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The extent and determinants of dissonance between actual and preferred residential neighborhood type

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Abstract. Although households' general preference for low-density residential environments is well documented in the literature, little research in geography and urban planning has explicitly investigated how many and which households experience a state of mismatch in terms of land-use patterns between their preferred residential neighborhood type and the type of neighborhood where they currently reside. Using data from 1358 commuters living in three communities in the San Francisco Bay Area, in this study we find that nearly a quarter of the residents live in a neighborhood type that does not match their land-use related preferences. The results of an investigation of the determinants of such dissonance are consistent with existing knowledge about residential preferences. It is shown that single suburban dwellers and large households and families in the city are more likely to be mismatched, or experience higher levels of mismatch in terms of neighborhood type. Further, the extent of mismatch is clearly related to automobile orientation, as well as to lifestyles and personality traits. The results suggest that policies aiming to attract a diverse market to neotraditional, high-density neighborhoods may not be as effective as decisionmakers and planners hope. If a broad range of households is artificially attracted to such new developments (for example, through providing financial advantages or other policy incentives), this might on average result in lower levels of residential satisfaction, higher residential mobility, lower sense of community, and enduring auto dependency. On the other hand, it is encouraging to see that there is also a substantial proportion of suburban dwellers preferring high-density environments. Relaxation of land-use laws in existing suburban communities might be successful in reducing residential neighborhood type dissonance for these types of suburban dwellers, but perhaps at the cost of increasing dissonance for the suburbanites preferring lower densities. It would be valuable to investigate whether there is a mix of densities and uses that would optimally satisfy both types of preferences.

1 Introduction

Households' preferences regarding the residential environment have been studied extensively over the past decades. Time and again, US evidence suggests that Americans en masse prefer living in a low-density environment, although a small but significant percentage of households holds a strong preference for living in the highly urbanized core areas of large cities (Brower, 1996; Talen, 2001). Comparable evidence is available for Europe (Bootsma, 1998; Brun and Fagnani, 1994; McDowell, 1997). Less attention, at least in the geographical and urban planning literature, has been directed toward the question of whether households are able to bring their residential location in accordance with the type of physical environment in which they prefer to live. One of the reasons for this lack of attention might be that many geographers and planners typically draw on a utility-maximization framework when studying residential choice decisions (Gärling and Friman, 2002), thereby assuming that, subject to budget and housing-market constraints, households will choose the alternative that corresponds best with their preferences.

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The question of to what extent households' actual and preferred residential location types correspond with each other is nevertheless important. For instance, the development of higher density neighborhoods at public transport nodes is often proposed as an alternative to the sprawling, low-density suburbs characterizing the automobile era after World War 2. The success of such initiatives ultimately depends on the extent to which these new developments attract not only household types that have always gravitated toward urban locations, but are also capable of appealing to the more suburb-oriented segments of the population. Whether this is likely to happen is yet difficult to say; however, a study that analyzes the extent and determinants of a mismatch between current and preferred residential location type will offer useful insights into the likely appeal of urban locations to current suburban dwellers. As such, it can contribute to the debate on residential development and urban sprawl.

One study that has attempted to contrast residents' current and preferred neighborhood type is that by Feldman (1990). She studied the settlement identity of 1648 workers in the Denver area, and found that about three quarters of the sample identified themselves with the kind of location in which they lived. Further, she showed that the majority of respondents experiencing a dissonance between residential location and settlement identity and who were willing to move had plans to relocate to a consonant location. Unfortunately, Feldman's work does not analyze how the mismatched residents can be described in terms of sociodemographic factors, personality traits, or lifestyles. Talen's (2001) study is also relevant in the current context, although it did not aim to provide estimates of the extent of a mismatch between actual and preferred neighborhood type. She investigated whether, and under which circumstances, affluent residents of a suburb 25 miles north of Dallas, Texas, would be willing to consider living in a more traditional urban environment. Her research reveals that dissatisfaction with the physical planning aspects of suburban developments exists among rich suburbanites, although strong support for traditional urbanist principles is lacking.

In the current study we aim to extend the knowledge on the prevalence and determinants of a mismatch in terms of land-use patterns between the actual and preferred type of residential neighborhood. The main objectives are threefold. First, we aim to develop a set of indicators of residential neighborhood type dissonance, which are described extensively in section 4. Second, using the developed indicators, we attempt to ascertain the extent of neighborhood type dissonance in an urban and two suburban communities in the San Francisco Bay area—the urban neighborhood of North San Francisco, and the contiguous suburban communities of Concord and Pleasant Hill (section 5). Third, we aim to determine the impact of a large set of personal and household characteristics spanning sociodemographic situation, mobility constraints, lifestyle factors, and personality traits on residential neighborhood type mismatch. To this end a series of statistical models is presented in section 6. The remainder of the paper starts with an exploration of the causes and implications of residential neighborhood type dissonance (section 2), and proceeds to a description of the empirical data available for this study (section 3).

2 Background

In this study the term 'residential neighborhood type dissonance' is used to denote an incongruence in terms of land-use patterns between the neighborhood type where an individual is currently residing and the individual's preference structure regarding such characteristics of the residential environment. This definition links neighborhood dissonance directly to one dimension of residential satisfaction, which can be defined as a product of the congruence between the actual residential environment and subjects' opinions about what this environment should look like (Amérigo, 2002; Lu, 1999).

In the work of Amérigo and others (Brower, 1996; Talen, 2001) the residential environment includes three distinct dimensions: the *dwelling*; the *physical structure* of the neighborhood of residence, in terms of the nature, mix, and intensity of land uses; and the *neighbors* who represent the social dimension. Although the work reported here is related to environmental psychologists' investigation of residential satisfaction, the interest of the current study lies primarily in the incongruence between physical attributes of the surroundings of the actual dwelling and preferences regarding such features. The main reason for this is that physical layout features, such as intensity and mix of land uses at the neighborhood level, are often considered important determinants of residents' travel patterns. For instance, it has frequently been shown that the probability of driving a car is lower when the intensity and mixing of land uses is larger (Cervero, 2002; Frank and Pivo, 1994). Others have, however, challenged such ideas and argued that such effects result from self-selection in residential choice processes: households with a predisposition toward a certain type of travel choose a residential location that enables the pursuit of the preferred type of travel (Boarnet and Sarmiento, 1998; Srinivasan and Ferreira, 2002). The current paper is part of a larger research project that aims to gain insights into the complicated interdependence of preferences regarding residential location and travel, travel patterns, and actual residential location (see also Schwanen and Mokhtarian, 2003a; 2003b). The remainder of this section is concerned with the development of hypotheses about the determinants of a dissonance between actual and preferred residential neighborhood.

In our opinion, at least three types of factor explain the existence of residential neighborhood type dissonance: those relating to *residential preferences*; those that are associated with the *residential choice process*; and those that have to do with *dynamics in the life course and attitudes*. As we asserted in the introduction, residential preferences have been studied extensively. Numerous researchers have shown that housing preferences vary not only with household structure and income, but also with lifestyles and personality factors. Because residential preferences play a central part in neighborhood type dissonance, it is logical to hypothesize that factors affecting residential location preferences are also associated with the existence of neighborhood dissonance. In an earlier paper (Schwanen and Mokhtarian, 2003a), we hypothesized, for instance, that adventure seekers—adventurous, variety-seeking, spontaneous, risk-taking individuals (Redmond, 2000)—prefer an urban residential location because of the heterogeneity of functions and people there. A similar conclusion is reached by Feldman (1996). On the basis of in-depth interviews with inhabitants of the Chicago metropolitan area, she argues that people identifying themselves with the city need the stimulating and enriching city life to support their self-conceptions. Hence we may postulate in the current context that adventure seekers residing in a more homogeneous suburban community have a higher probability of experiencing a mismatch between actual and preferred neighborhood type.

