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Do suburban- and traditional-neighborhood residents want different things? Evidence on neighborhood satisfaction and travel behavior



## Author

Lovejoy, Kristin

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# Do suburban- and traditional-neighborhood residents want different things?

# Evidence on neighborhood satisfaction and travel behavior

Kristin Lovejoy

Institute of Transportation Studies ◇ University of California, Davis

One Shields Avenue ◇ Davis, California 95616

PHONE: (530) 752-6548 ◇ FAX: (530) 752-6572

WEB: http://its.ucdavis.edu/

**Do suburban- and traditional-neighborhood residents want different things?**
**Evidence on neighborhood satisfaction and travel behavior**

By

KRISTIN LOVEJOY
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## Chapter 1. Introduction

Many factors have contributed to the development of sprawling suburbs in the United States over the past few decades, including the fact that suburbs offer features that many households view as advantages. However, a host of problems have also been associated with suburban development, including traffic congestion, high infrastructure costs, lack of social cohesion, and environmental degradation (e.g. Ewing 1997). Citing such problems, the New Urbanism movement has rallied for a return to more traditional-style neighborhoods—those built before World War II, with an orientation to walking and transit rather than private automobiles, and with a mix of residential and commercial land uses (Fulton 1996).

While the concept of New Urbanist communities is appealing to many planners, critics argue that Americans like their conventional suburbs and are uninterested in the features that New Urbanism offers. Indeed, assessments of consumer preferences, including their apparent choices in the market place, have shown preference for conventional suburban developments (reviewed in Ewing 1997, Myers and Gearin 2001). However, it is possible that consumers value only certain features of these neighborhoods, and "could do without the rest of the suburban package" (Ewing 1997, p. 111). There is mixed evidence as to the degree of preference for specific amenities that are usually "embedded in larger residential stereotypes," both in surveys and in the built environment (Myers and Gearin 2001, p. 639). It is unclear which aspects of these neighborhoods residents actually notice and value. In particular, which neighborhood features are important for residents' satisfaction with their neighborhoods?

To answer this question, Chapter 2 compares how residents experience

conventional suburban neighborhoods versus how they experience the type of traditional neighborhood from which new urbanist ideals derive. Based on survey data from residents of suburban and "traditional" neighborhoods in Northern California, we report descriptive statistics on perceptions of neighborhoods, desired neighborhood features, and gaps between the two. In addition, we present modeling results on the determinants of neighborhood satisfaction in each neighborhood type.

A second question of interest to the planning community is to what degree residential neighborhoods causally determine travel choices. Many researchers have documented that auto dependence is associated with sprawling development patterns, and have pointed to traditional neighborhood designs as a means of facilitating more transit use and active travel (such as biking and walking), which have been at least ideologically aligned with environmental, health, and social benefits. However, it is unclear to what extent the built environment shapes travel patterns. If we build smart growth, will people give up their cars? In future designs, are there ways to extricate some of the environmentally and socially costly aspects of suburban development, such as those associated with auto dependence, from other, attractive features of the suburbs?

To contribute partial answers to these broad questions, Chapter 3 investigates to what degree suburban versus traditional neighborhoods have a homogenizing effect on travel choices, given residents' diverse travel preferences. In particular, given two residents with the same preference for driving, if they locate in opposite neighborhood types, are there differences in their driving levels? To answer this question we draw on the same survey data used in Chapter 2, presenting comparisons of travel behavior among different combinations of travel preferences and residential neighborhood type.

# Chapter 2. Neighborhood satisfaction and its determinants

## 2.1. Conceptual basis

Much prior research has been devoted to identifying desirable neighborhood attributes (for a review, see Brower 1996). Clearly, what constitutes the ideal neighborhood is a matter of opinion. That is, neighborhood preferences are varied. It is assumed that people try to find neighborhoods that match their varied preferences, to the degree that they are able. However it is not known to what degree they are successful, and whether people in some types of neighborhoods are more satisfied than others.

People may live in neighborhoods that do not match their preferences for several reasons. For one, their choice set may be limited by what they can afford. Second, people choose neighborhoods as a part of a bundle of other residential decisions, such as type of housing, school district, and proximity to the workplaces of various household members. They may trade off some features for others and end up living in a neighborhood despite some of its qualities (Ewing 1997). Some of their preferences may be inherently contradictory; for example, they may desire both a large lot with plenty of parking, and many stores and services within walking distance. Third, residential moves are burdensome, which may cause households to stay in a place even if a better option becomes available, if their neighborhood changes for the worse, or if their own needs or preferences evolve (Ahlbrandt 1984). Some of the burdens associated with moving include cost, inconvenience, and the loss of social and community ties, which strengthen over time and are thought to be an important aspect of residential satisfaction (Marans and Rodgers 1975; Amerigo and Aragones 1997, Kasarda and Janowitz 1974). Furthermore, many sources of residential dissatisfaction

can be remedied, for those that are able, without relocating residences, such as by remodeling or cultivating social relationships beyond the bounds of the neighborhood (Fried 1982).

Several studies provide evidence on the extent of dissonance between neighborhood-type preferences and the actual neighborhood in which people live. Schwanen and Mokhtarian (2004) find that 76 percent of urban-neighborhood respondents have pro-high-density attitudes consonant with an urban environment, and that 73 percent and 81 percent percent of respondents in two suburban neighborhoods have anti-high-density attitudes consonant with those environments. Similarly, Feldman (1990) finds about 71 percent of respondents with city-type preferences to live in the city and 75 percent of those with suburban-type preferences to live in the suburbs. Hummon (1986) finds the percent of respondents with pro-urban versus anti-urban attitudes to be 62 percent versus 8 percent in an urban neighborhood, 15 percent versus 42 percent in suburban neighborhoods, and 0 percent versus 76 percent in a small town. These results show that for a significant minority, locations are not aligned with preferences. However, we cannot tell from these metrics how well the compromises that are chosen meet residents' needs.

We are interested in how well neighborhoods meet residents' needs. This can be thought of as a measure of satisfaction, defined as the fulfillment of a need or aspiration (*American Heritage Dictionary*, 2000). Research on residential quality has identified satisfaction as a useful metric because it can be defined more narrowly and practically than affective (emotional) attitudes and conative attitudes (behavioral intentions) (Francescato, et al. 1987; Campbell et al. 1976). In this literature, residential

satisfaction is defined as “the degree of ‘fit’ or congruence between one’s neighborhood aspirations and one’s actual residential circumstances” (Lee and Guest 1983, p. 288; see also Campbell, et al. 1976; Connerly and Marans 1988; Amerigo and Argones 1997; Lu 1999).

In this study, we focus on neighborhood satisfaction, which is but one aspect of overall residential satisfaction. Residential environments can be thought of consisting of at least three different realms that contribute to residential satisfaction: the housing unit, the neighborhood, and the larger community (Campbell, et al. 1976). We focus on neighborhood satisfaction because we are interested in comparing the experiences of residents in two contrasting neighborhood types: traditional neighborhoods and suburban neighborhoods. However, it should be recognized that feelings about any one of these realms can influence feelings about another (Campbell, et al. 1976; Basolo and Strong 2002). For example, if someone likes his house, he might feel more satisfied about his neighborhood.

Does neighborhood satisfaction matter? Neighborhood satisfaction is but one contributing factor to one’s overall residential satisfaction, which, in turn, is but one contributing factor to one’s overall satisfaction in life. Empirical studies show mixed results as to the extent that neighborhood features contribute to life satisfaction (Rohe and Basolo 1997; Ahlbrandt 1984; Marans and Rodgers 1975), perhaps partly due to the fact that a neighborhood matters less for people who are able to escape its confines in order to fulfill their needs (Ahlbrandt 1984). That is, people find many ways to be satisfied in life, sometimes in spite of their neighborhoods. Therefore, we might observe little association between neighborhood satisfaction and life satisfaction if

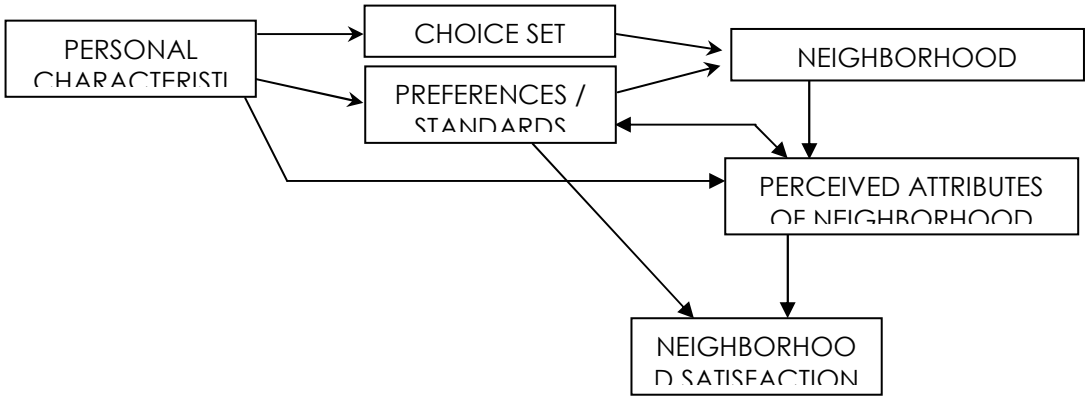
residents have gone out of their way to compensate for the deficiencies in their immediate neighborhood. However, better neighborhoods might save them from having to compensate in this way, making it easier to achieve life satisfaction. This is true for everyone, but especially for those with a limited ability to compensate for neighborhood deficiencies or for those unwilling or unable to undertake a move.

What can satisfaction measures tell us? Although there are good reasons to be cautious about interpreting any given level of satisfaction as a summary assessment of whether a neighborhood succeeds or fails, there are at least two ways that neighborhood satisfaction measures can be used effectively in analysis (Brower 1996; Aragones, et al. 2002; Francescato, et al. 1987). One is by comparing relative satisfaction levels across subgroups of the same study. The other is by examining which neighborhood attributes contribute significantly to overall satisfaction. A multivariate analysis of the determinants of satisfaction can help sort out which neighborhood features are important for the population studied. In this study, we compare relative satisfaction levels among traditional-neighborhood versus suburban-neighborhood respondents, and estimate the determinants of neighborhood satisfaction among each group.

The following conceptual framework, as developed in the residential satisfaction literature (e.g. Marans and Rodgers 1975; Marans and Spreckelmeyer 1981; Brower 1996; Campbell, et al. 1976), is useful in understanding the confluence of factors that affect neighborhood satisfaction. The expressed level of satisfaction is dependent on two things: (1) perceptions of neighborhood attributes, and (2) preferences or internal standards against which the individual judges things (Marans and Rodgers 1975). A person’s perceptions of his neighborhood are dependent on, but distinct from, the

neighborhood's objective attributes (Marans and Rodgers 1975). How someone perceives things and the standards that she has adopted are likely informed by who she is (personal characteristics such as age, family status, gender, income, cultural expectations, likes/dislikes, proclivity for optimism), and also to some degree by her current environment; people's environments may influence their preferences either in the sense that they become accustomed to what they have, or that they develop heightened sensitivity to the deficient aspects of their current situation (Brower 1996). In turn, what kind of neighborhood someone chooses (and therefore the objective attributes she experiences) is also informed by her preferences and by her ability to realize those preferences (Marans and Rodgers 1975). The following schematic summarizes these relationships, with arrows indicating the expected direction of influence.

**Figure 1. Schematic of the determinants of neighborhood satisfaction**




## 2.2. Previous studies

Previous empirical studies on the determinants of neighborhood satisfaction have identified both environmental attributes (subjective and objective) and personal characteristics that are significantly associated with neighborhood satisfaction.

However, the findings in these studies have been somewhat inconsistent. Given the importance of both who you are (personal characteristics) and where you are (neighborhood type, for instance) in the conceptual model above, it seems likely that the inconsistency across studies is due, at least in part, to the fact that differing populations and neighborhood types are examined in each. Differing statistical methods may also be a source of some of the differences across studies (Francescato, et al. 1987; Lu 1999).

A summary of the variables found to be significant in previous analyses of the determinants of neighborhood satisfaction is presented in the Appendix.[1] The environmental attributes listed in the appendix are sorted into four dimensions of the residential environment, as categorized by by Connerly and Marans (1988): physical environmental conditions, "locational characteristics" (Basolo and Strong 2002, p. 87), local services and facilities, and sociocultural environment.

There are two ways that previous studies have assessed the role of neighborhood type in neighborhood satisfaction studies. One is to assume that the determinants of satisfaction are the same in all neighborhood types, but to include neighborhood-type indicator variables that give a sense of whether, all else equal, residents of certain types of neighborhoods are more likely to be satisfied. For example, using a U.S. nationwide sample, Lu (1999) estimated a neighborhood-satisfaction model that included an indicator for living in a central city and an indicator for living in a suburb, finding both to be negatively associated with satisfaction: Residents outside of metropolitan areas are altogether more likely to be satisfied than suburban residents, and suburban

[1] Note that the table in the appendix does not show the potentially equally interesting findings regarding which variables were tested and found not to be statistically significant in each study.

residents are more likely to be satisfied than central-city residents, all else equal. However, it is not clear from this analysis whether the same neighborhood features would satisfy each of these groups.

