976) Task complexity and contingent processing in decision making: an information search and protocol analysis. Organ Behav Hum Perform 16:366–387

Pfeiffer D, Pearthree G (2018) Is the real estate industry cementing Millennials' residence in urban cores and central cities. In: Moos M, Pfeiffer D, Vinodrai T (eds) The Millennial city: trends, implications, and prospects for urban planning. Routledge, New York, pp 125–141

Phipps AG (1983) Utility function switching during residential search. Geogr Ann 65B:23–38

Phipps AG (1987) Households' utilities and hedonic prices for inner-city homes. Environ Plan A 19(1):59–80

Phipps AG (1988) Rational versus heuristic decision making during residential search. Geogr Anal 20:231–248

Phipps AG (1989) Intended-mobility responses to possible neighbourhood change in an American, a British, and a Canadian inner-urban area. Tijdschr Econ Soc Geogr 80(1):43–57

Phipps AG (2018) How to move home from a stress-resistance theoretical perspective. Int J Migr Resid Mobil 1(4):300–357. https://doi.org/10.1504/IJMRM.2018.094805

Phipps AG, Clark WAV (1988) Interactive recovery and validation of households' residential utilities. In: Golledge RG, Timmermans HJ (eds) Behavioral modelling in geography and planning. Croom-Helm, London, pp 245–271

Quigley JM, Weinberg DH (1977) Intraurban residential mobility: a review and synthesis. Int Reg Sci Rev 3:41–66

Ralph K (2018) Meet the four types of US Millennial travelers. In: Moos M, Pfeiffer D, Vinodrai T (eds) The Millennial city: trends, implications, and prospects for urban planning. Routledge, New York, pp 201–214

Rao VR (2014) Applied conjoint analysis. Springer, Berlin

Rashid M (2018) The evolving metropolis after three decades: a study of community, neighbourhood and street form at the urban edge. J Urban Des 23(5):624–653. https://doi.org/10.1080/13574809.2018.1429216

Roe B, Irwin EG, Morrow-Jones HA (2005) Changes in homeowner preferences for housing density following 11 September 2001. Appl Econ Lett 12(2):73–78. https://doi.org/10.1080/1350485042000307134

Rosetta Code (2020) Javascript multiple regression. http://rosettacode.org/wiki/Multiple_regression#JavaScript. Accessed 8 Apr 2021

Rushton G (1969) Temporal changes in space preference structures. Proc Assoc Am Geogr 1:129–132

Short JR (1978) Residential mobility. Prog Hum Geogr 2(3):419–447. https://doi.org/10.1177/030913257800200302

Sirgy MJ, Grzeskowiak S, Su C (2005) Explaining housing preference and choice: the role of self-congruity and functional congruity. J Hous Built Environ 20:329–347. https://doi.org/10.1007/s10901-005-9020-7

Smith TR, Clark WAV (1980) Housing market search: information constraints and efficiency. In: Clark WAV, Moore EG (eds) Residential mobility and public policy. Sage Publications, Beverly Hills, pp 100–125

Smith TR, Mertz F (1980) An analysis of the effects of information revision on the outcome of housing-market search, with special reference to the influence of realty agents. Environ Plan A 12:155–174

Statistics Canada (2016) Dictionary Census of population: dissemination area (DA). Government of Canada, Ottawa. http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/geo021-eng.cfm. Accessed 8 Apr 2021

Storper M (1985) The spatial and temporal constitution of social action: a critical reading of Giddens. Environ Plan D 3(3):407–424

Svenson O (1979) Process descriptions of decision making. Organ Behav Hum Perform 23:86–112

Takane Y, Young FW, de Leeuw J (1980) An individual differences additive model: an alternating least squares method with optimal scaling features. Psychometrika 45(2):183–209

Vasanen A (2012) Beyond stated and revealed preferences: the relationship between residential preferences and housing choices in the urban region of Turku, Finland. J Hous Built Environ 27(3):301–315. https://doi.org/10.1007/s10901-012-9267-8

Warren C, McGraw AP, Van Boven L (2011) Values and preferences: defining preference construction. WIREs Cogn Sci 2(2):193–205. https://doi.org/10.1002/wcs.98

Weinberg DH, Friedman J, Mayo SK (1981) Intraurban residential mobility: the role of transactions costs, market imperfections, and household disequilibrium. J Urban Econ 9(3):332–348