Although neighborhood preferences are important, residential choices involve many different factors. These can be classified conveniently into three underlying dimensions (Cropper and Gordon, 1991; Van de Vijvere et al, 1998; Weisbrod et al, 1980): housing characteristics; the residential environment; and relative location. Households are typically assumed to trade off these attributes in a compensatory decision process, so that they, given their (monetary) resources, choose a housing alternative that maximizes utility. The fact that many factors are involved in the housing choice process makes it likely that certain preferences are irreconcilable. After all, there are few residences "with one door on Fifth Avenue, another on a New England common, and a window looking out to the mountains" (Brower, 1996, page 6). In particular, a household's current residential neighborhood type may not correspond to its preferences, because other factors—the travel time to work or dwelling size, for instance—were more important in the household's residential choice process than physical neighborhood characteristics.

Neighborhood type dissonance may also result from the fact that residential choice is a household decision, and housing preference structures may vary across individuals within the same household (Molin et al, 1999). Disagreement about the importance of features of the residential environment among household members may lead to neighborhood type mismatch at the level of the individual or even the household. Further, the extent of dissonance may be associated with the size and heterogeneity of the choice set of housing alternatives available in the residential choice process. The trade-off between housing attributes becomes more complicated as the constraints on choice are larger. Following Lu (1999) and others, we therefore hypothesize that the extent of residential neighborhood type dissonance increases, as the household income is lower.

So far, residential preferences and choices have been approached in a nondynamic fashion. Preferences regarding the dwelling or its environment change over time, however, and this may, or may not, result in a decision to relocate (Brown and Moore, 1970; Clark and Dieleman, 1996; Lu, 1999). At least two types of change in preferences can be distinguished: those resulting from progress through different life-course stages; and those that stem from psychological processes. Already in the 1950s, Rossi (1955) posited that housing needs and preferences change as households experience major events in their life cycle, rendering previous choices obsolete. The life cycle as explanatory factor was later replaced by the notion of the life course, which does not assume a typical set of stages for all individuals but leaves room for more diversity of individual life trajectories (Mulder and Hooijmeier, 1999; Stapleton, 1980). The most obvious example of a life course event is having a child. It is well-known from the literature that, in particular, households with children have a preference for a nonurban home in a lower density, green environment (Brower, 1996; Filion et al, 1999; McDowell, 1997; Talen, 2001). Hence, we may hypothesize that couples who were living in the city and then had children are more likely to experience an incongruence of actual and preferred neighborhood type than couples who did not experience this event.

Although households can solve a state of dissonance by moving to another location, they do not take decisions about moving lightly, because relocation usually involves considerable monetary as well as nonmonetary costs (Brown and Moore, 1970; Lu, 1998). Moreover, a negative correlation between attachment to the current neighborhood and a propensity to move has been established (Hooimeijer and Van Ham, 2000; Oh, 2003; Speare, 1974). Instead of reacting proactively by moving, individuals can also adjust residential preferences so that these become more congruent with the current residential situation. This is an example of the cognitive dissonance reduction process (Festinger, 1957; Svenson, 1992).

In the process of restructuring residential preferences the level of attachment with the current neighborhood, which can be considered a place-specific psychological bond, may become larger. Thus, the level of residential neighborhood type dissonance and attachment to the current neighborhood are related in a complex fashion: whereas less attached households may be more inclined to solve a state of neighborhood type mismatch through relocating, households which are more attached to their current neighborhood may solve a situation of dissonance more gradually through adjustment of their residential preferences, which might in turn enhance the level of attachment to the current neighborhood. To account for the complex interrelations of neighborhood type dissonance and neighborhood attachment we have defined dissonance indicators that account for differences in the extent of attachment. Before presenting the various mismatch indicators, we first turn to a description of the data used for the empirical research.

3 Data

3.1 Sample and geographical area

The data used for this study were collected in the context of ongoing research aimed at gaining insights into individuals' motivations for and attitudes toward traveling. The underlying goal is to obtain a better understanding of why people travel as they do and to inform policymakers so that they can formulate policies that take more realistic account of travelers' needs and desires. The conceptual framework of the project and some of its results have been published in Mokhtarian and Salomon (2001), Mokhtarian et al (2001), and Redmond and Mokhtarian (2001).

A fourteen-page questionnaire survey collecting information on a variety of travel and related issues was mailed to 8000 households of three communities in the San Francisco Bay Area. Half were mailed to the urban neighborhood of North San Francisco; the other half were split evenly between the contiguous suburbs of Concord and Pleasant Hill. A randomly selected adult household member was requested to complete the survey. Some 2000 surveys were returned, yielding a response rate of 25%. This is well within the 10–40% range considered typical for mail surveys of the general population (Sommer and Sommer, 1997). More important than the response rate per se is the representativeness of the sample: a 10% sample that is perfectly representative of the desired population is statistically superior to a 75% sample that contains responses from all of group *X* but no one of group *Y* (a group of interest to the study). Conducting the usual check for representativeness by comparing the distribution of key characteristics of our sample with those of the population (by using census data) indicates that our sample is roughly representative with respect to gender, but (as is typical for self-administered questionnaires) those with more education and higher incomes are overrepresented. One-person households and households with two or more workers are underrepresented (Curry, 2000). Even representativeness, however, is less critical when the elements of study are relationships between variables (as is the case for us), rather than distributions for variables taken singly. As Babbie (1998, page 237) puts it, "this potential defect [of lack of generalizability of the sample to the population] is less significant in explanatory research than it would be in descriptive research.... Social processes and patterns of causal relationships appear to be more generalizable and more stable than specific characteristics."

For the empirical analysis a subset of 1358 respondents identified as workers commuting at least once a month is used. This restriction of the sample is based on the assumption that attitudes toward travel and residential location differ fundamentally between commuters and noncommuters. With respect to travel, the commute functions as a structural determinant of daily travel behavior, and the majority of travelers commute during peak hours when congestion is most widespread (Schwanen and Dijst, 2003). These conditions will almost certainly influence attitudes toward traveling to differ, on average, from those who do not experience them. With respect to residential location, commuter status serves as a marker for a constellation of demographic and other traits that are likely to influence a household's location preferences, as well as generally imposing a constraint on the residential location choice set.

The communities where the survey was held differ in terms of spatial structure. Built in the period 1860–90, North San Francisco is an example of a traditional, urban neighborhood with high building densities, good accessibility by public transportation, comparatively small residences and lots, and little parking space. The neighborhood is located close to the University of San Francisco campus. Urban amenities in San Francisco's center are also easily accessible. The other two communities are located in the suburban belt of the Bay Area, specifically on the eastern side of the Bay. Concord, which has experienced major growth since 1960, is more or less the opposite of North

San Francisco, with low building densities, large houses and yards, and ample parking space. In the adjacent city of Pleasant Hill residential development started in the 1920s and continued apace, so that by 1961 about half of the existing buildings were in place. However, the opening of Interstate 680 in 1964 spurred additional construction, which has continued until today. In terms of land use, Pleasant Hill is characterized by low levels of land-use mixing and hence lower accessibility to grocery stores and parks, as well as by cul-de-sac street patterns. On the other hand, building densities are somewhat higher and cycling facilities better developed than in Concord.

In this paper we assume that the geographical units surveyed represent neighborhoods, but especially for the suburbs of Concord and Pleasant Hill this assumption may have its shortcomings. They are administrative units of a considerable size, and their boundaries may not coincide with residents' perceptions of what constitutes a neighborhood (which the results presented below for Pleasant Hill may indeed suggest). Although we readily acknowledge this shortcoming, we believe that the data, notwithstanding their relatively high level of spatial aggregation, still yield insightful results on the level and extent of dissonance. Future work should employ data with a higher level of spatial resolution, preferably at the level of individual parcels.

3.2 Personal and household characteristics

The survey contained not only questions on many facets of people's travel behavior, but also elicited detailed information on their sociodemographic situation, their personality and lifestyle, and constraints that prevent them from traveling. As in almost all travel surveys, the questionnaire included an extensive list of questions on the respondents' sociodemographic position: vehicle type, years in the USA, years in the current neighborhood, education, income and employment information, and household information such as the number of people and their age distribution. On the basis of this information, a typology of households was devised (the distribution of respondents across categories is given in table 1, over):

(1) single workers: one adult, no children;
(2) two-worker couples: two adults, each of whom is employed;
(3) one-worker couples: two adults, one of whom is employed;
(4) multiple-worker families: households consisting of two or more working adults and one or more children aged 18 years or under;
(5) one-worker families: households consisting of one working and one nonworking adult and one or more children aged 18 years or under;
(6) multiple-working adults: households consisting of three or more adults at least two of whom are employed; no children aged 18 years or under are present; and
(7) other households, including single parents, that is, one adult and one or more children.