The second way to assess the role of neighborhood type is to evaluate whether the determinants of satisfaction are different across neighborhood types, as we do in this study. For example, Fried (1982) investigates whether the determinants of overall residential satisfaction (not just neighborhood satisfaction) are different among urban and suburban residents by estimating separate models for residential satisfaction for the two groups. He finds that variables such as neighborhood quality and housing quality are comparably important to both groups, but he does not test which aspects of neighborhood quality each group values. Cook (1988) studies neighborhood satisfaction among single mothers living in traditional and suburban neighborhoods in the Twin Cities area. She estimates separate neighborhood satisfaction models for the two neighborhood types, and finds both similarities and differences in the determinants of satisfaction among the two groups of mothers. In particular, the perception of safety and quiet are found to be important determinants of satisfaction for both groups, and therefore, to the extent that the suburbs are perceived to be safer and quieter, it is no surprise that the suburban mothers report higher levels of neighborhood satisfaction overall. The groups differ in that for the suburban respondents, housing and the nearness of schools and shopping were also significant determinants of neighborhood satisfaction; whereas other determinants of neighborhood satisfaction for the urban respondents included whether discrimination in the rental market was anticipated and the residents' acceptance of their limited opportunities. Cook notes that these

differences might be explained by the fact that the majority of the suburban mothers were white and employed, whereas the urban mothers were more likely to be black, unemployed, and without a car, and may find the suburban locations closed to them.

Cook's results underscore the importance of personal characteristics in affecting the choice set, expectations, and values in determining preferences and satisfaction levels. Given the importance of personal characteristics, it is useful to note at the outset what personal characteristics we might expect to play a role in neighborhood satisfaction. We might expect certain types of people to be more likely to achieve satisfaction, regardless of their specific neighborhood preferences. First, people with fewer mobility constraints are better equipped to move to a neighborhood that suits them. This would include higher-income households, who are presumably more able to purchase or rent a unit in their neighborhood of choice (e.g. Marans and Rodgers 1975; Campbell, et al. 1976; Davis and Davis 1981; Lee and Guest 1983; Ahlbrandt 1984; Jagun, et al. 1990; Lu 1999), and residents who are less emotionally attached to their neighborhoods (Ahlbrandt 1984; Schwanen and Mokhtarian 2002; Connerly and Marans 1988). Second, there are two conflicting theories as to whether long-time residents are more or less likely to be satisfied. On the one hand, if a household has moved recently it means that preferences may have been brought in line with reality more recently and hence these residents are more likely to be satisfied with what they have than longer-time residents, whose location choice may be more outdated. On the other hand, longer-time residents may stay because they are satisfied, and years spent in a particular environment may reinforce preferences for that type of environment (e.g. Ahlbrandt 1984; Schwanen and Mokhtarian 2004). Third, some have hypothesized that older

residents are more likely to be satisfied, as found in several studies (Ahlbrandt 1984; Cook 1988; Cutter 1982; Davis and Davis 1981; Jagun, et al. 1990; Lu 1999) though not in others (Basolo and Strong 2002; Cook 1988; Miller, et al. 1980), because demands and expectations diminish with age (Ahlbrandt 1984). Fourth, homeowners in all neighborhood types may tend to be more satisfied because their decisions to locate in that neighborhood were presumably made more thoughtfully than those of renters, and because the experience of owning may itself contribute to a feeling of satisfaction with the place (Ahlbrandt 1984). Finally, factors that contribute to a general positive outlook on life and/or a sense of resignation would also tend to be associated with higher satisfaction levels. This might include an optimistic attitude or a satisfying family situation.

We also might expect certain types of people to find satisfaction in the types of neighborhoods studied here, given prior research on the neighborhood preferences of different types of people. For example, smaller households with multiple working adults, households with fewer cars, younger or more dynamic households, adventure-seekers, and those that value the cultural and recreational offerings of cities are thought to be better suited to urban environments (Schwanen and Mokhtarian 2004; Hummon 1986); whereas households with more cars, fewer workers, children, and who value yard space and quiet are better suited to suburban environments (Schwanen and Mokhtarian 2004; Hummon 1986; Cook 1988). Because the neighborhoods studied here are dominated by single-family homes, we might expect those with the suburban-preference profile to be more satisfied, on average, in most of the neighborhoods

studied. However, we might still find differences in preference-profile for different types of single-family neighborhoods.

### 2.3. In this study

Part I of this study investigates neighborhood preferences and satisfaction levels among residents of traditional versus suburban neighborhoods from several directions. First, we present measures of preference for and perception of particular neighborhood characteristics, as reported by residents of two different neighborhood types: suburban and "traditional." Second, we deduce a measure of satisfaction with each of the neighborhood characteristics, based on the gap between residents' perceptions and preferences. Third, we present results on the relative levels of overall neighborhood satisfaction among residents of the two neighborhood types, and explore the determinants of overall neighborhood satisfaction among residents of the suburban versus traditional neighborhoods. We model neighborhood satisfaction as determined by personal characteristics, in each of the neighborhood types, giving a sense of what types of people tend to be satisfied in each of the two neighborhood types, and whether sociodemographics drive differences in satisfaction levels across the two neighborhood types. We also model neighborhood satisfaction as determined by perceived neighborhood attributes (along with sociodemographic attributes of the respondents) in each of the neighborhood types, giving a sense of what types of neighborhood attributes contribute significantly to satisfaction among residents of suburban versus traditional neighborhoods.

## 2.4. Source of the data

The data used in Chapter 2 and Chapter 3 come from a self-administered twelve-page survey that asked respondents about the characteristics of their neighborhoods, neighborhood preferences, travel behavior, travel attitudes, and sociodemographics. The survey was mailed in two rounds in late 2003 to households in eight neighborhoods in Northern California. These were selected to vary systematically on three dimensions: neighborhood type, size of the metropolitan area, and region of the state. One traditional neighborhood (built mostly pre-WWII) and one suburban neighborhood (built after WWII) were chosen in each of the following areas: Sacramento, Santa Rosa, Modesto, and Silicon Valley. (See Handy, et al. 2004 for more information on the survey development and administration process.) Although the boundaries of the areas studied as examples of each neighborhood type were rigidly delineated based on researcher-imposed criteria, the survey questions that ask residents about their "neighborhood" do not specify what is meant by the term, allowing respondents to answer the questions based on whatever they think of as their neighborhoods. This means that residents from the same neighborhood may have different geographic areas in mind when answering the survey questions, and that these areas almost certainly differ from the confines of the area from which we drew our sample (Connerly and Marans 1988; Amerigo and Argones 1997; Haney and Knowles 1978; Bonnes, et al. 1991; Handy 2002).

A total of 1,682 responses were received (784 from suburban neighborhoods and 898 from traditional neighborhoods), which is equivalent to about 24.9 percent of valid addresses in the original database. Although this response rate is good for this type of

survey (Babbie 1998), it is likely that the sample has several sources of bias. First, because one of the original purposes of the survey was to assess changes in travel behavior upon moving to a new neighborhood, residents who have recently moved to their neighborhoods were deliberately over-sampled. Second, any self-administered survey relying on voluntary participation is subject to response bias. A comparison of sample characteristics to population characteristics (based on the 2000 U.S. Census) shows that survey respondents tend to be older on average than residents of their neighborhood as a whole, and that households with children are underrepresented for most neighborhoods, while homeowners are overrepresented for all neighborhoods (Handy, et al. 2004).

It is unclear how these biases would affect the preferences and satisfaction levels measured; older residents and homeowners tend to be more satisfied with their neighborhoods, whereas the results are mixed on length of tenancy (see Appendix A). However, the impact on the results of this study will be reduced to the extent that biases are consistent across neighborhood type. In addition, multivariate analysis is used to isolate the effect of neighborhood type while controlling for sociodemographics.

## 2.5. Perceptions of and preferences for neighborhood characteristics

### *Measures of perceptions and preferences*

To assess perceptions, respondents were asked to indicate how true 34 attributes are of their neighborhood on a four-point scale from 1 (“not at all true”) to 4 (“entirely true”). To assess preferences, respondents were also asked to indicate the importance of these same 34 attributes when or if they were looking for a new place to live, as measured on a four-point scale from 1 (“not at all important”) to 4 (“extremely important”). The 34

attributes included in the survey were drawn from prior surveys and based on research on the link between neighborhood characteristics and travel behavior. While the list of 34 attributes is lengthy it is by no means comprehensive. Of the many aspects of a residential environment that contribute to a resident's overall experience, the 34 items primarily focus on neighborhood characteristics, both social and physical, with just a few items devoted to assessing satisfaction with individual units or properties. The content of the list reflects the fact that it was developed for the purposes of studying the relationship between the built environment and transportation choices. It does not focus on specific housing characteristics or on social ties to the community, both of which have been associated with residential satisfaction in other studies (see appendix).

As a part of a previous effort (Handy, et al. 2005), the 34 items were reduced to six underlying factors through principal components factor analysis of the perceived and preferred variables together (some items were dropped due to their poor conceptual interpretability). The six factors were named accessibility, physical-activity options, safety, socializing, outdoor spaciousness, and attractiveness, to reflect the attributes that load heavily on each (shown in Table 1). Thus, we have at our disposal for this study respondents' ratings with respect to the importance of 34 neighborhood attributes (reflecting preferences), respondents' ratings with respect to the trueness of 34 neighborhood attributes for their current neighborhood (reflecting perceptions), as well as scores reflecting respondents' preference for six underlying neighborhood factors, and scores reflecting respondents' perceived trueness of the six neighborhood factors.

**Table 1. Definitions of six neighborhood factors**

| *Factor* | *Statement* | *Loading** |
|---|---|---|
| Accessibility | Easy access to a regional shopping mall | 0.854 |
| | Easy access to downtown | 0.830 |
| | Other amenities such as a community center available nearby | 0.667 |
| | Shopping areas within walking distance | 0.652 |
| | Easy access to the freeway | 0.528 |
| | Good public transit service (bus or rail) | 0.437 |
| Physical-activity options | Bike routes beyond the neighborhood | 0.882 |
| | Sidewalks throughout the neighborhood | 0.707 |
| | Parks and open spaces nearby | 0.637 |
| | Good public transit service (bus or rail) | 0.353 |
| Safety | Quiet neighborhood | 0.780 |
| | Low crime rate within neighborhood | 0.759 |
| | Low level of car traffic on neighborhood streets | 0.752 |
| | Safe neighborhood for walking | 0.741 |
| | Safe neighborhood for kids to play outdoors | 0.634 |
| | Good street lighting | 0.571 |
| Socializing | Diverse neighbors in terms of ethnicity, race, and age | 0.789 |
| | Lots of people out and about within the neighborhood | 0.785 |
| | Lots of interaction among neighbors | 0.614 |
| | Economic level of neighbors similar to my level | 0.476 |
| Outdoor spaciousness | Large back yards | 0.876 |
| | Large front yards | 0.858 |
| | Lots of off-street parking (garages or driveways) | 0.562 |
| Attractiveness | Attractive appearance of neighborhood | 0.780 |
| | High level of upkeep in neighborhood | 0.723 |
| | Variety of housing styles | 0.680 |
| | Big street trees | 0.451 |

* Represents the degree of association between the statement and the factor.

Source: Handy, et al. (2005).

### *Findings on the perception of various neighborhood characteristics*

Table 2 presents average scores for the six factors and Table 3 average ratings for the 34 attributes of how true neighborhood characteristics are perceived to be by residents. While useful for comparing results across neighborhood types, the results in Table 2 should be interpreted cautiously: Because the factor scores are automatically standardized (in particular, mean-centered), and because the factors are based on perceptions and preferences combined, a negative score simply reflects a score that is

lower than the overall sample mean of the combined perception and preference measures for a given factor. When a trueness (perception) mean factor score is negative (as for safety in Table 2), the corresponding preference mean factor score will generally be positive (as seen in Table 4). Thus, a negative mean in Table 2 does not necessarily imply a negative perception in an absolute sense, only one that generally tends to be lower than the corresponding preference. As shown in Table 3, respondents give the highest trueness scores to sidewalks, parks, and several features related to accessibility, safety, and attractiveness. Respondents give the lowest trueness scores to newness, yard size, and several features related to socializing, including interaction with neighbors, proximity to friends and family, and having people out and about in the neighborhood.

In comparing results between neighborhood types, we find statistically significant differences that generally confirm stereotypes of the two neighborhood types. Residents in suburban neighborhoods have a higher average score for the safety factor, and among the individual attributes, their average ratings are particularly higher for cul-de-sacs, newness, school quality, parking, and quiet. Residents in traditional neighborhoods have higher average scores for accessibility, attractiveness, and socializing, and their average ratings on the individual attributes are particularly higher for access to downtown, housing variety, big street trees, having lots of people out and about, and interaction among neighbors. Suburban neighborhoods are also perceived to be more diverse in terms of age and race, which counters a common conception of suburbs but likely reflects reality for those neighborhoods (see Frey 2001). The opposite signs on the “attractiveness” factor is intriguing, seeming to suggest that suburban neighborhoods are considered unattractive. But this differential is likely driven by the

"big street trees" and "variety in housing styles" ratings—for which the average ratings across neighborhoods are more different than the other attributes comprising the attractiveness factor. The lack of such features does not necessarily imply the opposite of attractiveness.

Overall, the results on perceptions of neighborhood characteristics by neighborhood type match findings from previous research (e.g. Hummon 1986), but this is not a surprising result, given the fact that the eight neighborhoods included in the study were selected by the researchers as examples of stereotypical neighborhoods. Thus, these results serve to confirm that the neighborhoods chosen do seem to have the qualities the researchers had in mind when they chose them, as perceived by the neighborhoods' residents. Perhaps notably, however, there are no differences in the perception of parks, crime, or yards, features often assumed to be associated with suburban-style neighborhoods; nor differences in the perception of sidewalks and the safety for walking, features often assumed to be associated with traditional neighborhoods.