Respondents were also asked to indicate how well each of seventeen words and phrases described their personality. Through factor analysis these traits were reduced to four underlying dimensions (for a detailed description see Mokhtarian et al, 2001; Redmond, 2000): the adventure-seeking, organizer, loner, and calm factors. In addition, eighteen Likert-type scale statements relating to work, family, money, status, and the value of time were used to construct four lifestyle dimensions (Mokhtarian et al, 2001; Redmond, 2000): the frustrated, family/community-oriented, status-seeking, and workaholic factors. Further, respondents were asked whether they suffered from any physical or physiological limits that prevent traveling on certain modes or at certain times of the day. Ordinal response categories were used, ranging from "no limitation" through "limits how often or how long", to "absolutely prevents" (coded as 1, 2, and 3, respectively). The survey also contained a question asking "Do you feel attached to this neighborhood?", with ordinal response categories from "no" through "somewhat" to "yes".

As table 1 indicates, the distribution of sociodemographics, personality and lifestyle factors, and mobility constraints varies considerably across the three communities surveyed. The largest differences can be noticed between Concord and North San Francisco. Although Concord and Pleasant Hill do differ from each other, the clearest differences are those between the urban neighborhood of North San Francisco on the one hand and the two suburban communities on the other hand. North San Francisco respondents frequently belong to younger and smaller households, often with multiple workers and less often with children. They are less car oriented, and on average have higher scores on the adventure-seeker and loner factors. Suburban respondents are more often drawn from slightly older and larger households, have more cars available, and have higher scores on the organizer factor. They have also lived in their current neighborhood for a longer period of time than their urban counterparts. A more detailed analysis of differences in population composition is presented in Schwanen and Mokhtarian (2003a). Together with the remarks on land-use patterns in section 3.1, table 1 suggests that North San Francisco is a prototype of a diverse but relatively affluent urban neighborhood in a US metropolitan region, whereas Pleasant Hill and Concord can be regarded as rather typical middle-to-upper-middle-class suburbs.

3.3 Residential preference indicators

One section of the travel survey consisted of thirty-two attitudinal statements related to travel, land use, and the environment. Respondents were asked to respond on five-point Likert-type scales ranging from "strongly agree" to "strongly disagree". Factor analysis was used to extract the relatively uncorrelated fundamental dimensions spanned by these thirty-two statements. Six factors could be identified, by means of principal-axis factoring with oblique rotation: pro-environmental policy, commute benefit, travel freedom, travel dislike, and travel stress factors well as a pro-high-density factor (table 2, over). The last is of central interest to the current study: we assume the respondents' scores on this factor to reflect their preference structure regarding physical characteristics of the residential environment with a higher factor score indicating a stronger preference for a higher density environment. Note that two of the four statements characterizing the pro-high-density factor can serve as indicators of the mix of land uses as well as density. Given that density and land-use mix are often closely intertwined, our 'pro-high-density' label should be interpreted as shorthand for a 'pro-high-density/mixed-use' attitude. Indirectly the pro-high-density factor also yields limited information on the social dimension of the residential environment (the neighbors or the community) as well as dwelling characteristics, reflecting the interdependencies of the dwelling, physical, and social characteristics of residential neighborhoods (Brower, 1996). However, exactly because the information on these additional neighborhood dimensions is limited, we prefer to interpret the pro-high-density factor as an indicator of the residents' preference for a particular type of physical neighborhood layout. Also note that the geographical area to which the above statements pertain is not objectively defined; rather, the definition of the neighborhood, as well as "within walking distance", is left to the respondent himself or herself. This is consistent with the notion of the neighborhood as a personal category (Amérigo and Aragonés, 1997; Lu, 1999).

The neighborhood-wide averages for the pro-high-density factor are (standard deviations in parentheses): 0.471 (0.663) for North San Francisco; −0.380 (0.687) for Pleasant Hill; and −0.539 (0.637) for Concord. These values provide further support for the differences in population composition alluded to in section 3.2 between urban North San Francisco and the suburban communities of Pleasant Hill and Concord.

Table 1. Descriptive statistics for commuting respondents in the sample, by neighborhood of residence.

	North San Francisco			Pleasant Hill			Concord		
	Mean	SD	*N* cases	Mean	SD	*N* cases	Mean	SD	*N* cases
Sociodemographics									
Car availability index[a]	0.82	0.47	642	1.11	0.41	357	1.14	0.51	307
Household income (US$ thousand)[b]	69.9	30.7	656	75.3	37.0	354	69.6	27.1	311
Ratio of workers to household members	0.87	0.25	668	0.80	0.28	369	0.74	0.29	315
Respondent's age (years)[b]	40.6	11.7	670	46.4	11.6	369	46.4	10.6	317
Length of stay in the neighborhood (months)	98.0	115.7	663	125.1	114.9	363	135.2	117.5	316
Mobility limitations									
Driving during the day	1.03	0.18	669	1.01	0.14	369	1.01	0.08	317
Driving at night	1.06	0.28	669	1.04	0.20	369	1.04	0.19	317
Driving on the freeway	1.05	0.25	669	1.03	0.20	369	1.01	0.14	317
Using public transportation	1.04	0.22	669	1.04	0.22	369	1.03	0.22	317
Riding a bicycle	1.09	0.37	669	1.11	0.36	369	1.09	0.35	317
Walking	1.03	0.19	669	1.06	0.27	369	1.03	0.19	317
Personality traits[c]									
Adventure-seeker factor	0.18	0.86	670	−0.03	0.96	369	−0.11	0.96	318
Organizer factor	−0.05	0.82	670	0.09	0.78	369	0.08	0.80	318
Loner factor	0.19	0.89	670	−0.05	0.90	369	−0.05	0.93	318
Calm factor	−0.08	0.81	670	−0.04	0.86	369	0.04	0.76	318
Lifestyles[c]									
Frustration factor	0.01	0.84	670	0.07	0.80	369	0.07	0.85	318
Family/community-oriented factor	0.05	0.72	670	0.04	0.73	369	0.05	0.72	318
Status-seeker factor	0.10	0.79	670	0.01	0.79	369	0.10	0.79	318
Workaholic factor	0.04	0.80	670	0.00	0.72	369	0.04	0.80	318

Table 1 (continued).

	North San Francisco		Pleasant Hill		Concord	
	N cases	Percentage	*N* cases	percentage	*N* cases	percentage
Sociodemographics						
Household type						
single worker	212	31.6	73	19.8	39	12.3
two-worker couple	212	31.6	115	31.2	71	22.3
one-worker couple	29	4.3	26	7.0	34	10.7
multiple-worker family	89	13.3	89	24.1	114	35.8
one-worker family	22	3.3	29	7.9	19	6.0
multiple working adults	61	9.1	19	5.1	16	5.0
‘other’ household	28	4.8	14	3.8	18	5.7
Gender						
female	329	49.4	199	53.9	163	51.6
Occupation type						
service or repair	29	4.3	24	6.5	20	6.3
sales	55	8.2	35	9.5	31	9.7
production or construction or crafts	18	2.7	9	2.4	23	7.2
manager or administrator	148	21.6	90	24.4	60	18.9
clerical or administrative support	66	9.9	50	13.6	33	10.4
professional or technical	348	52.2	157	42.5	143	45.0
other	7	1.0	4	0.8	8	2.5

[a] Quotient of the number of vehicles and the number of valid driver’s licenses in a household.
[b] Mean category midpoint is used as estimate of the true value.
[c] Factor scores are standardized; more information on factor loadings available in Mokhtarian et al (2001) and Redmond (2000).

Table 2. Pattern matrix for the six attitude factors (source: Mokhtarian et al, 2001; Redmond, 2000).

	Pro-high-density	Pro-environ-mental-policy	Commute benefit	Travel freedom	Travel dislike	Travel stress
Living in a multiple family unit would not give me enough privacy	−0.617					
I like living in a neighborhood where there is a lot going on	0.486					
Having shops and services within walking distance of my home is important to me	0.401	0.243				
I like to have a large yard at my home	−0.323					
To improve air quality, I am willing to pay a little more to use an electric or other clean-fuel vehicle		0.641				
We should raise the price of gasoline to reduce congestion and air pollution		0.617				
We need more public transportation, even if taxes have to pay for a lot of the costs		0.612				
I limit my auto travel to help improve congestion and air quality		0.372				
We can find cost-effective technological solutions to the problem of air pollution		0.353				
We need more highways even if taxes have to pay for a lot of the costs		−0.194				
My commute is a real hassle			−0.695			
My commute trip is a useful transition between home and work			0.583			
The traveling that I need to do interferes with doing other things I like			−0.530			
I use my commute time productively			0.467			
Travel time is generally wasted time			−0.461			
Getting stuck in traffic doesn't bother me too much			0.419			
In terms of local travel, I have the freedom to go anywhere I want to				0.511		
In terms of long-distance travel, I have the freedom to go anywhere I want to				0.422		
The vehicles I travel in are comfortable				0.295		
It is nice to be able to do errands on the way to or from work				0.269		
I am willing to pay a toll to travel on an uncongested road				0.212		
Traveling is boring					0.621	
I like exploring new places					−0.537	
The only good thing about traveling is arriving at your destination					0.525	
Getting there is half the fun					−0.465	
I worry about my safety when I travel						0.544
Traveling makes me nervous						0.537
Traveling is generally tiring for me						0.410
I'd rather have someone else do the driving						0.329
I tend to get sick when traveling						0.318
I am uncomfortable being around people I don't know when I travel						0.297
I like traveling alone						−0.194

4 Residential neighborhood type dissonance indicators

On the basis of the preceding sections, several criteria can be formulated that an indicator of residential neighborhood type dissonance should meet:

1. It should give a straightforward assessment of the presence of mismatch.
2. It should be able to reflect subtle differences in the extent of dissonance across individuals.
3. It should take account of the variation in the level of attachment to the current neighborhood.
4. It should be equally applicable to different kinds of neighborhoods.

Because some of these demands are difficult to reconcile, we chose to define a set of five complementary indicators that as a group meet these criteria. All measures are based on the same principle: residents' scores on the pro-high-density dimension are contrasted with their actual neighborhood type.

The first measure was specifically designed with the first criterion in mind. Hence, it is defined as a binary indicator having a value of 1 for respondents whose score does not fall into the expected range of scores for their neighborhood of residence and 0 otherwise. Persons in the urban neighborhood of North San Francisco are expected to have a score on the pro-high-density factor that is higher than average. Because the factor scores are standardized and the sample is about evenly distributed between urban and suburban locations, this coincides approximately with a positive score on the pro-high-density factor. As a result, North San Francisco (NSF) inhabitants having a below-average or negative score on this factor are considered mismatched and are assigned the value of 1 on the first mismatch indicator. For suburbanites in Pleasant Hill (PH) and Concord (CON) the measure is defined likewise, the only difference being that a respondent is considered mismatched if he or she has a positive score on the pro-high-density factor (PROHIDENS). More formally, this dissonance indicator can be defined for respondent i as

$$\mathrm{MM1}_i = \begin{cases} 1, \text{ if } \mathrm{PROHIDENS}_i < 0, \text{ for } \mathrm{NSF}_i = 1, \\ 1, \text{ if } \mathrm{PROHIDENS}_i > 0, \text{ for } \mathrm{PH}_i = 1, \mathrm{CON}_i = 1, \\ 0, \text{ otherwise.} \end{cases}$$

Although potentially a useful measure, a binary indicator is by definition crude; it does not reflect gradual differences in dissonance. To meet the second criterion formulated above, a more fine-grained indicator was defined that measures the difference between the score for respondent i on the standardized pro-high-density factor and the minimum or maximum score on that factor, depending on the neighborhood. To make this measure less sensitive to outliers, we took the 5th and 95th percentile scores as the minimum and maximum scores on the pro-high-density factor. For North San Francisco respondents the 5% highest scores on this factor were set equal to the 95th percentile point. Similarly, the 5% lowest scores were set equal to the 5th percentile score, if respondents reside in suburban Pleasant Hill or Concord. Consequently, this mismatch indicator (like all the rest) is always 0 or positive. In formula:

$$\mathrm{MM2}_i = \begin{cases} \mathrm{PROHIDENS}_{\max} - \text{minimum}(\mathrm{PROHIDENS}_{\max}, \mathrm{PROHIDENS}_i), \text{for } \mathrm{NSF}_i = 1, \\ \text{maximum}(\mathrm{PROHIDENS}_i, \mathrm{PROHIDENS}_{\min}) - \mathrm{PROHIDENS}_{\min}, \text{for } \mathrm{PH}_i = 1, \mathrm{CON}_i = 1, \end{cases}$$

where, for our dataset, $\mathrm{PROHIDENS}_{\max} = 1.325$, and $\mathrm{PROHIDENS}_{\min} = -1.331$. For example, a score of 1.4 would be set to 1.325 for a North San Francisco resident (resulting in $\mathrm{MM2}_i = 0$, or no mismatch), but left unchanged for a suburban resident (resulting in the relatively large mismatch value of 2.731 for $\mathrm{MM2}_i$).

As we argued before, neighborhood attachment and neighborhood type dissonance are linked to each other, which calls for dissonance indicators that account for variation in neighborhood attachment. We therefore interacted the above measures of residential mismatch with an ordinal indicator, ATTACH, of the level of attachment to the neighborhood (1 = attached; 2 = somewhat attached; 3 = not attached) derived from one of the questions in the survey (section 3.2). This yielded two additional mismatch indicators:

$$\mathrm{MM3}_i = \mathrm{MM1}_i \times \mathrm{ATTACH}_i ,$$

$$\mathrm{MM4}_i = \mathrm{MM2}_i \times \mathrm{ATTACH}_i ,$$

where $\mathrm{MM1}_i$ and $\mathrm{MM2}_i$ are defined as before. These measures reflect the notion that the level of neighborhood type dissonance is exacerbated by a lack of attachment to the current neighborhood.

When describing the three communities where the survey was conducted, we classified Pleasant Hill as a typical suburb, notwithstanding that it also exhibits several more urban features, such as moderate building densities. Treating this neighborhood solely as a suburban, low-density community may result in an overestimation of the number of people who are mismatched (and indeed it does, as section 5 seems to indicate). To prevent such misclassification, we devised an additional mismatch indicator $\mathrm{MM5}_i$. Respondents are considered dissonant if their score on the pro-high-density factor is extremely high (low) compared with the neighhorhood-wide average for their suburban (urban) neighborhood. 'Extremely high (low)' is defined as a score that is higher (lower) than the neighborhood average plus (minus) one standard deviation. The threshold values for North San Francisco, Pleasant Hill, and Concord are −0.192, 0.307, and 0.098, respectively. This dissonance measure differs from the previous four in the sense that the number of people considered mismatched is approximately the same across neighborhoods—by definition about 16%, assuming an approximately normal distribution for PROHIDENS—hence providing a more conservative estimation

Table 3. The extent of residential neighborhood dissonance in three San Francisco Bay Area communities, by type of indicator.