**Table 2. Average trueness scores for six neighborhood factors, by neighborhood type**

| | *How true?* | | | |
|---|---|---|---|---|
| *Factor*[a] | *Suburban* | *Traditional* | *Total* | *P-value*[b] |
| *More true in suburban neighborhoods* | | | | |
| Safety | –0.01 | –0.31 | –0.17 | 0.000 |
| *More true in traditional neighborhoods* | | | | |
| Accessibility | 0.30 | 0.63 | 0.48 | 0.000 |
| Attractiveness | –0.19 | 0.42 | 0.14 | 0.000 |
| Socializing | 0.15 | 0.36 | 0.27 | 0.000 |
| *No difference* | | | | |
| Physical-activity options | 0.35 | 0.38 | 0.37 | 0.454 |
| Outdoor spaciousness | 0.08 | 0.09 | 0.09 | 0.815 |
| *N* | 766 | 892 | 1658 | |

[a] Factors produced by principal component analysis of 34 underlying neighborhood attributes (perceived and preferred combined). Attributes comprising each factor are shown in Table 1.

[b] For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

**Table 3. Average trueness ratings for 34 neighborhood characteristics, by neighborhood type**

| *Characteristic* | *How true?*[a] *Suburban* | *Traditional* | *Total* | *P-value*[b] |
|---|---|---|---|---|
| *More true in suburban neighborhoods* | | | | |
| High quality K-12 schools | 3.3 | 2.9 | 3.1 | 0.000 |
| Low crime rate within neighborhood | 3.2 | 3.1 | 3.1 | 0.001 |
| Safe neighborhood for kids to play outdoors | 3.2 | 3.0 | 3.1 | 0.009 |
| Quiet neighborhood | 3.1 | 2.9 | 3.0 | 0.000 |
| Lots of off-street parking (garages or driveways) | 3.1 | 2.8 | 2.9 | 0.000 |
| Good street lighting | 3.1 | 2.9 | 3.0 | 0.000 |
| Diverse neighbors in terms of ethnicity, race, and age | 3.1 | 3.0 | 3.0 | 0.005 |
| Good investment potential | 3.1 | 2.9 | 3.0 | 0.002 |
| Affordable living unit | 3.0 | 2.9 | 3.0 | 0.012 |
| Economic level of neighbors similar to my level | 3.0 | 2.8 | 2.9 | 0.000 |
| Low level of car traffic on neighborhood streets | 2.7 | 2.5 | 2.6 | 0.001 |
| Large front yards | 2.4 | 2.3 | 2.3 | 0.032 |
| Living unit on cul-de-sac rather than through street | 2.1 | 1.4 | 1.7 | 0.000 |
| New living unit | 1.9 | 1.5 | 1.7 | 0.000 |
| *More true in traditional neighborhoods* | | | | |
| Easy access to downtown | 3.0 | 3.7 | 3.4 | 0.000 |
| Easy access to the freeway | 3.3 | 3.5 | 3.4 | 0.000 |
| Big street trees | 2.9 | 3.5 | 3.2 | 0.000 |
| Variety in housing styles | 2.7 | 3.4 | 3.1 | 0.000 |
| Attractive appearance of neighborhood | 3.2 | 3.3 | 3.3 | 0.000 |
| Shopping areas with walking distance | 3.1 | 3.2 | 3.2 | 0.001 |
| Good public transit service (bus or rail) | 3.0 | 3.2 | 3.1 | 0.000 |
| High level of upkeep in neighborhood | 3.0 | 3.2 | 3.1 | 0.000 |
| Lots of people out and about within the neighborhood | 2.7 | 3.1 | 2.9 | 0.000 |
| Close to where I work | 2.9 | 3.1 | 3.0 | 0.001 |
| Close to friends or family | 2.7 | 2.9 | 2.8 | 0.001 |
| Other amenities such as a community center nearby | 2.7 | 2.9 | 2.8 | 0.006 |
| Lots of interaction among neighbors | 2.4 | 2.7 | 2.6 | 0.000 |
| *No difference* | | | | |
| Sidewalks throughout the neighborhood | 3.6 | 3.6 | 3.6 | 0.852 |
| Parks and open spaces nearby | 3.5 | 3.5 | 3.5 | 0.361 |
| Safe neighborhood for walking | 3.3 | 3.4 | 3.4 | 0.167 |
| Bike routes beyond the neighborhood | 3.1 | 3.1 | 3.1 | 0.300 |
| Easy access to a regional shopping mall | 3.1 | 3.0 | 3.1 | 0.280 |
| High quality living unit | 3.0 | 3.0 | 3.0 | 0.185 |
| Large back yards | 2.5 | 2.6 | 2.5 | 0.065 |

[a] Respondents rated each item on a four-point scale from "1" (not at all true) to "4" (entirely true).

[b] For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

Note: The sample size varies from item to item due to item non-response, ranging from 650 to 767 suburban-neighborhood respondents and from 633 to 890 traditional-neighborhood respondents.

***Findings on preferences for various neighborhood characteristics***

Table 4 and Table 5 present scores for the six factors (Table 4) and ratings for the 34 attributes (Table 5) of how important neighborhood characteristics are to residents. In general, the safety factor has the highest importance scores, followed by attractiveness. This trend is also shown among the individual attributes, with high average ratings for low crime, safety for walking, and safety of kids' play. Affordability, attractiveness, upkeep, quiet, and low level of street traffic area also rated highly, on average, among residents of both neighborhood types. Characteristics relating to accessibility, physical-activity options, and socializing appear to be the least important among those considered in this study. Among the individual attributes, living on a cul-de-sac, newness, community centers, and front yards are also given lower importance ratings.

These results generally confirm results found elsewhere, in which residents' first concern is the basic need for a safe place to call home, along with the ability to practically afford it. Attractiveness and quiet make sense as secondary concerns that add to the pleasantness of an environment, especially when considered in contrast to unattractiveness and loudness. However the fact that an alternative to quiet could be cast in a positive light, such as "vibrancy"—but was not offered among this list—leaves open the question of to what extent quiet is preferred over activity and vibrancy.

In comparing results by neighborhood type, we find many significant differences in preferences between the two groups. The largest differences are for newness, cul-de-sacs, schools, safety for kids' play, and investment potential (more valued among suburban residents) and for access to downtown and big street tress (more valued among traditional-neighborhood residents). However, not all of these attributes for

which there is the greatest differential between the suburban and traditional averages are among the most important to the group that appears to prefer them. For example, newness and cul-de-sacs are rated rather low, even by suburban residents. Attributes that suburban residents prefer more strongly than do traditional-neighborhood residents *and* are rated as somewhat important have to do with safety, affordability, quiet, and attractiveness—features that are rated as relatively important among respondents in both groups.

We find no difference across neighborhood types in the preference scores for the two factors that are most related to transportation: accessibility and physical-activity options. There are also no differences across neighborhood types in the preference ratings for interactions among neighbors, proximity to friends and family, a high quality living unit, or sidewalks.

**Table 4. Average preference scores for six neighborhood factors, by neighborhood type**

| | *How important?* | | | |
|---|---|---|---|---|
| *Factor*[a] | *Suburban* | *Traditional* | *Total* | *P-value*[b] |
| *More preferred in suburban neighborhoods* | | | | |
| Safety | 0.61 | 0.22 | 0.40 | 0.000 |
| Outdoor spaciousness | 0.00 | –0.11 | –0.06 | 0.023 |
| *More preferred in traditional neighborhoods* | | | | |
| Socializing | –0.29 | –0.19 | –0.24 | 0.051 |
| Attractiveness | 0.01 | 0.10 | 0.06 | 0.041 |
| *No difference* | | | | |
| Physical-activity options | –0.31 | –0.28 | –0.29 | 0.603 |
| Accessibility | –0.41 | –0.34 | –0.37 | 0.141 |
| *N* | 762 | 888 | 1650 | |

[a] Factors produced by principal component analysis of 34 underlying neighborhood attributes (perceived and preferred combined). Attributes comprising each factor are shown in Table 1.

[b] For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

**Table 5. Average preference ratings for 34 neighborhood characteristics, by neighborhood type**

| | *How important?*[a] | | | |
|---|---|---|---|---|
| *Characteristic* | *Suburban* | *Traditional* | *Total* | *P-value*[b] |
| *More preferred in suburban neighborhoods* | | | | |
| Low crime rate within neighborhood | 3.7 | 3.5 | 3.6 | 0.000 |
| Safe neighborhood for walking | 3.6 | 3.6 | 3.6 | 0.002 |
| Affordable living unit | 3.6 | 3.5 | 3.6 | 0.008 |
| Quiet neighborhood | 3.5 | 3.2 | 3.3 | 0.000 |
| Attractive appearance of neighborhood | 3.4 | 3.3 | 3.4 | 0.047 |
| High level of upkeep in neighborhood | 3.3 | 3.2 | 3.3 | 0.007 |
| Safe neighborhood for kids to play outdoors | 3.3 | 3.0 | 3.1 | 0.000 |
| Good street lighting | 3.3 | 3.0 | 3.1 | 0.000 |
| Low level of car traffic on neighborhood streets | 3.3 | 3.1 | 3.2 | 0.000 |
| Lots of off-street parking (garages or driveways) | 3.0 | 2.9 | 2.9 | 0.002 |
| Good investment potential | 3.0 | 2.7 | 2.8 | 0.000 |
| Easy access to the freeway | 3.0 | 2.7 | 2.8 | 0.000 |
| Economic level of neighbors similar to my level | 2.7 | 2.4 | 2.5 | 0.000 |
| Large back yards | 2.6 | 2.5 | 2.6 | 0.005 |
| New living unit | 2.5 | 1.8 | 2.2 | 0.000 |
| High quality K-12 schools | 2.5 | 2.1 | 2.3 | 0.000 |
| Easy access to a regional shopping mall | 2.5 | 2.2 | 2.3 | 0.000 |
| Large front yards | 2.3 | 2.1 | 2.2 | 0.000 |
| Living unit on cul-de-sac rather than through street | 2.3 | 1.7 | 2.0 | 0.000 |
| *More preferred in traditional neighborhoods* | | | | |
| Close to where I work | 2.8 | 3.0 | 2.9 | 0.004 |
| Big street trees | 2.7 | 3.0 | 2.8 | 0.000 |
| Easy access to downtown | 2.5 | 2.9 | 2.7 | 0.000 |
| Shopping areas with walking distance | 2.6 | 2.8 | 2.7 | 0.000 |
| Variety in housing styles | 2.6 | 2.8 | 2.7 | 0.003 |
| Lots of people out and about within the neighborhood | 2.6 | 2.8 | 2.7 | 0.000 |
| Bike routes beyond the neighborhood | 2.5 | 2.7 | 2.6 | 0.030 |
| Diverse neighbors in terms of ethnicity, race, and age | 2.4 | 2.6 | 2.5 | 0.000 |
| Good public transit service (bus or rail) | 2.4 | 2.5 | 2.4 | 0.016 |
| *No differences* | | | | |
| High quality living unit | 3.4 | 3.3 | 3.3 | 0.104 |
| Parks and open spaces nearby | 3.1 | 3.1 | 3.1 | 0.602 |
| Sidewalks throughout the neighborhood | 3.1 | 3.0 | 3.0 | 0.154 |
| Close to friends or family | 2.8 | 2.8 | 2.8 | 0.356 |
| Lots of interaction among neighbors | 2.6 | 2.7 | 2.7 | 0.595 |
| Other amenities such as a community center nearby | 2.2 | 2.1 | 2.2 | 0.346 |

[a] Respondents rated each item on a four-point scale from "1" (not at all important) to "4" (extremely important).

[b] For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

Note: The sample size varies from item to item due to item non-response, ranging from 738 to 768 suburban-neighborhood respondents and from 852 to 892 traditional-neighborhood respondents. The response rate is somewhat better for these ratings than for those in Table 3, perhaps due to being asked earlier in the 12-page survey.

The results up to this point give some sense of what features are important to residents, relative to the other items on the list. But it is not clear how important any one feature is for overall neighborhood satisfaction. It is particularly difficult to interpret the degree of importance of the categories of features represented by the arbitrarily scaled factor scores. The modeling section later in the chapter addresses these issues.

***Gaps between perceptions and preferences as a measure of satisfaction***

By assuming that the two four-point trueness and importance scales are comparable, we can infer each individual's degree of satisfaction with each of the 34 characteristics and the six underlying factors by comparing his perception and preferences scores for each characteristic. For example, a low perception score and a high preference score for "accessibility" suggests that an individual is not satisfied with the degree of accessibility offered by his neighborhood. In contrast, if a perception score is about the same level or higher than the preference score, then it suggests that an individual is generally satisfied with that factor.

In particular, we calculate measures of satisfaction for the six factors by first rescaling the preference ($p$) and trueness ($t$) scores for each factor to range between zero and one, so that they are comparable to each other. Degree of satisfaction is then calculated as the difference between perceived trueness and preference, plus one. This difference creates a continuous scale of satisfaction ranging between zero and two, in which zero represents the least amount of satisfaction (e.g. maximum preference, minimum trueness), one represents contentment (level of preference = level of trueness), and values between one and two potentially represent some sort of surplus

satisfaction, for example with a low preference and high trueness score. However, because for the values between one and two someone is represented as having higher levels of satisfaction the less he prefers the factor, this surplus satisfaction is at least ambiguous if not meaningless. Therefore, we cap the scale at one, setting all values greater than one to equal one. Degree of satisfaction ($s_i$) with the $i^{th}$ factor then ranges between zero and one, with

$$s_i = \begin{cases} 1 & \text{, if } \left( \frac{t_i - \min(t_i)}{\max(t_i) - \min(t_i)} - \frac{p_i - \min(p_i)}{\max(p_i) - \min(p_i)} + 1 \right) > 1, \text{ and} \\ \frac{t_i - \min(t_i)}{\max(t_i) - \min(t_i)} - \frac{p_i - \min(p_i)}{\max(p_i) - \min(p_i)} + 1 & \text{, else.} \end{cases}$$

Measures of satisfaction for the 34 individual attributes are calculated in a similar way. However, because the attribute ratings only take on the discrete integer values one through four, the satisfaction measure for each can only take on the values 0, 0.33, 0.66, or 1.00. (That is, a respondent's preference rating can be zero, one, two, or three points higher than her trueness rating for a characteristic, reflecting different degrees of deficit.) As with the factor scores, if the respondent's trueness rating is higher than her preference rating, we assume no surplus is gained, capping the satisfaction measure for the individual attributes at one.