	$\mathrm{MM1}_i$			$\mathrm{MM2}_i$		
	NSF	PH	CON	NSF	PH	CON
0 (not dissonant) (%)	76.1	72.9	81.1			
1 (dissonant) (%)	23.9	27.1	18.9			
2 (more dissonant) (%)						
3 (most dissonant) (%)						
Average				0.88	0.98	0.82
Standard deviation				0.63	0.64	0.59
Median				0.82	0.94	0.81
N observations	670	369	318	670	369	318
χ^2		6.49*				
Cramer's V		0.07*				
ANOVA (F-test)[a]					5.65**	
Adjusted R^2					0.01	

Note: *significant at $\alpha < 0.05$; **significant at $\alpha < 0.01$.
NSF = North San Francisco; PH = Pleasant Hill; CON = Concord.
[a] ANOVA – analysis of variance.

of the number of mismatched respondents than the binary indicator $\mathrm{MM1}_i$. Thus,

$$\mathrm{MM5}_i = \begin{cases} 1, \text{ if } \mathrm{PROHIDENS}_i < -0.192, & \text{for } \mathrm{NSF}_i = 1, \\ 1, \text{ if } \mathrm{PROHIDENS}_i > 0.307, & \text{for } \mathrm{PH}_i = 1, \\ 1, \text{ if } \mathrm{PROHIDENS}_i > 0.098, & \text{for } \mathrm{CON}_i = 1, \\ 0, \text{ otherwise.} \end{cases}$$

We believe that these five indicators as a group give an adequate representation of the existence and level of neighborhood type dissonance. Note, however, that, as a result of data limitations, all measures are cross-sectional, measuring the level of mismatch at a single point in time. This means that changes in the level of dissonance experienced by residents cannot be analyzed. Also note that the variables are defined for individuals within households and not at the household level. The development of indicators accounting for these shortcomings is left for future research.

5 Extent of neighborhood type dissonance

The simplest and most straightforward measure—the binary indicator $\mathrm{MM1}_i$—reveals that, overall, 23.6% of the workers in the sample are classified as mismatched. In other words, about one quarter of the sample experience a dissonance in terms of land-use patterns between the actual and preferred type of residential neighborhood; three quarters are living in a location that matches their preferences, a result that is strikingly similar to that of Feldman (1990). Segmentation by neighborhood shows that the percentage of dissonant residents is highest in Pleasant Hill and lowest in Concord with North San Francisco taking an intermediate position (table 3). A χ^2-test indicates that the differences between the neighborhoods are statistically significant at the 5% level; however, the strength of the association is rather weak (Cramer's $V = 0.069$). For the continuous indicator $\mathrm{MM2}_i$, the results point in the same direction. The extent of neighborhood dissonance is largest in Pleasant Hill and lowest in Concord. An analysis of variance indicates that the variation between the

Table 3 (continued).

$\mathrm{MM3}_i$			$\mathrm{MM4}_i$			$\mathrm{MM5}_i$		
NSF	PH	CON	NSF	PH	CON	NSF	PH	CON
76.6	72.8	81.1				84.6	84.6	83.3
12.9	12.6	8.2				15.4	15.4	16.7
8.5	11.3	8.5						
2.1	3.3	2.2						
			1.36	1.56	1.37			
			1.24	1.27	1.20			
			1.16	1.29	1.10			
661	364	317	661	364	317	670	369	318
	9.51						0.30	
	na						na	
				3.28**				
				0.00				

neighborhoods is statistically significant. Yet, the explanatory power of a model with only neighborhood type is very low ($R^2 = 0.01$).

Turning to the variables constructed by interacting both the binary and the continuous mismatch indicators with neighborhood attachment, we find that the level of mismatch remains highest in Pleasant Hill (table 3). However, for $\mathsf{MM3}_i$ the variation between the neighborhoods is not statistically significant at the 95% or even the 90% confidence level. The variation is statistically significant for $\mathsf{MM4}_i$, but no differences can be noticed between North San Francisco and Concord. Logically, no neighborhood differences are found for $\mathsf{MM5}_i$. Recall from section 4 that this variable has been constructed in such a way that by definition about 16% of the respondents are classified as dissonant.

The reasons for the higher prevalence of residential mismatch in Pleasant Hill are not immediately clear. Perhaps this result points to a measurement error. Although individual-specific measures of residential preferences are used, no individual-specific measures of neighborhood type are available; the same binary value (urban or suburban) is applied to everyone in a given neighborhood. Using different data, Bagley et al (2002) show the extensive variation in perceived neighborhood characteristics exhibited by residents of the three neighborhoods investigated here. Hence, we may be classifying as 'mismatched' a suburban resident who lives in an apartment complex near a commercial area and has in fact more or less realized his or her pro-high-density preferences. This is more likely to happen in Pleasant Hill, because it has the greatest heterogeneity of residence types among the three neighborhoods. Other reasons may lie in the characteristics of the respondents. It is to the impact of such factors on residential neighborhood type dissonance that we turn in the following section.

6 Determinants of neighborhood dissonance

In this section of the paper we look at the factors that may explain the extent of residential neighborhood type mismatch. A series of models, segmented by neighborhood type, is presented in which sociodemographics, mobility constraints, lifestyle factors, and personality traits are allowed to be included as explanatory variables. The type of statistical model depends on the nature of the mismatch indicator: for the binary indicators $\mathsf{MM1}_i$ and $\mathsf{MM5}_i$, (unordered) binary probit modeling is used; for the interaction variable consisting of the binary dissonance indicator times neighborhood attachment, $\mathsf{MM3}_i$, ordered binary probit models are estimated; for the two continuous indicators, $\mathsf{MM2}_i$ and $\mathsf{MM4}_i$, tobit regression models are presented. These model structures are described briefly below, followed by the results for North San Francisco (section 6.2) and the suburban neighborhoods of Concord and Pleasant Hill (section 6.3).

6.1 Model structures

Binary probit models are similar to binary logit models: both are based on random utility theory, and assume that individuals maximize utility given certain constraints. In addition, utility consists of a structural, deterministic component and a random component in both model types. The important difference between the models concerns the assumptions that are made regarding the random components. In logit models these random terms are assumed to follow a Gumbel distribution, against a normal distribution in probit models (Ben-Akiva and Lerman, 1985). For binary probit models, the conventional McFadden ρ^2 can be used as a goodness-of-fit statistic, which is defined as 1 minus the quotient of the log likelihood at convergence and the likelihood at 0 (equally likely model as base) or the likelihood for a model with a single constant term (market share model as base). We use the latter definition, which is more conservative.

An ordered probit model is an extension of the standard probit model, specifically designed for response variables that are not nominal but ordinal in nature, such as $\mathsf{MM3}_i$ in the present application. Such a model is based on an underlying continuous latent variable, with the observed variable taking its discrete values as the latent (unobserved) variable crosses certain thresholds. These thresholds are unknown parameters to be estimated. Here, the values '2' and '3' of $\mathsf{MM3}_i$ are collapsed to a single category because of the small sample sizes in the latter category, so that the modified variable can take on three values (0, 1, or 2). Hence, the ordered probit model can be expressed as:

$$
\begin{aligned}
y_i^* &= \boldsymbol{\beta}^{\mathrm{T}} \boldsymbol{x}_i + \varepsilon_i \,, \\
y_i &= 0, \quad \text{if } y_i^* \leqslant \mu_0 \,, \\
y_i &= 1, \quad \text{if } \mu_0 < y_i^* \leqslant \mu_1 \,, \\
y_i &= 2, \quad \text{if } \mu_1 < y_i^* \,,
\end{aligned}
$$

where y_i^* and y_i are the latent and observed dependent variables, respectively and $\boldsymbol{x}_i$ represents a vector of independent variables with $\boldsymbol{\beta}^{\mathrm{T}}$ as a vector of parameters to be estimated. In this context y_i^* can be seen as corresponding to the ith respondent's true level of residential neighborhood type dissonance, whereas y_i represents the category in which that true level falls. The ε_i are assumed to follow a standard normal distribution, having a mean of 0 and a variance of 1. The μ are the threshold parameters to be estimated, with μ_0 generally taken to be 0 for the convenience (shifting all the μ by the same constant does not alter the maximum likelihood estimates of the $\boldsymbol{\beta}$ parameters). They represent the points on the latent continuous dissonance scale that identify the bounds for each observed dissonance category, and do not have any behavioral significance. No commonly accepted measures for goodness of fit exist for the ordered probit model.

Ordinary least squares (OLS) regression modeling is the standard statistical procedure for explaining the variance in continuous dependent variables such as $\mathsf{MM2}_i$ or $\mathsf{MM4}_i$. In the case of censored variables where values less than a certain threshold—typically 0—are not observed, OLS regression results in inconsistent estimators and predictive values that may fall below the threshold (Greene, 2002). Because both $\mathsf{MM2}_i$ and $\mathsf{MM4}_i$ are nonnegative variables, left censored at 0, we have estimated a series of tobit regression models. Like the ordered probit models, the tobit model is based on a latent continuous dependent variable y_i^* that can take on any value:

$$
\begin{aligned}
y_i^* &= \boldsymbol{\beta}^{\mathrm{T}} \boldsymbol{x}_i + \varepsilon_i \,, \\
y_i &= \begin{cases} 0, & \text{if } y_i^* \leqslant 0, \\ y_i^*, & \text{if } y_i^* > 0, \end{cases}
\end{aligned}
$$

where y_i is the observed variable, $\mathsf{MM2}_i$ or $\mathsf{MM4}_i$, for respondent i. The random variable ε_i is assumed to follow a normal distribution with a mean of 0 and variance σ^2. Maximum likelihood estimation is used to obtain statistically consistent estimators of the vector of parameters $\boldsymbol{\beta}$ and the scalar σ, which has no behavioral significance. A universally accepted goodness-of-fit statistic is also lacking for the tobit model; however, Veall and Zimmerman (1994) recommend the use of a modified McKelvey–Zavoina statistic as a pseudo R^2 measure:

$$
R_{\mathrm{MZ}}^2 = \frac{\sum_{i=1}^{N} (\hat{y}_i^* - \hat{y}_\bullet^*)^2}{\sum_{i=1}^{N} (\hat{y}_i^* - \hat{y}_\bullet^*)^2 + N\hat{\sigma}^2} \,,
$$

where $\hat{y}_i^* = \hat{\boldsymbol{\beta}}^{\mathrm{T}} \boldsymbol{x}_i$ is the predicted value of the latent variable for the individuals with characteristics $\boldsymbol{x}_i$, $\hat{y}^*_\bullet$ is the mean of $\hat{y}^*_i$, and $\hat{\sigma}^2$ is the estimated variance of ε_i. The numerator of R^2_{MZ} is a measure of the explained variance, and the second term in the denominator an indicator of unexplained variance.

In the remainder of this section we present final model specifications for all mismatch indicators segmented by neighborhood type. Decisions about the inclusion of variables in the final models were made after extensive experimentation with alternative specifications on the basis of log-likelihood tests and conceptual plausibility.

6.2 Urban North San Francisco

The first thing that can be noticed upon looking at the results in table 4 is that considerable variation exists in the determinants that show up for the different dissonance indicators. Apart from the constant, only two variables are included in all models: the car availability index and limitations on the use of public transport. This variation in determinants suggests that the five mismatch constructs capture (subtly) different aspects of residential neighborhood dissonance. Nonetheless, all sets of variables—sociodemographics, mobility constraints, personality traits, and lifestyle indicators—are included in the various models, and when the same variables appear in more than one model, they always have the same sign. Closer inspection of the results shows that all models point in the same general direction; they will therefore be discussed collectively.

Across all dissonance indicators, the models show that urban dwellers are more mismatched as the household has more cars available. This seems to suggest that more automobile-oriented individuals living in urban surroundings prefer a suburban environment that is better geared to auto use. Household composition is also related to the extent of mismatch. In three models the ratio of the number of workers to the number of persons (including children) in the household is negatively related to the probability of being mismatched or the extent of dissonance. In other words, small households and households with many working adults are more at home in an urban environment, whereas larger households in particular those with children, are less comfortable in an urban environment. This result is consistent with the hypotheses in section 2, and aligns with the standard theory on the distribution of household types across urban space (for example, Bootsma, 1998; Champion, 2001; Filion et al, 1999). The effect of length of stay in the current neighborhood may also be interpreted from a life-course-analysis perspective. The coefficient is in all cases positive, revealing that urban dwellers are more likely to be dissonant if they have lived for a longer period of time in North San Francisco. Thus, this urban neighborhood appears to be a more appropriate residential environment for younger and/or more dynamic households, many of whom might not yet have made commitments in their household and professional careers. An alternative interpretation is that residents who have lived for a short period in this neighborhood have more recently attempted to bring their neighborhood type in line with their location preferences by relocating. As a result of this, they are less likely to experience neighborhood type mismatch.

On the other hand, our hypothesis that monetary resources are related to the extent of neighborhood dissonance is not uniformly validated by the modeling results. Only for one indicator, the continuous $\mathsf{MM2}_i$, is the household income inversely associated with the extent of residential neighborhood type mismatch. It presumably reflects that households with higher incomes have larger and more varied choice sets from which to choose a residential location that accords with their preferences. Another indicator of socioeconomic position is related to the extent of dissonance. Four out of five models indicate that individuals holding an occupation in sales are more likely to be mismatched. The reasons for this are not clear, but further analysis indicates that

Table 4. Determinants of residential dissonance for North San Francisco respondents ($N = 606$), by type of indicator.

	$MM1_i$		$MM2_i$		$MM3_i$		$MM4_i$		$MM5_i$	
	coef.	*t*-stat.	coef.	*t*-stat.	coef.	*t*-stat.	coef.	*t*-stat.	coef.	*t*-stat.
Constant	−1.055	−2.663	0.628	3.269	−1.910	−6.467	0.140	0.501	−1.768	−4.431
Car availability index	0.353	2.723	0.258	4.691	0.315	2.196	0.323	2.959	0.293	2.081
Ratio of workers to household members	−0.913	−3.123	−0.353	−2.924					−0.651	−2.344
Multiple-worker family					0.433	2.774				
Two-worker couple	−0.318	−2.185								
One-worker couple	−0.717	−2.316								
Length of stay in the neighborhood	0.021	3.985	0.010	4.282	0.014	2.794			0.010	1.960
Household income			−0.020	−2.332						
Occupation in sales	0.445	2.180	0.319	3.454	0.410	2.215	0.731	3.846		
Limitations on use of public transportation	0.666	2.451	0.337	2.787	0.636	2.609	0.825	3.330	0.859	3.131
Adventure-seeker factor	−0.151	−2.185	−0.056	−1.895	−0.120	−1.995	−0.128	−2.115		
Organizer factor									0.178	2.186
Status-seeker factor	0.204	2.812	0.134	4.402	0.230	3.272	0.237	3.790		
Workaholic factor									0.173	1.970
σ			0.613	32.299			1.260	32.442		
μ_0					0.573	9.392				
μ_1					1.447	11.654				
Type of model	binary probit		tobit regression		ordered probit		tobit regression		binary probit	
Log likelihood at constant	−329.9				−457.0				−256.3	
Log likelihood at convergence	−284.7		−574.6		−426.0		−963.0		−230.7	
χ^2	90.0				62.1				51.3	
ρ^2 (market share base)	0.137								0.100	
Adjusted ρ^2	0.110								0.076	
R^2_{MZ}			0.150				0.070			

urban dwellers occupied in sales have a household income below the neighborhood average. Thus, income effects might be captured indirectly by this variable.

With regard to mobility limitations, all models indicate that urban individuals have a higher propensity to be mismatched if they have physical or psychological difficulties that make the use of public transport troublesome. A private automobile (or minivan) can be especially equipped to accommodate some mobility limitations more readily than public transit vehicles can. An urban individual with such limitations may prefer getting around by automobile, but find auto travel in the city to be inconvenient for the same reasons that others do (crowded streets and scarce and/or expensive parking). Hence, such a person may wish to live in a lower density environment where auto travel is easier. Alternatively, some people expressing a predominantly psychological distaste for traveling by transit may simply wish to live in a location where public transit is not an 'intrusive' feature of the environment.

Differences in lifestyle and personality also contribute to our understanding of the extent of residential neighborhood dissonance. More specifically, we see that a higher score on the adventure-seeker factor is associated with lower levels of dissonance, whereas the opposite is true for the status-seeker factor. Both effects are consistent with expectations. It should be no surprise that a high score on the adventure-seeker factor tends to coincide with a high score on the pro-high-density factor and hence a low level of residential neighborhood dissonance, given the fact that "I like living in a neighborhood where there is a lot going on" is one of the defining statements of this factor (see section 3.3). However, this result is also consistent with Jacobs's (1961) ideas about mixing land uses and promoting public space. With regard to the status-seeker factor, it is important to remember that status-seeking behavior in this context refers mainly to private vehicles (Redmond, 2000). Thus, this variable suggests that people who derive a significant part of their status from the type of vehicle they drive tend to be more dissonant in an urban environment, because driving takes more effort there than in lower density environments. Further, individuals with a high score on the status-seeker factor may also hold stronger aspirations for the perceived status of suburban living (large home and yard).