Note that these measures do not capture respondents' displeasure with the presence of any attributes, since all the attributes are presented as desirable features (such as "low level of car traffic" rather than "lots of traffic"), and respondents can only indicate each attribute's degree of importance. So at most, these measures capture absence of a positive thing, that is, degree of deficit in satisfaction.

Both an advantage and a disadvantage of this measure of satisfaction is that it does not directly ask respondents how they feel. This is an advantage because these sorts of inferred measures of satisfaction have been cited as one strategy for avoiding social desirability bias (Aragones, et al., 2002). However, it is a disadvantage because it forces us to equate the scales for degree of importance and degree of trueness, and to draw conclusions about satisfaction that may be shaky. For example, based on this measure, someone who rates a characteristic as “extremely important” and “entirely true” is considered to be just as satisfied with that characteristic as someone who rates that characteristic to be only a little important and only somewhat true, and as someone who rates it as “not at all important” and “entirely true.” Thus, while we have tried to make the score as meaningful as possible by excluding degrees of surplus satisfaction that we believe to poorly represent how people probably feel, our measure is not perfect. Because of the measure’s tendency to categorize people as satisfied who don’t care very much about a characteristic, we expect that it may tend to overestimate the prevalence of satisfaction. Therefore, we might expect that any differences between the two neighborhood types found using this measure may underestimate true differences, making the analysis presented here conservative.

In general, we find that the satisfaction scores for the six factors are as low as 0.11 but are disproportionately equal or close to the capped maximum of 1.00 (Table 6). Satisfaction is lowest for the safety factor, and highest for accessibility, with mean scores for the remaining factors (physical-activity options, socializing, attractiveness, and outdoor spaciousness) all still above 0.90. Attractiveness is the only factor in addition to safety for which less than half of respondents are satisfied (where “satisfied”

is a score = 1.00). For all 34 individual attributes, the majority of respondents are satisfied, although just barely for the level of car traffic, affordability, crime, and newness, for which 40 to 50 percent of respondents have scores less than 1.00 (Table 7).

In comparing differences across neighborhood types, we find that satisfaction levels are significantly different in suburban versus traditional neighborhoods for three of the six factors: accessibility, socializing, and attractiveness, which all have higher average satisfaction scores among the traditional-neighborhood respondents. In addition, for 18 of the 34 items, residents in traditional neighborhoods have higher average satisfaction scores, including those relating to attractiveness, safety, proximity to friends and family, and having people out and about in the neighborhood. In contrast, there are only two individual attributes for which suburban residents have higher satisfaction scores, on average, than traditional-neighborhood residents: those relating to parking and diversity. There are no apparent differences across neighborhood types for attributes such as crime, quiet, affordability, investment potential, traffic, parks, or sidewalks.

The tally of characteristics better satisfying resident in each neighborhood type seems to suggest that traditional-neighborhood residents are more satisfied with their neighborhoods overall. However, the list of characteristics considered is not necessarily comprehensive. In particular, the fact that there are only two attributes and no underlying factors with which people are more satisfied in suburban neighborhoods could be an indication that the characteristics listed in the survey do not capture some of the desirable features of suburban neighborhoods. In addition, it is wrong to enumerate this list of attributes as if each were equally important and non-overlapping

with other items on the list. Therefore, we cannot make conclusions about overall neighborhood satisfaction levels from these results.

**Table 6. Satisfaction scores for six neighborhood factors**

| | *Suburban* | *Traditional* | | *All neighborhoods* | | |
|---|---|---|---|---|---|---|
| *Factor* | *Mean score* | *Mean score* | *p-value** | *Observed minimum score* | *% with maximum score* | *Mean score* |
| Safety | 0.86 | 0.87 | 0.278 | 0.11 | 33% | 0.86 |
| Outdoor spaciousness | 0.91 | 0.92 | 0.304 | 0.15 | 54% | 0.92 |
| Attractiveness | 0.89 | 0.94 | 0.000 | 0.20 | 46% | 0.91 |
| Socializing | 0.96 | 0.97 | 0.012 | 0.21 | 72% | 0.96 |
| Physical-activities options | 0.96 | 0.95 | 0.291 | 0.22 | 69% | 0.95 |
| Accessibility | 0.97 | 0.99 | 0.000 | 0.28 | 85% | 0.98 |
| *N* | 757 | 886 | | | | 1643 |

* For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

**Table 7. Satisfaction scores for 34 neighborhood attributes**

| | *Sub.* | *Trad.* | *All neighborhoods* | | |
|---|---|---|---|---|---|
| *Characteristic* | *Mean score* | *Mean score* | *Mean score* | *% with maximum score* | *p-value** |
| *Attributes with which suburban residents are more satisfied* | | | | | |
| Lots of off-street parking (garages or driveways) | 0.89 | 0.85 | 0.87 | 72.9 | 0.000 |
| Diverse neighbors (ethnicity, race, and age) | 0.95 | 0.92 | 0.93 | 84.1 | 0.005 |
| *Attributes with which traditional-neighborhood residents are more satisfied* | | | | | |
| New living unit | 0.79 | 59.3 | 0.74 | 0.84 | 0.000 |
| Living on cul-de-sac rather than through street | 0.82 | 65.2 | 0.80 | 0.84 | 0.001 |
| High quality living unit | 0.84 | 61.4 | 0.82 | 0.85 | 0.005 |
| Large back yards | 0.86 | 70.8 | 0.84 | 0.88 | 0.008 |
| High level of upkeep in neighborhood | 0.87 | 67.2 | 0.84 | 0.89 | 0.000 |
| Safe neighborhood for walking | 0.87 | 68.1 | 0.85 | 0.88 | 0.007 |
| Lots of interaction among neighbors | 0.88 | 71.3 | 0.85 | 0.90 | 0.000 |
| Attractive appearance of neighborhood | 0.88 | 71.6 | 0.86 | 0.90 | 0.000 |
| Close to friends or family | 0.90 | 76.8 | 0.88 | 0.91 | 0.006 |
| Variety in housing styles | 0.92 | 80.8 | 0.87 | 0.96 | 0.000 |
| Lots of people out and about in the neighborhood | 0.92 | 80.5 | 0.90 | 0.94 | 0.000 |
| Good public transit service (bus or rail) | 0.93 | 85.1 | 0.92 | 0.94 | 0.041 |
| Big street trees | 0.94 | 85.1 | 0.91 | 0.96 | 0.000 |
| Other amenities such as community center nearby | 0.94 | 86.7 | 0.93 | 0.95 | 0.014 |
| Economic level of neighbors similar to my level | 0.94 | 85.9 | 0.93 | 0.95 | 0.035 |
| Easy access to a regional shopping mall | 0.96 | 91.0 | 0.95 | 0.97 | 0.001 |
| Easy access to the freeway | 0.96 | 91.2 | 0.94 | 0.98 | 0.000 |
| Easy access to downtown | 0.97 | 92.4 | 0.95 | 0.99 | 0.000 |
| *Attributes for which there are no differences in satisfaction levels across neighborhood types* | | | | | |
| Low level of car traffic on neighborhood streets | 0.75 | 51.4 | 0.74 | 0.76 | 0.329 |
| Affordable living unit | 0.78 | 53.5 | 0.78 | 0.78 | 0.662 |
| Low crime rate within neighborhood | 0.82 | 57.5 | 0.82 | 0.82 | 0.911 |
| Quiet neighborhood | 0.83 | 61.6 | 0.83 | 0.83 | 0.660 |
| Good street lighting | 0.85 | 68.6 | 0.85 | 0.86 | 0.553 |
| Safe neighborhood for kids to play outdoors | 0.86 | 67.9 | 0.85 | 0.87 | 0.141 |
| Large front yards | 0.89 | 75.5 | 0.89 | 0.89 | 0.450 |
| Close to where I work | 0.89 | 77.5 | 0.89 | 0.90 | 0.425 |
| Bike routes beyond the neighborhood | 0.92 | 83.3 | 0.93 | 0.91 | 0.080 |
| Good investment potential | 0.92 | 83.4 | 0.92 | 0.93 | 0.189 |
| Shopping areas with walking distance | 0.94 | 85.7 | 0.93 | 0.94 | 0.779 |
| High quality K-12 schools | 0.94 | 86.3 | 0.94 | 0.94 | 0.869 |
| Sidewalks throughout the neighborhood | 0.95 | 90.4 | 0.96 | 0.95 | 0.278 |
| Parks and open spaces nearby | 0.95 | 87.6 | 0.95 | 0.95 | 0.340 |

* For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

Note: The sample size varies from item to item due to item non-response, ranging from 710 to 764 suburban-neighborhood respondents and 826 to 887 traditional-neighborhood respondents.

## 2.6. Overall neighborhood satisfaction and its determinants

We are interested in relative levels of overall satisfaction among residents in these two neighborhood types, which we cannot tell from the analysis up to this point because it is unknown if the list of 34 attributes assembled by the researchers accurately captures what matters to the people who live in these neighborhoods. Thus we present in this section results from the measure of overall neighborhood satisfaction, as well as estimates as to which neighborhood characteristics significantly contribute to neighborhood satisfaction, by neighborhood type.

### *Measuring overall satisfaction with the neighborhood*

To measure overall satisfaction, respondents were asked to rate how well the "characteristics of the neighborhood itself" "meet the needs of [their] household[s]", on a five-point scale from "1" (very poorly) to "5" (very well). This wording is preferable to asking respondents directly "how satisfied" they are because it is thought to diminish the pressure of a social-desirability bias that may push respondents to report that they are more satisfied than they feel (Aragones, et al. 2002, Francescato, et al. 1987).

We find that the majority of respondents (about 74 percent) report that the characteristics of their neighborhoods meet the needs of their households "well" or "very well" (Table 8). Relatively few report "poorly" or "very poorly" (5 percent). This could be the result of a social desirability bias, but could also very likely be the result of residents' ability to choose neighborhoods that mostly meet their needs. As a comparison, among a sample of inner-city residents who are presumed to have, on average, fewer choices than the sample used in this study, about 31 percent report being "very satisfied" with their neighborhood, the highest in a five-category scale, as

compared with 41 percent choosing the highest category in a five-category scale for this sample (Basolo and Strong 2002).

**Table 8. Overall neighborhood satisfaction, by neighborhood type**

| *How well neighborhood characteristics meet household needs* | *Suburban* | *Traditional* | *Total* |
|---|---|---|---|
| Very poorly | 0.9% | 0.3% | 0.5% |
| Poorly | 7.2% | 3.5% | 5.1% |
| About right | 25.9% | 16.1% | 20.5% |
| Well | 36.9% | 31.7% | 34.0% |
| Very well | 29.2% | 48.5% | 39.8% |
| *N* | 583 | 722 | 1305 |

Comparing satisfaction levels of suburban and traditional-neighborhood respondents, we find that traditional neighborhoods better serve their residents, corroborating the findings in previous sections finding higher satisfaction scores on more neighborhood characteristics among traditional-neighborhood respondents. On the one-to-five scale, the average response is 3.9 among suburban respondents, with 29 percent indicating "very well," versus 4.2 among traditional-neighborhood respondents, with 49 percent indicating "very well." (Differences across neighborhood type are statistically significant: A *t*-test for equivalence of means and a $\chi^2$ test for independence of response distribution from neighborhood type both produce $p = 0.000$.)

While this suggests that traditional neighborhoods better provide for their residents' needs than do suburban neighborhoods, it is possible that the higher level of satisfaction in the traditional neighborhoods is attributable to factors other than the neighborhood, such as personal or household attributes that could potentially vary by neighborhood type. Furthermore, from a policy perspective, it is not clear whether suburban residents would be more satisfied if they resided in traditional neighborhoods because it is not

known what features contribute to neighborhood satisfaction among the two groups of residents. Both of these issues are explored in the modeling section below.

### *Modeling framework*

In this section, we estimate several models to ascertain determinants of overall neighborhood satisfaction. The dependent variable is obtained from responses to the question of how well the "characteristics of the neighborhood itself" meet the needs of respondents' households. As noted above, responses were reported on a five-point scale, from "very poorly" to "very well," but for this analysis, we consolidate these five categories into four, due to the scarcity of responses in the lowest category (Table 9).

**Table 9. Response frequency for the dependent variable**

| *How well neighborhood characteristics meet household needs* | *Suburban* | *Traditional* | *Total* |
|---|---|---|---|
| Very well | 427 | 247 | 674 |
| Well | 284 | 270 | 554 |
| About right | 145 | 192 | 337 |
| Poorly (consolidated) | 34 | 58 | 92 |
| Poorly | 31 | 53 | 84 |
| Very poorly | 3 | 5 | 8 |
| *Total* | 890 | 767 | 1657 |

The dependent variable is discrete and ordinal, presumably representing an underlying continuous measure of how well households' needs are met. An appropriate model for this type of dependent variable is an ordered logit, which relates explanatory variables to the probability of falling into each interval of the dependent variable (Lu 1999; Borooah 2001).[2] In this type of model, when an explanatory variable has a

[2] A discrete ordered model is estimated by assuming that there is a latent continuous variable, $Y^*$, underlying the discrete categories in the dependent variable, $Y$, for which there is a linear model $Y^* = \sum_{k=1}^{K} \beta_k X_{ik} + \varepsilon_i$, with $\beta_k$ as the coefficient associated with the $k^{\text{th}}$ explanatory variable in the model. The probability that the $i^{\text{th}}$ respondent's level of satisfaction falls in the first category $\Pr(Y_i = 1)$ is

positive coefficient, it indicates that higher values of that variable are associated with higher values on the underlying latent measure of need fulfillment. That is, a positively valued coefficient suggests a variable is positively associated with neighborhood satisfaction and a negative value suggests that a variable is negatively associated with neighborhood satisfaction.

We estimate the models using Limdep 7.0 (using the ORDERED PROBIT function with model type = LOGIT). We assess the model fit using McFadden's pseudo-$R^2$ and the McKelvey-Zavoina pseudo-$R^2$, number of significant coefficients, log-likelihood value for the model, and interpretability.[3] To test the "parallel slopes" assumption that

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$\Pr\left(\sum_{k=1}^{K}\beta_k X_{ik} + \varepsilon_i \le \delta_1\right)$ for some arbitrary cut-point $\delta_1$ along $Y^*$ between $Y$=1 and $Y$=2, and the probability of it falling in the second category is $\Pr(Y_i = 2) = \Pr\left(\delta_1 - \sum_{k=1}^{K}\beta_k X_{ik} < \varepsilon_i \le \delta_2 - \sum_{k=1}^{K}\beta_k X_{ik}\right)$, and so on for the other two categories. The likelihood of observing any given sample is the product $L = \prod_{j=1}^{4}\prod_{i \in c_j}\Pr(Y_i = j)$, where $c_j$ is the set of people choosing alternative $j$. By assuming that the error terms $\varepsilon_i$ are logistically distributed, then

$$\Pr(Y_i = 1) = \Lambda\left(\delta_1 - \sum_{k=1}^{K}\beta_k X_{ik}\right),$$

$$\Pr(Y_i = 2) = \Lambda\left(\delta_2 - \sum_{k=1}^{K}\beta_k X_{ik}\right) - \Lambda\left(\delta_1 - \sum_{k=1}^{K}\beta_k X_{ik}\right),$$

$$\Pr(Y_i = 3) = \Lambda\left(\delta_3 - \sum_{k=1}^{K}\beta_k X_{ik}\right) - \Lambda\left(\delta_2 - \sum_{k=1}^{K}\beta_k X_{ik}\right), \text{ and}$$

$$\Pr(Y_i = 4) = 1 - \Lambda\left(\delta_1 - \sum_{k=1}^{K}\beta_k X_{ik}\right), \text{ where } \Lambda(\cdot) \text{ is the logistic cumulative distribution function. Values}$$

of $\delta_1$, $\delta_2$, $\delta_3$, and $\beta_k$ are estimated as those that maximize $L$ (see, for example, Borooah 2001).

[3] McFadden's pseudo-$R^2$ is "an informal goodness-of-fit index that measures the fraction of an initial log likelihood value explained by the model" (Ben-Akiva and Lerman 1985, p.91). We use the more conservative version of this measure, defined as $1 - \frac{\ell_{\hat{\beta}}}{\ell_c}$, where $\ell_{\hat{\beta}}$ is the log-likelihood value associated with the specified model and $\ell_c$ is the log-likelihood value associated with a constants-only model estimated on the same data. The McKelvey-Zavoina pseudo-$R^2$ is another informal goodness-of-fit measure that can be interpreted as an estimate of the explained sum of squares divided by an estimate of

is required for ordered logit, that is, that the estimated impact of the explanatory variables is the same for each level of the dependent variable, we also estimate multinomial logit models for each of our final specifications.

***Sociodemographics-only model***

The purpose of this section is to determine what types of people (in terms of sociodemographic characteristics) tend to be satisfied with their neighborhoods. This will tell us whether the differences in satisfaction levels across neighborhood types (with traditional-neighborhood respondents appearing more satisfied, overall) are due to systematic differences in the sociodemographic characteristics of the residents of the two neighborhood types. It will also show which types of people tend to be satisfied in the two different neighborhood types. The sociodemographic characteristics considered for inclusion in the model are shown in Table 10.

Prior to model estimation, we analyzed bivariate relationships between neighborhood satisfaction and each potential explanatory variable, using correlation coefficients, $\chi^2$ tests, and ANOVA (results not presented). Clearly some of these respondent attributes are interrelated, which makes the use of a model valuable in its ability to account for the additional effects of a given variable, when all other variables

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the total sum of squares, equal to $\frac{\sum_{i=1}^{N}\left(\hat{Y}_i^* - \overline{Y}^*\right)^2}{\sum_{i=1}^{N}\left(\hat{Y}_i^* - \overline{Y}^*\right)^2 + N\hat{\sigma}^2}$, where $N$ is the number of observations, $\hat{Y}_i^*$ is the predicted value for the latent dependent variable $Y^*$ for the $i^{\text{th}}$ observation in the sample, $\overline{Y}^*$ is its average over all $N$, and $\hat{\sigma}^2$ is the estimated variance, normalized to $\frac{\pi^2}{3}$ in logit models (Veall and Zimmermann 1996). Monte Carlo experiments by Veall and Zimmermann (1996) indicate that the McKelvey-Zavoina pseudo-$R^2$ produces a measure that is closest to the latent variable ordinary least squares $R^2$.

are held constant. But it also makes model building tricky, as there are likely several combinations of explanatory variables that can capture a similar effect.

**Table 10. Sociodemographic variables considered for inclusion in the neighborhood satisfaction models**

| | *Mean value or % affirmative* | | | |
|---|---|---|---|---|
| *Variable* | *Suburban* | *Traditional* | *p-value*[*] | *N* |
| Respondent's age | 48.9 | 45.1 | 0.000 | 1677 |
| Household income | 65,316 | 69,964 | 0.010 | 1679 |
| Vehicles per adult in the household | 1.00 | 0.99 | 0.459 | 1682 |
| Tenancy (years lived in current residence) | 10.5 | 8.8 | 0.005 | 1627 |
| Household size (number of household members) | 2.4 | 2.0 | 0.000 | 1682 |
| Ratio of working adults to children | 0.6 | 0.7 | 0.000 | 1682 |
| Number of children under age 5 in household | 0.2 | 0.1 | 0.005 | 1682 |
| Number of children under age 18 in household | 0.5 | 0.3 | 0.000 | 1682 |
| Presence of children under age 5 in household | 13% | 9% | 0.004 | 1682 |
| Presence of children under age 18 in household | 32% | 17% | 0.000 | 1682 |
| Respondent has a driver's license | 98% | 97% | 0.634 | 1660 |
| Respondent has physical or mental conditions that prevent driving | 2.2% | 2.1% | 0.915 | 1653 |
| Respondent has physical or mental conditions that prevent walking outside the home | 4.7% | 4.4% | 0.777 | 1655 |
| Household rents (rather than owns) current residence | 27% | 44% | 0.000 | 1657 |
| Respondent is female | 51% | 54% | 0.170 | 1634 |
| Respondent has a four-year college degree | 59% | 68% | 0.000 | 1658 |
| Respondent has a graduate degree | 23% | 27% | 0.071 | 1658 |
| Traditional-neighborhood indicator | 0 | 1 | n/a | 1682 |
| Neighborhood satisfaction (dependent variable) | 2.92 | 3.24 | 0.000 | 1657 |

* For *t*-test of equivalence of means across suburban- and traditional-neighborhood groups.

We initially estimate three different versions of this model: one using the entire sample, one using only the suburban segment of the sample, and one using the traditional-neighborhood segment of the sample (Table 11).The purpose of this set of models is to compare any differences in the sociodemographic determinants of neighborhood satisfaction across neighborhood types. We use these results to build a final model that uses the entire sample, but utilizes neighborhood-type segment-specific coefficients where appropriate (Table 13).

In comparing the results across segments (Table 11), we find that a different set of variables produce the best model in each case, suggesting that the types of residents who find satisfaction in the two neighborhood types are not equivalent. As mentioned above, it is likely that several combinations of explanatory variables may capture similar effects. For example, in the suburban-only specification, it is likely that the number of vehicles is closely related to household income. We include number of vehicles instead of income because it produces a higher log-likelihood value, and because when both variables are included, the coefficient on the income variable is insignificant, suggesting stronger association of number of vehicles with neighborhood satisfaction. Furthermore, the included variable may have a direct effect on satisfaction, in addition to indirectly accounting for the effect of income.

**Table 11. Models of neighborhood satisfaction, as determined by sociodemographic characteristics only, segmented by neighborhood type**

| | *All neighborhoods* | | *Suburban only* | | *Traditional only* | |
|---|---|---|---|---|---|---|
| *Variable* | *β estimate* | *p-value* | *β estimate* | *p-value* | *β estimate* | *p-value* |
| Age | 0.01 | 0.000 | 0.03 | 0.000 | 0.01 | 0.021 |
| Income ($1,000s) | 0.01 | 0.000 | | | 0.01 | 0.000 |
| Graduate degree | 0.27 | 0.019 | 0.38 | 0.022 | | |
| Walking limitation | -0.70 | 0.001 | | | -0.99 | 0.001 |
| Years in residence | | | -0.02 | 0.000 | 0.02 | 0.004 |
| Female | | | | | 0.26 | 0.048 |
| Vehicles per adult | | | 0.38 | 0.015 | | |
| Household size | | | 0.21 | 0.000 | | |
| Renter | | | -0.41 | 0.011 | | |
| Constant 1 | 1.79 | 0.000 | 0.78 | 0.054 | 2.04 | 0.000 |
| Constant 2 | 1.80 | 0.000 | 1.91 | 0.000 | 1.88 | 0.000 |
| Constant 3 | 3.28 | 0.000 | 3.49 | 0.000 | 3.39 | 0.000 |
| *Summary statistics* | | | | | | |
| *N* | 1620 | | 879 | | 869 | |
| Log-likelihood, model | -1940.6 | | -987.2 | | -965.1 | |
| Log-likelihood, constants-only model | -1969.8 | | -999.4 | | -985.9 | |
| $\chi^2$ value | 58.4 | | 24.5 | | 41.5 | |
| McFadden pseudo-$R^2$ | 0.01 | | 0.01 | | 0.02 | |
| McKelvey-Zavoina pseudo-$R^2$ | 0.88 | | 0.48 | | 0.58 | |

We can observe the following differences across neighborhood types. In traditional neighborhoods, the dummy variable for having physical or mental disabilities that interfere with walking outside the home is negatively associated with neighborhood satisfaction (people who can't walk are less satisfied), but this variable does not have a significant association with satisfaction in the suburban-only model. Income is likely associated with neighborhood satisfaction in both neighborhood types, but in the suburban model, a combination of other variables that are related to income seem to better capture this association, including vehicle ownership, homeownership, and education. Household size (although not presence of children) is significantly associated with neighborhood satisfaction among suburban residents but not among traditional-neighborhood residents. Interestingly, the tenancy variable (the number of years a respondent has lived in her current house or apartment) produces coefficients with similar magnitudes but opposite signs in the two neighborhood types: negative among suburban respondents and positive among traditional-neighborhood respondents. (This finding is discussed in more detail in a later section.)

Next we test whether each of the three specifications above produce statistically significantly different results when estimated using only the suburban-resident data versus only the traditional-resident data. In particular, we conduct *t*-tests across the neighborhood-type segments to test for significant differences in the magnitudes of the estimated coefficients for each variable, for each of the three specifications. Results of these tests are summarized in Table 12.

**Table 12. Results of *t*-tests comparing estimated parameter coefficients across suburban- and traditional-neighborhood segments**

| *Specification* | *Statistically significant differences across suburban- and traditional-neighborhood types* | *No statistically significant differences* |
|---|---|---|
| All neighborhoods (pooled model) | Age, Income, Walking limitation | Graduate degree |
| Suburban only | Age, Vehicles per adult, Tenancy, Household size | Renter, Graduate degree |
| Traditional only | Age, Tenancy, Female indicator | Income, Walking limitation |

Informed by these results, we estimate a combined model that includes segment-specific variables to capture differences across neighborhood types. The segment-specific variables are simply interaction terms between a given sociodemographic variable and the neighborhood-type indicator variable. The advantage of the combined model is that it captures some of the differences found in the suburban- and traditional-neighborhood segments while retaining the precision of using the full sample to estimate the influence of variables common to both segments. The best model, based on goodness-of-fit measures, significance of coefficients, significant differences across segment-specific coefficients, and interpretability, is shown in Table 13.[4]

There are several conclusions we might draw from the modeling results in Table 13. First, the overall explanatory power of the model is limited. The log-likelihood value for the model is significantly improved over what it would be for a constants-only model, but it is still far from zero. Accordingly, McFadden's pseudo-$R^2$ measure of

[4] To test whether segment-specific coefficients are appropriate for a given variable, we estimate a model that includes a traditional-specific and suburban-specific version of the variable and conduct a *t*-test of whether the two coefficients are equivalent. To test the null hypothesis that the $i^{th}$ and $j^{th}$ coefficient are equivalent, the test-statistic $\frac{\hat{\beta}_i - \hat{\beta}_j}{\sqrt{\text{Var}(\hat{\beta}_i) + \text{Var}(\hat{\beta}_j) - 2\text{Cov}(\hat{\beta}_i, \hat{\beta}_j)}}$ is approximately *t*-distributed with $N - K$ degrees of freedom, where $N$ is the sample size and $K$ is the number of parameters estimated in the model.

goodness of fit is abysmally low, although the McKelvey-Zavoina $R^2$ pegs the model fit to be much better.[5] The questionable fit suggests that sociodemographics alone, or at least those considered in this study, do a poor job of explaining neighborhood satisfaction. It also means that omitted variables may be introducing bias in the estimates for the included variables, but for the remainder of this analysis we will take these estimates as given.