Although the adventure-seeker and status-seeker factors show up in four models, two different personality and lifestyle factors are included in the model for $\mathsf{MM5}_i$: the organizer personality and the workaholic lifestyle factors. In both instances, the coefficients are positive. Why organizers are more often mismatched is not immediately clear. Perhaps (some) people become better organizers when they have formed a family and have to combine multiple roles in their daily life. If this were true, this factor would capture some part of the suburban preference of family households, which is not seized by any of the sociodemographic indicators. In addition, a high score on the organizer factor is also indicative, albeit weakly, of a preference for staying close to home (Redmond, 2000), which is associated with a preference for a suburban neighborhood type, as Feldman (1996) argues on the basis of her qualitative research among sixty-four adult residents in Chicago. The effect for the workaholic factor might be explained by referring to the fact that congestion effects in traffic but also in shops, restaurants, and other busy facilities tend to be more prevalent in urban than in suburban surroundings. Especially workaholics may have negative feelings about this bustle, as they may place more value on the loss of time.

The goodness-of-fit statistics cannot be compared easily across models, mainly because of different model structures. The fact that the ρ^2 for $\mathsf{MM5}_i$ is lower than for $\mathsf{MM1}_i$ suggests that the latter model is better. Interestingly, the tobit model that accounts for differences in neighborhood attachment performs worse than the model that does not reckon with attachment. For all models, however, the conclusion holds that the model fit is rather modest, suggesting that many relevant explanatory variables are lacking from the analysis. This was not totally unexpected, given that information about residents' dwellings, their accessibility considerations, as well as their satisfaction with the current residence and the social aspects of the neighborhood are not included because of data limitations. Nevertheless, the models yield useful insights regarding the impact of sociodemographics, personality traits, and lifestyles on the extent of neighborhood type dissonance.

6.3 Suburban communities

Compared with the models for North San Francisco, the number of variables that are included in all five models for suburban dwellers is larger: five versus two (table 5, see over). However, more or less the same variables show up in the models as in those for the urban neighborhood, suggesting that the influences important to residential neighborhood type dissonance (at least among those measured in this study) are to a large extent identical in different spatial contexts. Initially, separate models were estimated for Pleasant Hill and Concord, and differences did exist between the determinants of neighborhood type mismatch in these neighborhoods. Overall, however, the conclusions pointed toward the same direction. As a result, we restrict ourselves here to a discussion of combined models for Pleasant Hill and Concord.

Consistent with the results for the urban neighborhood, the extent of neighborhood type dissonance is lower when the number of cars per driver in the household is larger. Also consistent is the result that households with fewer workers relative to household members are less often mismatched. In addition, table 5 shows that one-person households and various alternative household structures, combined in the 'other' household category, are less satisfied with the land-use patterns in their suburban environment. Again this is in line with previous research in residential preferences (McDowell, 1997). The signs of the length of stay variable are negative, showing that residents tend to be less mismatched if they have lived longer in their current community. This result favors the life-course interpretation of this variable over an explanation that focuses on having recently brought the residential location type in line with preferences (see section 6.2). Collectively, the coefficients for both the urban and suburban models suggest that people value a suburban environment more positively as they grow older. The sales occupation variable is included in three of the models. It is the only variable with a sign that is inconsistent with the results for North San Francisco. Thus, commuters in sales jobs are not only more likely to be mismatched in an urban but also in a suburban neighborhood type. The reasons for this are not clear. Additional analysis did not show that suburban dwellers occupied in sales have a sociodemographic profile that differs from that of the average suburbanite in the sample and this holds even true for household income. Perhaps suburban sales persons have a strong preference for a lifestyle with an emphasis on conspicuous consumption, to which (gentrified) urban environments are usually well suited (for instance, McDowell, 1997). Perhaps sales workers in general, who succeed by always striving to make the next sale, are by nature not inclined to be satisfied with the status quo.

Only for $\mathsf{MM1}_i$ and $\mathsf{MM2}_i$ are limitations on mobility relevant predictor variables. In both cases the extent of mismatch is lower for people with public transit mobility constraints, which accords with the results for North San Francisco. For the binary indicator $\mathsf{MM1}_i$ a second measure is incorporated, showing that people with fewer limitations on bicycling are less likely to be dissonant if they reside in the suburbs. Recall from section 3.1 that cycling facilities are relatively well developed in Pleasant Hill. This is not surprising, because suburbs are often more bicycle friendly than urban environments—in our case, particularly true of Pleasant Hill. Thus, those who are

Table 5. Determinants of residential dissonance for suburban respondents ($N = 627$), by type of indicator.

	$MM1_i$		$MM2_i$		$MM3_i$		$MM4_i$		$MM5_i$	
	coef.	*t*-stat.	coef.	*t*-stat.	coef.	*t*-stat.	coef.	*t*-stat.	coef.	*t*-stat.
Constant	0.119	0.182	0.859	3.456	−0.816	−3.121	1.726	8.441	−1.563	−6.557
Car availability index	−0.315	−2.094	−0.262	−4.435	−0.333	−1.964	−0.478	−4.198		
Ratio of workers to household members			0.325	3.142	0.616	2.555	0.532	2.652	0.756	2.730
Single worker	0.404	2.420	0.261	3.446	0.427	2.706	0.617	4.216	0.302	1.730
‘Other’ household	0.841	3.169	0.339	2.844	0.715	2.950	0.607	2.637	0.854	3.117
Length of stay in the neighborhood	−0.001	−2.350	−0.001	−3.239	−0.001	−2.311	−0.003	−6.161	−0.002	−2.580
Occupation in sales			0.167	1.960			0.417	2.547	0.353	1.716
Limitations on driving a car during the day			0.417	1.961						
Limitations on bicycling	0.375	0.163								
Limitations on using public transport	−1.417	−2.256	−0.310	−2.556						
Adventure-seeker factor			0.048	1.740						
Organizer factor	−0.179	−3.979	−0.135	−4.175	−0.187	−2.331	−0.239	−3.915	−0.210	−2.531
Status-seeker factor	−0.326	−2.330	−0.143	−4.397	−0.300	−3.754	−0.260	−4.154	−0.364	−3.948
σ			0.613	33.016			1.187	33.146		
μ_0					0.459	8.435				
μ_1					1.338	11.422				
Type of model	binary probit		tobit regression		ordered probit		tobit regression		binary probit	
Log likelihood at constant	−335.4				−471.3				−273.5	
Log likelihood at convergence	−300.6		−594.7		−440.4		−522.2		−248.3	
χ^2	69.6				61.8				50.4	
ρ^2 (market share base)	0.104								0.092	
Adjusted ρ^2	0.080								0.067	
R^2_{MZ}			0.134				0.144			

more inclined to cycle are more likely to find a hospitable environment for it in the suburbs. In the tobit model for the continuous $MM2_i$, the variable that measures constraints on driving a car during the day is included. An explication similar to that for the public transit limitations variable can be given: because the car plays a central part in the suburban transport system, people who have problems with driving an auto may feel less satisfied with their residential environment, and prefer an environment in which transit is more readily available.

Personality and lifestyle factors are also significantly associated with the extent of neighborhood type dissonance for suburban dwellers. Across all models, suburban status seekers are less likely to be mismatched, or experience lower levels of mismatch. In contrast, adventurous suburbanites are more likely to be mismatched, although this effect is only statistically significant for the continuous indicator $MM2_i$. Last, the organizer factor is negatively related with the level of neighborhood type dissonance. For all these variables the results are in line with those for North San Francisco.

In terms of goodness of fit, the models perform similar to those for North San Francisco, with one important exception. Here, the tobit model that accounts for neighborhood attachment ($MM4_i$) outperforms the model for $MM2_i$.[1] It thus appears that more (qualitative) research into the complex relationships between neighborhood type dissonance and attachment to the neighborhood, which is more place specific in nature, is warranted.