**Table 13. Model of neighborhood satisfaction, as determined by sociodemographic characteristics only**

| *Variable* | *β estimate* | *Standardized β estimate*[a] | *p-value* |
|---|---|---|---|
| Traditional neighborhood | 1.954 | 3.916 | 0.000 |
| Walking limitation | -0.625 | -3.006 | 0.003 |
| Renter | -0.273 | -0.569 | 0.012 |
| Graduate degree | 0.237 | 0.549 | 0.047 |
| Female, in traditional neighborhood | 0.225 | 0.494 | 0.084 |
| Household size, in suburban neighborhood | 0.161 | 0.107 | 0.003 |
| Tenancy, in traditional neighborhood | 0.019 | 0.002 | 0.004 |
| Tenancy, in suburban neighborhood | -0.020 | -0.002 | 0.000 |
| Age, in suburban neighborhood | 0.028 | 0.001 | 0.000 |
| Income ($1,000s) | 0.005 | 0.000 | 0.002 |
| Constant 1 | 0.862 | | 0.010 |
| Constant 2 | 1.886 | | 0.000 |
| Constant 3 | 3.439 | | 0.000 |
| *Summary statistics* | | | |
| *N* | 1537 | | |
| Log-likelihood, model | -1783.3 | | |
| Log-likelihood, constants-only model | -1854.1 | | |
| $\chi^2$ value | 141.6 | | |
| McFadden pseudo-$R^2$ | 0.038 | | |
| McKelvey-Zavoina pseudo-$R^2$ | 0.928 | | |

[a] The estimated β coefficient for a variable divided by that variable's standard deviation.

Second, with regard to our question as to whether sociodemographic differences are driving differences in neighborhood-satisfaction levels across neighborhood types, this

[5] Veall and Zimmermann (1996) find that the McFadden pseudo-$R^2$ tends to have a downward bias that becomes worse when the number of categories in the dependent variable increases from three to four, as used here, potentially explaining why the McFadden values are so much lower than the McKelvey-Zavoina values for these results.

model suggests that they are not, or that they are not entirely. This is shown by the fact that the neighborhood-type indicator variable has a coefficient that is not only statistically significant, but also has a standardized magnitude that is larger than any other contributing factor: Even after controlling for sociodemographic variables, respondents in traditional neighborhoods are more likely to report higher levels of satisfaction with their neighborhoods than residents in suburban neighborhoods.

Third, these results offer some insights as to which neighborhood types are more satisfying for different types of people. In particular, after controlling for tenancy, household size and age are associated with higher levels of satisfaction in suburban neighborhoods, but are not (or, in the case of age, are less so) in traditional neighborhoods. In general, we would expect more satisfaction with age, both because of growing to like what you have and because older people have had more of their lifetimes to secure what they want. And previous research indicates that people with companions and families tend to be more satisfied with all things, but particularly with residential features. By sharing, larger households may also get more for the money they individually allocate on housing. But apparently these dynamics do not play out equivalently in the different neighborhood types. One interpretation of this might be that in-home companionship is more important in the suburban neighborhoods than in the traditional neighborhoods, where there is more to do outside the home nearby. In addition, older householders may be more satisfied than younger householders in suburbs because they are less interested in activities outside the home or in active travel.

Controlling for household size, age, and income, longer tenancies are associated with neighborhood satisfaction in traditional neighborhoods while shorter tenancies are associated with neighborhood satisfaction in suburban neighborhoods. With respect to the contrasting theories of who is more likely to be satisfied (recent movers, because they may have more recently brought their preferences in line with their actual residential circumstances, or long-time residents, because they would have moved already if they didn't like the neighborhood, i.e. survival bias) it seems that different theories hold in different neighborhood types. Whatever the explanation for this finding, the fact that neighborhood satisfaction decreases over time in the suburbs may provide a clue as to why overall neighborhood satisfaction is lower, on average, in those neighborhoods.

In addition, females are more satisfied than males in traditional neighborhoods, whereas there are no significant differences by gender among suburban residents.[6] Perhaps this is related to women's heightened sensitivity to the possibility of assault while coming and going; if they perceive their neighborhoods to be safe, they may be more likely to report higher levels of satisfaction with their neighborhoods than men (but report less satisfaction if they do not perceive their neighborhoods to be safe). Safety may be more of an issue in traditional neighborhoods than suburban neighborhoods because walking is less common in suburbs and because suburbs are perceived to be safer. Alternatively, this result could be related to the fact that women tend do more household errands than men, and therefore may be more appreciative of

[6] Note that the coefficient for the traditional-specific female indicator is only marginally significant. The variable was retained in the model because the *p*-value for the estimated coefficient is still relatively low (significant at $\alpha = 0.10$), the magnitude of its standardized coefficient is relatively high, and its inclusion improved the goodness-of-fit measures.

the shorter distances to destinations in traditional neighborhoods than are their male family members and neighbors. Or there could be reasons that men are particularly unsatisfied in traditional neighborhoods, perhaps relating to stereotypical pressures to achieve the American dream as a breadwinner with a house in the suburbs. Clearly, these issues require further research for more conclusive evidence.

Finally, these results also suggest several sociodemographic characteristics that are commonly associated with satisfaction in both neighborhood types and that corroborate results found elsewhere, including income, homeownership, and higher levels of education. Higher incomes enable people to purchase satisfying residential environments. Even after controlling for income, homeowner-status is associated with higher levels of neighborhood satisfaction, all else equal, possibly because these residents are more attached to their neighborhoods and/or because they have already expressed their preference for the neighborhood by deliberately choosing to invest in a home there. This may also be due to spillover effects, whereby a positive experience with the residential unit causes general satisfaction with the entire residential situation. A feature negatively associated with neighborhood satisfaction in both neighborhoods is the indicator for persons reporting walking limitations.[7] This may reflect the importance of walking as a means of enjoying one's neighborhood or the shortcomings of both neighborhood types in accommodating disabled residents. Alternatively, this indicator may be associated with other attributes not accounted for in this study that are also associated with lower levels of satisfaction, such as extreme age or illness.

[7] A joint (both neighborhoods) coefficient seems to perform better than do separate neighborhood-type specific coefficients, despite the findings from the initial set of models.

***Full model***

The purpose of this section is to consider which neighborhood characteristics are associated with neighborhood satisfaction, controlling for respondents' sociodemographic characteristics. This will tell us something more about residents' preferences. In particular, it will tell us which, if any, of the factors considered in this study contribute significantly to neighborhood satisfaction, and whether different factors are more or less important for satisfaction among residents of the different neighborhood types.

As measures of neighborhood characteristics, we first consider the six factors based on respondents' perceptions of the neighborhoods in which they live (accessibility, physical-activity options, safety, socializing, outdoor spaciousness, and attractiveness). The rationale for using perceived measures of neighborhood attributes rather than objective measures of "actual" conditions is that subjective measures are thought to better reflect "the quality of neighborhood life as experienced and perceived by the people living there" (Connerly and Marans 1988, p. 41; also Galster and Hesser 1981; Lu 1999; Marans and Rodgers 1975; Weidemann and Anderson 1985). So-called objective measures may not be truly objective (Connerly and Marans 1988), particularly since the concept of what is meant by "neighborhood" may be different for everyone. Using the perceived measures ensures that the geographic reference area is consistent between dependent and explanatory variables for any individual respondent.

Given the decision to use measures of neighborhood characteristics based on respondents' perceptions, the question remains of whether to use the inferred measure of satisfaction developed earlier—based on perceived trueness and importance—or to

use the perceived trueness scores themselves. If we use satisfaction scores, we are effectively weighting the perceptions by degree of importance, as measured by the importance scores. This is not desirable in this case because one of the purposes of estimating the model is to assess which perceptions are important using a different methodology than used previously in this chapter, namely by estimating their association to overall neighborhood satisfaction. Supporting this decision are results from previous studies indicating that importance weightings do not produce more meaningful results than using raw scores, relative to global measures (Russell, et al. 2006). Furthermore, when we estimate correlation coefficients between satisfaction scores for the six neighborhood characteristics and overall neighborhood satisfaction, we find significant, though not strong, correlations for all the factors (Table 14).

**Table 14. Correlation of satisfaction scores and perception scores with overall neighborhood satisfaction**

| | *Satisfaction score*[b] | | *Perception score*[c] | |
|---|---|---|---|---|
| *Factor*[a] | *Pearson Correlation*[d] | *p-value*[e] | *Pearson Correlation*[d] | *p-value*[e] |
| Accessibility | 0.075 | 0.003 | 0.139 | 0.000 |
| Physical-activities options | 0.147 | 0.000 | 0.180 | 0.000 |
| Safety | 0.346 | 0.000 | 0.400 | 0.000 |
| Socializing | 0.079 | 0.002 | 0.211 | 0.000 |
| Outdoor spaciousness | 0.160 | 0.000 | 0.163 | 0.000 |
| Attractiveness | 0.346 | 0.000 | 0.527 | 0.000 |
| *N* | 1628 | | 1642 | |

[a] Factors produced by principal component analysis of 34 underlying neighborhood attributes (perceived and preferred combined). Attributes comprising each factor are shown in Table 1.

[b] Satisfaction score derived from the gap between respondents' trueness and importance scores for each factor, as described in section 2.5.

[c] Score representing respondents' ratings of how true a characteristic is of their neighborhoods.

[d] The estimated correlation coefficient between each factor and the measure of neighborhood satisfaction**.**

[e] For significance of Pearson correlation coefficient.

The perception scores have somewhat stronger correlations with overall neighborhood satisfaction, perhaps pointing to a deficiency in the satisfaction measures. One source of trouble may be imperfections in the measure, described in a previous section. For all of these reasons, we use the scores for perceived trueness of neighborhood characteristics (as represented by the six factors), rather than the satisfaction measures derived from these, as explanatory variables in the model.

**Table 15. Objective accessibility measures considered for inclusion in the model**

| | | *Mean value*[a] | | *Pearson correlation with dependent variable*[b] |
|---|---|---|---|---|
| *Accessibility measure* | | *Suburban* | *Traditional* | |
| Total number of businesses within | … 400 meters | 1.1 | 4.0 | 0.07 |
| | … 800 meters | 5.6 | 18.4 | 0.10 |
| | … 1600 meters | 23.9 | 65.6 | 0.13 |
| Number of different business types within | … 400 meters | 0.8 | 2.6 | 0.08 |
| | … 800 meters | 3.7 | 7.5 | 0.10 |
| | … 1600 meters | 9.6 | 13.0 | 0.12 |
| Number of institutional businesses (e.g. libraries, post office, place of worship) within | … 400 meters | 0.4 | 1.5 | 0.07 |
| | … 800 meters | 1.9 | 6.5 | 0.10 |
| | … 1600 meters | 8.0 | 23.5 | 0.15 |
| Number of maintenance businesses (e.g. banks, pharmacies, grocery stores) within | … 400 meters | 0.2 | 0.9 | – |
| | … 800 meters | 1.0 | 3.6 | 0.05 |
| | … 1600 meters | 4.2 | 13.0 | 0.15 |
| Number of leisure businesses (e.g. bars, gyms, theaters, bookstores, video-rental stores) within | … 400 meters | 0.3 | 0.9 | – |
| | … 800 meters | 1.3 | 4.2 | 0.08 |
| | … 1600 meters | 5.4 | 16.6 | 0.10 |
| Number of restaurants (e.g. fast food, pizza, ice cream, bakeries) within | … 400 meters | 0.3 | 0.8 | 0.05 |
| | … 800 meters | 1.4 | 4.0 | 0.10 |
| | … 1600 meters | 6.3 | 12.5 | – |
| Number of convenience and grocery stores within | … 400 meters | 0.1 | 0.6 | – |
| | … 800 meters | 0.6 | 2.5 | – |
| | … 1600 meters | 2.8 | 8.9 | 0.11 |
| Minimum distance to a convenience or grocery store | | 1268 | 469 | -0.14 |

[a] Mean values are statistically significantly different across suburban- and traditional-neighborhood types at $\alpha = 0.05$ for all accessibility measures shown.

[b] In all neighborhoods. All coefficients shown are statistically significant at $\alpha = 0.05$.

We supplement the perceived neighborhood characteristics with an additional set of objective measures based on distances between each resident's individual GIS-coded address and a variety of types of businesses, as listed in the yellow pages. (See Handy, et al. (2004) for a description of this methodology.) We defend the use of the objective measures in this case because they are supplementary rather than in place of subjective measures. In addition, distances to businesses is well suited to objective measurement, and may capture an additional dimension of the neighborhood environment not well captured by any of the six factors and one that is of particular interest to planners as a measure of mixed land use, thought to be an important component of New Urbanist developments. Summary statistics for this set of variables appear in Table 15.

As with the models in the previous section using only sociodemographic characteristics as explanatory variables, we initially estimate three different versions of this model: one using the entire sample, one using only the suburban segment of the sample, and one using the traditional-neighborhood segment of the sample (Table 16).

As with the previous set of models, the purpose of this set of models is to compare any differences in the determinants of neighborhood satisfaction across neighborhood types. We use these results to build a final model that uses the entire sample, but utilizes neighborhood-type segment-specific coefficients where appropriate (Table 17). The models throughout this section are estimated by first entering sociodemographic variables, then the perceived neighborhood characteristics, and then the objective accessibility measures. At each step, variables that are not significant are removed and variables that are significant are retained.

**Table 16. Models of neighborhood satisfaction, as determined by respondent sociodemographics and by neighborhood characteristics, segmented by neighborhood type**

| | *All neighborhoods* | | *Suburban only* | | *Traditional only* | |
|---|---|---|---|---|---|---|
| *Variable* | *β estimate* | *p-value* | *β estimate* | *p-value* | *β estimate* | *p-value* |
| Income ($1,000s) | 0.004 | 0.011 | | | 0.004 | 0.053 |
| Age | 0.006 | 0.069 | 0.012 | 0.022 | | |
| Walking limitation | -0.568 | 0.012 | | | -0.618 | 0.039 |
| Household size | | | 0.102 | 0.062 | | |
| Graduate degree | | | 0.370 | 0.027 | | |
| Total businesses within 1600 meters | 0.008 | 0.000 | | | 0.005 | 0.056 |
| Safety perception[a] | 0.884 | 0.000 | 0.906 | 0.000 | 0.908 | 0.000 |
| Socializing perception[a] | 0.185 | 0.003 | | | 0.349 | 0.000 |
| Attractiveness perception[a] | 1.105 | 0.000 | 1.106 | 0.000 | 1.088 | 0.000 |
| Constant 1 | 2.831 | 0.000 | 2.713 | 0.000 | 3.328 | 0.000 |
| Constant 2 | 2.338 | 0.000 | 2.380 | 0.000 | 2.361 | 0.000 |
| Constant 3 | 4.413 | 0.000 | 4.524 | 0.000 | 4.384 | 0.000 |
| *Summary statistics* | | | | | | |
| *N* | 1547 | | 738 | | 861 | |
| Log-likelihood, model | -1509.9 | | -755.9 | | -797.3 | |
| Log-likelihood, constants-only model | -1885.0 | | -938.5 | | -984.3 | |
| $\chi^2$ value | 750.3 | | 365.1 | | 373.9 | |
| McFadden pseudo-$R^2$ | 0.199 | | 0.195 | | 0.190 | |
| McKelvey-Zavoina pseudo-$R^2$ | 0.963 | | 0.756 | | 0.916 | |

[a] Factors produced by principal component analysis of 34 underlying neighborhood attributes (perceived and preferred combined). Attributes comprising each factor are shown in Table 1.

The results in Table 16 show that only three of the six perceived neighborhood factors enter significantly in any of the models. Safety and attractiveness are in all three models, and the socializing factor has a significant coefficient only in the traditional-neighborhoods model. The physical-activity-options, outdoor-spaciousness, and accessibility factors do not have significant coefficients in any of the models. Many of the objective accessibility measures (from Table 15) produce statistically significant coefficients when entered in the traditional-neighborhood model. However, perhaps due to multicollinearity problems, including just the overall measure (numbers of all types of businesses) seems to produce better results than any subset of the more specific

measures. None of the objective accessibility measures (from Table 15) produces statistically significant coefficients in the suburban-only model.

Again, we conduct *t*-tests across segments to test for significant differences in the magnitudes of the estimated coefficients for each variable. The only significant differences found are for the socializing factor (both in the pooled and the traditional-neighborhood specifications) and in the age variable (in the suburban specification). There are no differences for income, household size, graduate degree, number of businesses, the safety perception, or the attractiveness perception.

**Table 17. Model of neighborhood satisfaction, as determined by neighborhood characteristics and respondent sociodemographics, combined version**

| *Variable* | *β estimate* | *Standardized β estimate*[a] | *p-value* |
|---|---|---|---|
| Walking limitation | -0.541 | -2.601 | 0.017 |
| Attractiveness perception[b] | 1.098 | 1.155 | 0.000 |
| Safety perception[b] | 0.901 | 0.967 | 0.000 |
| Socializing perception, in traditional neighborhood[b] | 0.352 | 0.559 | 0.000 |
| Age | 0.006 | 0.000 | 0.061 |
| Income ($1,000s) | 0.003 | 0.000 | 0.018 |
| Number of businesses within 1600 meters, in traditional neighborhood | 0.006 | 0.000 | 0.000 |
| Constant 1 | 3.007 | | 0.000 |
| Constant 2 | 2.337 | | 0.000 |
| Constant 3 | 4.423 | | 0.000 |
| *Summary statistics* | | | |
| *N* | 1547 | | |
| Log-likelihood, model | -1504.8 | | |
| Log-likelihood, constants-only model | -1885.0 | | |
| $\chi^2$ value | 760.5 | | |
| McFadden pseudo-$R^2$ | 0.202 | | |
| McKelvey-Zavoina pseudo-$R^2$ | 0.963 | | |

[a] The estimated $\beta$ coefficient for a variable divided by that variable's standard deviation.

[b] Factors produced by principal component analysis of 34 underlying neighborhood attributes (perceived and preferred combined). Attributes comprising each factor are shown in Table 1.

We estimate a combined model that includes segment-specific variables (interaction terms between a neighborhood-type indicator and another explanatory variable) to

capture differences across neighborhood types. The best model—based on goodness-of-fit measures, significance of coefficients, statistically significant differences across segment-specific coefficients, and interpretability—is shown in Table 17.

There are several conclusions we might draw from the modeling results in Table 17. First, we note that the goodness of fit is improved over the sociodemographics-only model, as would be expected. But because it is still far from a perfect fit, there is still a possibility of omitted-variable bias affecting the estimates presented. However, taking the estimates as given, we note first off that the traditional-neighborhood indicator does not appear in this model. (If added to the specification in Table 17, its estimated coefficient is not significant, with $p = 0.743$.) This means that having included neighborhood characteristics in the model, differences in satisfaction levels across neighborhood-type segments are accounted for. That is, neighborhood characteristics as perceived by residents do have something to do with the differences in satisfaction levels across neighborhood types. In particular, the two most important neighborhood characteristics (based on the magnitude of their standardized coefficients)—attractiveness and safety—are comparably important to residents of each neighborhood type (confirmed by a *t*-test of equivalence for segment-specific coefficients, with $p = 0.979$ and $p = 0.666$ for attractiveness and safety, respectively). For attractiveness, the fact that it receives higher trueness scores among traditional-neighborhood respondents (Table 2) suggests that traditional neighborhoods simply perform better with respect to this factor, which *does* matter to people in both neighborhood types. (This explanation does not hold for the safety factor, however, which has higher trueness scores in suburban neighborhoods.) In addition, two factors that contribute to neighborhood

satisfaction in traditional neighborhoods do not contribute to satisfaction in suburban neighborhoods: the socializing factor (diverse neighbors, lots of people out and about, lots of interaction among neighbors, economic homogeneity) and having more businesses nearby.

There are two different reasons why these variables might not be important for suburban satisfaction. One is that suburbanites do not value these things, and so whether they are present in the neighborhood has no significant relationship with neighborhood satisfaction levels. The other reason could be that these features are generally absent in suburban neighborhoods, such that the degree that these features are present does not contribute significantly to satisfaction levels there. (These two explanations may be interrelated: If a feature is absent, a resident may be less likely to develop an appreciation for it.) In this case, both explanations seem to be true to some extent, since the socializing factor is rated both as less true and less important among suburban residents than traditional-neighborhood residents (Table 2 and Table 4) and there are significantly fewer nearby businesses in suburban neighborhoods than in traditional neighborhoods (Table 15). Regardless of the exact dynamic responsible for this effect, we know that these parameters contribute to traditional-neighborhood residents' higher levels of neighborhood satisfaction because their addition makes the traditional-neighborhood indicator insignificant. (If we add the traditional-neighborhood indicator to the pooled-model specification in Table 16 that contains neighborhood characteristics, but no segment-specific coefficients, its coefficient remains marginally significant, with $p = 0.082$. Only the addition of the segment-specific coefficients makes it insignificant.)

Since there are no neighborhood attributes that are only significant as suburban-specific variables, we might question whether our data set has captured the types of factors that suburban residents value but that traditional-neighborhood residents do not, helping to explain suburbanites' decisions to live where they do. On the other hand, the absence of any characteristics uniquely valued by suburbanites helps to explain their lower overall neighborhood satisfaction levels. This leads us to question why suburban residents are more likely to live in neighborhoods that aren't as satisfying, even after controlling for respondent attributes that presumably contribute to their ability to purchase and find their preferred residential environments, that is, income-level and age, respectively. Income and age *do* matter for neighborhood satisfaction, but seemingly to an equal extent in both neighborhood types.[8] This confirms that the differences in satisfaction levels across neighborhood types are not due to these attributes.

Therefore, it seems logical to conclude that suburban residents either choose their neighborhoods for reasons other than neighborhood characteristics—such as housing, or other attributes not covered in our data set—or that they have more of a tendency to become less well matched to their neighborhoods over time, as suggested by the finding in the sociodemographics-only model that tenancy is negatively associated with satisfaction among suburban residents. For example, perhaps suburbs have changed more noticeably over the course of residents' tenancy than have traditional neighborhoods over the same period. This might be conceivable because, as newer

[8] Even though the coefficient for the age variable showed statistically significant variation across segments in the suburban specification shown in Table 16 ($p = 0.038$), no significant differences were found across segments using the specification in Table 17, $p = 0.640$).

neighborhoods, suburbs may develop congestion or other changes as they mature, whereas, as older neighborhoods, traditional neighborhoods may have long-ago stabilized with whatever features they have. Another explanation might be due to residents' reasons for moving into and out of suburban versus traditional neighborhoods, which could result in more of a tendency to linger in suburban neighborhoods past the "optimal" time. For example, suburban residents might reason, "This neighborhood doesn't work for *me* anymore, but we should wait until the kids move out before we move," or "This neighborhood doesn't really work for us anymore now that the kids are out of the house, but we haven't gotten around to moving yet," which contrasts with the impetus of starting a family, which is thought to provide a pressing motivation for some to move out of a traditional neighborhood and into a suburb. None of these effects would be captured by the types of variables we have considered for inclusion in the model.

## Chapter 3. Neighborhood type and travel

The previous chapter explored differences in preferences about neighborhood attributes, among residents of traditional versus suburban neighborhoods. This chapter explores a different aspect of individual preferences and neighborhood type, in particular examining the relationship between residential self-selection and travel behavior: To what extent are observed differences in travel patterns across neighborhood types due to environmental effects, as it may seem, or due to pre-existing travel preferences? This question has been the focus of much previous work (see e.g. Cao, et al. 2006; Handy 2005). It is of interest because it offers an alternate explanation for the observed association between neighborhood type and travel, with more driving and less walking in suburban neighborhoods than in traditional or urban neighborhoods. This issue is relevant for transportation policy because it has bearing on the efficacy of land use policies intended to shape travel choices (as mentioned e.g. in Cao, et al. 2006; Handy, et al. 2006). For example, if planners implement policies resulting in more traditional-style neighborhoods, to what extent can we expect driving levels to decline or walking levels to increase?

In the current study, we offer an additional dimension to the self-selection question by asking to what degree the role of the built environment relative to self selection differs in its effect on travel in contrasting neighborhood types? In particular, is the built environment equally important in determining travel behavior in suburban versus traditional neighborhoods? Are there different implications for driving versus for walking? As with more general research on the role of the built environment, the answers to these questions can help inform travel modeling, in this case offering

insights as to whether the built environment is differentially influential in different types of neighborhoods. In addition, another motivation for exploring the role of the built environment versus self selection by neighborhood type is that the degree of correspondence between travel preferences and realized travel behavior in different neighborhood types is one metric on which to evaluate how well different neighborhood designs meet residents' needs.

### 3.1. Previous studies

Previous studies have produced mixed evidence as to the relative roles of the built environment and self-selection in determining travel. One reason that a conclusive answer to the self-selection question remains elusive is that it requires that researchers establish causality, which is difficult. Furthermore, it is conceivable that there are multiple causal connections at work, and that causality is bidirectional. For example, travel preferences and residential location may independently and directly affect travel behavior. In addition, travel preferences may affect residential location and conversely residential location may influence travel preferences. Furthermore, preferences may change over time in response to past choices, that is, particular travel behaviors may influence travel preferences. For this reason, habits established in a given built environment may be self-reinforcing (see Cao, et al. 2006).

In general, proof of causality (for any one of these causal connections) requires not only statistical association, but also nonspuriousness, time precedence, and the identification of a causal mechanism (Singleton and Straits 1999). Previous studies have met these requirements to varying degrees, using methods such as direct questioning, statistical controls, instrumental variables models, sample selection and

other joint models, and longitudinal designs (Cao, et al. 2006). Differing methodologies may be one reason for differing results in previous work. Even so, most studies suggest that the built environment does have some influence on travel, even after accounting for self selection and attitudes (as reviewed in Cao, et al. 2006).

Using the same data analyzed for the current study, Handy, et al. (2005) and Handy, et al. (2006) estimate models of walking, strolling, and vehicle-miles driven, both cross-sectionally and accounting for changes in the built environment caused by residential relocation in a quasi-longitudinal analysis. While the cross-sectional analysis suggests that attitudes are more important than the built environment in determining miles driven, the quasi-longitudinal analysis of miles driven, and both the cross-sectional and quasi-longitudinal analysis of walking levels suggest that both attitudes and the built environment play a role.