7 Conclusions and discussion

This paper has investigated the extent of the dissonance (in terms of land-use patterns) between residents' preferred type of neighborhood and the type of neighborhood they actually live in. To this end, their stated preferences regarding physical neighborhood characteristics are contrasted with their actual location, in an urban neighborhood or in a suburban community. Using a binary indicator, we have found that nearly a quarter of our sample of commuting residents are mismatched, a result that is strikingly similar to Feldman's (1990). The level of mismatch differs between suburban neighborhoods, indicating that variation exists between suburbs in physical layout and people's satisfaction therewith.

An attempt to characterize the residents who experience a neighborhood type mismatch suggests a strong correspondence with existing knowledge in geography and urban planning regarding the residential location preferences of various population segments. Thus, we find, for example, that single suburban dwellers and larger households with children residing in an urban neighborhood have higher probabilities of being mismatched. This aligns with many previous studies arguing that single persons prefer an urban location, and families a residence in the suburbs (for example, Bootsma, 1998; Brun and Fagnani, 1994; McDowell, 1997).

Moreover, as the summary of results in table 6 (see over) shows, the determinants of neighborhood type dissonance have, with the exception of having a sales occupation, opposite signs in the urban and suburban models. This indicates a consistency of influence of a given variable across neighborhood types, with a variable that contributes to greater mismatch in an urban area contributing to less mismatch in a suburb and conversely. The most consistent determinants of mismatch fall in the sociodemographic category. Demographic variables—ratio of workers to household members; being a single worker or member of an 'other', nonstandard household type; length of stay in the neighborhood—are clearly the most important determinants, which again

[1] Because the number of parameters in the model for $MM4_i$ is smaller than in that for $MM2_i$, there is no real need to test formally whether the pseudo R^2s differ significantly between the two models.

Table 6. Summary of results.

	Urban models (5)		Suburban models (5)		Total times significant
	times significant	sign[a]	times significant	sign[a]	
Sociodemographics					
Car availability index	5	positive	4	negative	9
Ratio of workers to household members	3	negative	4	positive	7
Single worker	0		5	positive	5
Multiple-worker family	1	positive	0		1
Two-worker couple	1	negative	0		1
One-worker couple	1	negative	0		1
'Other' household	0		5	positive	5
Length of stay in the neighborhood	4	positive	5	negative	9
Household income	1	negative	0		1
Occupation in sales	4	positive	3	positive	7
Mobility limitations					
Driving during the day	0		1	positive	1
Using public transportation	5	positive	2	negative	7
Riding a bicycle	0		1	positive	1
Personality traits					
Adventure-seeker factor	4	negative	1	positive	5
Organizer factor	1	positive	5	negative	6
Lifestyle					
Status-seeker factor	4	positive	5	negative	9
Workaholic factor	1	positive	0		1

[a] 'Positive' indicates that a higher value of the variable contributes to greater residential neighborhood dissonance, 'negative' that a higher value is associated with a lower degree of dissonance.

corresponds with standard thinking about residential preferences. Table 6 also reveals the importance of auto orientation. Commuters with a strong auto orientation tend to be mismatched when they live in an urban environment, whereas the opposite is true for highly auto-oriented suburbanites, as indicated by the results for the car-availability index and the status-seeker factor. Contrary to expectations, household income is included in only one model, suggesting that the role of monetary constraints in explaining differences in dissonance is limited, or captured by other determinants that are correlated with household income, such as occupation in sales (see section 6.2) and car availability.

Notwithstanding the fact that we have shown that many variables influence the presence and extent of residential neighborhood type dissonance, one may raise the question as to what extent conclusions based on data from the San Francisco Bay Area can be generalized to other metropolitan areas in the USA or elsewhere. After all, housing is expensive in the Bay Area and parts of San Francisco (including North San Francisco) are characterized by above-average population densities. Although the local context always affects the study results, we believe our outcomes to have a wider applicability for two reasons. First, we have concentrated mainly on the relationships between variables. Although the exact number of people belonging to a certain sociodemographic group or attitudinal segment in the Bay Area may differ from other regions, the population segments or explanatory variables in this study can also be discerned or employed in other geographical contexts. Second, as we argued before, our results are in many respects consistent with previous studies about residential preferences and the distribution of population groups over metropolitan space. And once more we would like to draw attention to the correspondence in the percentage of mismatched respondents in the study by Feldman (1990) and ours.

Nonetheless, many improvements to the study design can be made in future work. As the goodness-of-fit indicators in tables 4 and 5 reveal, the level of explanation that the models offer is rather modest. On one hand this indicates the complexity of the issue studied, but on the other hand the limited explanatory power is also associated with a number of limitations of the current study. First, our study is limited to dissonance in terms of the physical dimension of what constitutes a neighborhood. This one-dimensional perspective on mismatch may bias the results. Persons who are now classified as mismatched may in fact be perfectly consonant on the social dimension of the neighborhood concept; may occupy a dwelling that completely matches the household's preference; or may reside in a location that provides optimal access to (different) jobs or relevant facilities. Second, because the data were not collected for this specific study purpose, only a few neighborhood types could be studied. Had we collected new data, we would certainly have included a much wider range of especially suburban neighborhood types. Third, as the results for Pleasant Hill suggest, the measures of dissonance proposed are not tailored to diverse land-use conditions within single neighborhoods. These can be quite large, as Bagley et al (2002) show on the basis of different data for the same study neighborhoods. As a consequence, we may be classifying as dissonant those living in relatively consonant pockets within otherwise dissonant neighborhoods. To overcome these deficiencies, new data should be collected with questions addressing all determinants of residential location choice and their relative importance, as well as respondents' subjective opinions about the features of the immediate surroundings of their dwelling and the wider neighborhood. Such data would enable the derivation of mismatch indicators for different neighborhood dimensions; structural equation modeling could be utilized to determine the impact of exogenous variables (as we did here) and to examine the endogenous effects or trade-offs among different mismatch indicators.

What are the implications of the current study for policymakers' attempts to combat urban sprawl by developing more compact, mixed-use neighborhoods? The results suggest that residents with a strong preference for a low-density, auto-oriented environment have a higher chance of experiencing residential dissatisfaction, if they do happen to be enticed to (neo)traditional developments through financial incentives or other policies. Hence, a more diverse population composition in these new developments may on average result in a higher level of residential dissatisfaction. This might stimulate residential mobility and adversely affect the sense of community or the social cohesion within the development. However, it is also possible that (initially) dissatisfied residents solve their dissonant state not by relocating, but through an adjustment of their residential preference, which may foster feelings of community and the level of cohesion.

There may nevertheless be other adverse consequences: (initially) dissonant residents may stick to travel habits they developed previously when residing in a low-density, auto-oriented environment. More specifically, they may exhibit travel and activity patterns which are firmly rooted in automobile use and make only very limited use of the enhanced opportunities a high-density location offers to travel by alternative modes, such as transit or walking. It might hence be tempting to reject policies aimed at attracting a diverse population to neotraditional developments; however, limiting automobile use is but one goal which new urbanists pursue by building compact neighborhoods. We therefore recommend that policymakers, when deciding whether or not to adopt neotraditional policies, prioritize and trade off the goals they want to achieve.

Although our results may not unequivocally support neotraditional development, they may point to less ambitious policies. The fact that there is a substantial proportion of suburban dwellers who seem to prefer higher density environments suggests that policies aiming at the relaxation of land-use laws in existing communities may be successful in reducing neighborhood type dissonance, at least for those dwellers. However, those gains may be achieved at the cost of increased dissonance for the suburban dwellers preferring lower densities. It may be that there is a mix of land uses and densities that would optimize the preferences of both types of dwellers. In any case, further research is needed to explore the reasons for mismatches, the constraints preventing the realization of residential preferences, and the extent to which the latter are amenable to mitigation. If, as indicated in section 2, residential location choice very often involves trade-offs among irreconcilable objectives, then the level of dissonance in the population as a whole may remain relatively stable despite efforts to reduce it.

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