However, it is not clear from this work whether there are differences in the role of the built environment in the two neighborhood types. To our knowledge, the only previous work that compares the role of the built environment on travel behavior across neighborhood types is that by Schwanen and Mokhtarian (2003, 2005a, 2005b), comparing suburban and urban neighborhoods in the San Francisco Bay Area. They find that with respect to trip frequency (2003), distance driven (2005b), and commute mode (2005a), the built environment has a stronger effect than does self-selection in suburban neighborhoods, but that their roles are more balanced in urban neighborhoods.

### 3.2. In this study

In this chapter we use a method similar to that introduced by Schwanen and Mokhtarian (2004), who compare the travel behavior of residentially matched and mismatched

individuals. In particular, Schwanen and Mokhtarian (2003, 2004, 2005a, 2005b) classify suburban-dwelling and urban-dwelling survey respondents according to their preference for a more or less dense/diverse neighborhood than the one in which they currently live. They then use individuals' mismatch status as an explanatory variable in cross-sectional travel models.

By contrast, in the current study, using the same dataset as in Chapter 2, we classify survey respondents according to their travel preferences, and examine the extent to which these preferences are realized in contrasting neighborhood types, using descriptive techniques only. We use a simple two-by-two factorial design, measuring levels of travel among the four groups of respondents who either live in a suburban or a traditional neighborhood, and either have positive or negative preferences for a given mode of travel. In particular, we focus on levels of driving among residents who like and don't like driving, and on levels of walking among residents who like and don't like walking, across the two neighborhood types. Assuming the groups of respondents are otherwise similar, this setup helps isolate the associations between neighborhood type versus travel preferences and travel behavior.

However, because the methods of analysis in this section fall short of providing evidence on any but the "association" requirement for demonstrating causality, only tentative inferences can be made. Although the motivation for this study has been described in terms of the causal effect of the built environment versus self-selection on travel behavior, the method of analysis does not allow us to prove the direction of causality; rather we can only indicate association. In addition, because other determinants of travel have not been controlled for in a multivariate model, such as

sociodemographic characteristics and other attitudes, we cannot rule out that such elements also influence differences observed. Finally, because our analysis is only cross-sectional, we also do not take into account the effects of time, for example, in reinforcing existing habits. The value of the analysis is in providing tentative new evidence on differences in the role of the built environment in suburban versus traditional neighborhoods, an issue not yet addressed in the previously published models using this data set. Based on Schwanen and Mokhtarian's results (2003, 2005a, 2005b), we hypothesize that the suburban neighborhoods have a stronger homogenizing effect on travel behavior than do traditional neighborhoods, which offer more choices.

### 3.3. Driving behavior by driving preferences and neighborhood type

We classify all respondents into two groups, those who like driving and those who do not like driving. These categorizations are determined based on survey responses to the statement "I like driving," which were indicated on a five-point scale from "strongly disagree" to "strongly agree." For the purposes of this analysis, we categorize all those who indicate "agree" or "strongly agree" as liking driving, and all those who indicate "strongly disagree" or "disagree" as not liking driving. We discard all "neutral" responses, which amount to 182 and 228 responses, or 24 and 26 percent of the total suburban and traditional samples, respectively. This leaves us with the sample shown in Table 18.

**Table 18. Number of respondents by neighborhood type and "like-driving" preference**

| | *Suburban* | | *Traditional* | | *Total* | |
|---|---|---|---|---|---|---|
| *Preference category* | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| Doesn't like driving | 84 | 14.6% | 162 | 24.6% | 246 | 19.9% |
| Likes driving | 493 | 85.4% | 497 | 75.4% | 990 | 80.1% |
| Total | 577 | 100.0% | 659 | 100.0% | 1,236 | 100.0% |

Note that in this sample most people like to drive (80 percent), but the share that likes driving is significantly higher among the suburban-neighborhood than among the traditional-neighborhood respondents (85 percent versus 75 percent, with $p = 0.000$).

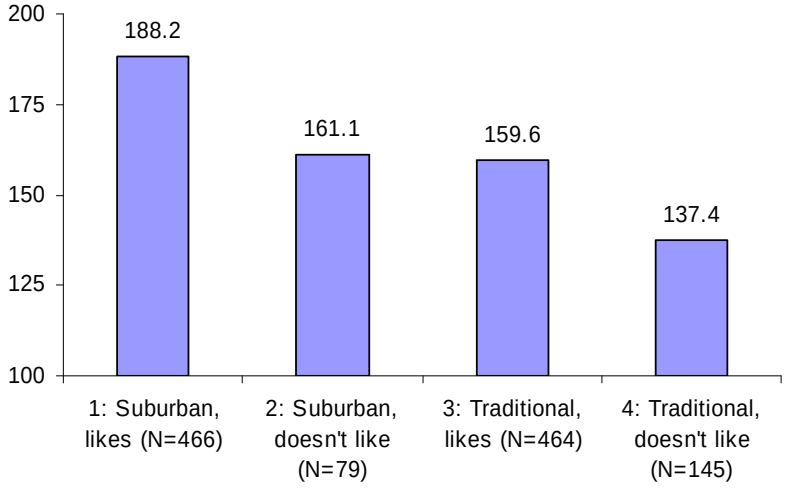
Next we compare amounts of driving for each of these groups. Driving levels are measured in two different ways, one based on miles driven and the other based on numbers of trips taken. First we measure miles driven using respondents' self-reported estimates in response to the question, "Approximately how many miles do ***you*** drive in a typical week (including weekends)?" [9] Respondents reported driving an average of 161 miles per week, but suburban residents report significantly higher average mileage than do traditional-neighborhood respondents, and residents who like driving reported higher mileage than those who do not. (Suburban drivers reported 176 miles per week on average compared with 148 among traditional-neighborhood respondents; a test of equivalence of means produces $p = 0.001$. Those who like driving report driving 174 miles compared to 146 miles for those who do not; a test of equivalence of means produces $p = 0.022$.) Thus, on average, both suburban-neighborhood type and a preference for driving are associated with higher levels of vehicle-miles driven.

The question is, How much driving is done by people who have the same driving preferences, but live in different neighborhood types? We hypothesize that the most driving will be done by those who live in suburban neighborhoods and like driving, while the least will be done by those who live in traditional neighborhoods and who do not like driving. For the relative amounts of driving among the other two groups, if the built environment has a strong effect, then, all else equal, the suburban residents who

[9] Six respondents (out of 1,589) reported values greater than 1,000 miles per week, which were deemed infeasible and therefore recoded to a value of 1,000.

don't like driving will still drive more than the traditional-neighborhood residents who do like driving. We note that any differences we do find may be conservative, due to the fact that our measure does not take into account intervening preferences, such as those who like driving, but voluntarily curtail the number of miles they drive for environmental concerns.

**Figure 2. Weekly vehicle-miles driven, by neighborhood type and "likes-driving" preference**




The average numbers of miles driven per week in each group is presented in Figure 2, which shows that the relative levels of driving roughly match our expectations. We use ANOVA and *t*-tests on a logged version of the dependent variable to assess whether the differences across all groups and between each pair of groups are statistically significant (results shown in Table 19).[10] The results indicate that preference for driving

[10] Because ANOVA requires normality of the dependent variable within each group, especially with unequal group sizes, we first transform the otherwise skewed VMD variable using its natural log. Using logged VMD, a Kolmogorov-Smirnov test for normality (with Lilliefors Significance Correction) still fails (we reject the null hypothesis of normality, with $p < 0.05$), both overall and within the four groups of respondents. However, the K-S test is very conservative, and plots of the logged VMD appear much closer to normal than do VMD, both overall and within each of the four groups. Based on these plots and because ANOVA is somewhat robust to departures from normality (Kutner, et al. 2004), we assume this transformation is sufficient. In addition, Levene's test suggests homogeneity of variances within each category (we fail to reject null hypothesis of equality with $p = 0.266$). Thus we use ANOVA for this

has no significant relationship with driving levels within suburban neighborhoods, but does have a significant relationship with driving levels within traditional neighborhoods. In addition, among those who like driving, suburban residents drive more. And suburban residents who don't like driving still drive more miles than traditional-neighborhood residents who don't like driving, but about the same as traditional-neighborhood residents who like driving. Overall, these results are consistent with those presented by Schwanen and Mokhtarian (2003, 2005a, 2005b).

**Table 19. Results of tests for differences in (logged) vehicle-miles driven across neighborhood-type and driving-preference groups**

| *Comparison* | *Description* | *p-value*[a] | *N* |
|---|---|---|---|
| All groups | | 0.000 | 1154 |
| Group 1 vs. 2 | Suburban: likes driving vs. doesn't like driving | 0.247 | 545 |
| Group 3 vs. 4 | Traditional: likes driving vs. doesn't like driving | 0.015 | 609 |
| Group 1 vs. 3 | Likes driving: suburban vs. traditional | 0.000 | 930 |
| Group 2 vs. 4 | Doesn't like driving: suburban vs. traditional | 0.023 | 224 |
| Group 2 vs. 3 | Suburban, doesn't like vs. traditional, does like driving | 0.418 | 543 |

[a] *P*-value is for ANOVA *F*-test for equivalence in means across all groups, and for *t*-test for equivalence of means between each pair of groups.

One interpretation of these results is that suburban environments have a homogenizing effect on driving behavior—those who like driving and don't like driving both end up driving the same number of miles, on average, when living in a suburban neighborhood. In contrast, there is a statistically significant difference in miles-driven among traditional-neighborhood residents according to their driving preferences, with those who report that they don't like driving traveling 14 percent fewer miles per week, on average.

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analysis. Reassuringly, we find that Welch's test for equality of means and Brown & Forsythe's test for equality of means, thought to be more robust with unequal sample sizes across groups, produce similar results.

The contrasting results found in the suburban and traditional neighborhoods is particularly remarkable given the fact that average trip length is likely longer (in terms of miles) in the suburbs than in the traditional neighborhoods, due to the lower-density development patterns found there (as shown in Table 15). This means that on average, if a suburban respondent takes additional trips, it would add more miles to his weekly average than if a traditional-neighborhood resident takes additional trips. Based on this reasoning, we expect that differences in miles found in suburbs would tend to magnify differences in numbers of trips among suburban residents, and that differences in miles found in traditional neighborhoods would tend to understate differences in numbers of trips among traditional residents. This suggests that our findings are conservative. Alternatively, the types of trips taken at the margin—that is, discretionary trips that might be most influenced by travel preference—may be shorter than obligatory trips such as the commute to work. If the obligatory trips dominate respondents' overall total mileage, assessing driving levels using vehicle-miles driven may hide the effects of driving preferences on suburban levels of trip-making.

Therefore, to further explore the effect of preferences on numbers of trips, we consider an additional measure of driving level based on responses to the question, "In a ***typical month with good weather***, how often do you ***drive or ride as a passenger in a private vehicle*** (car, van, SUV, pick-up, motorcycle) from your home to . . . a store or place to shop?" Respondents answered on a six-point scale, ranging from "Never" to "Two or more times per week." For the purposes of this analysis, we consolidate the first five categories, creating a binary distinction between those who drive once a week

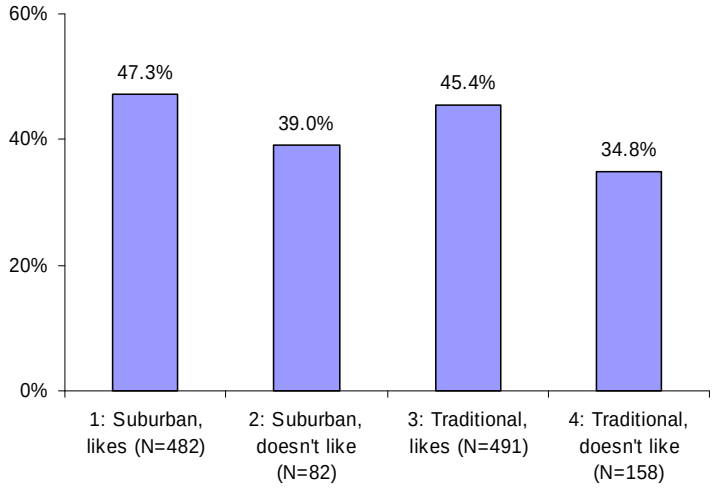
or less, versus those who drive two or more times per week to a store. The frequency of responses by neighborhood type is shown in Table 20.

**Table 20. Distribution of responses to question on frequency of drives to store, by neighborhood type**

| *Frequency* | *Suburban* | *Traditional* | *Total* |
|---|---|---|---|
| Once per week or less (consolidated) | 412 | 499 | 911 |
| Never | 56 | 46 | 102 |
| Less than once per month | 27 | 24 | 51 |
| Once or twice a month | 42 | 71 | 113 |
| About once every 2 weeks | 59 | 81 | 140 |
| About once per week | 228 | 277 | 505 |
| Two or more times per week | 345 | 377 | 722 |
| *Total* | 757 | 876 | 1633 |

Overall, 44 percent of the sample reports that they typically drive to the store twice a week or more, with no significant difference in this share across neighborhood types (a *t*-test produces $p = 0.304$). However, respondents who report liking driving are statistically significantly more likely to report higher frequencies of trips, with 46 percent of those who like driving reporting at least twice-weekly driving trips to the store versus 36 percent among those do not like driving (a $\chi^2$ test produces $p = 0.005$). Thus, based on this metric of driving levels, driving preference contributes to higher levels of driving, but neighborhood type does not. The question remains as to whether this holds to an equal extent in the two neighborhood types, for which we turn to the results on the share reporting twice-weekly driving trips in each of the four groups, shown in Figure 3.

**Figure 3. Share of residents who report making at least twice-weekly driving trips to a store in a typical month with good weather, by neighborhood type and "likes-driving" preference**




Using $\chi^2$ tests to evaluate whether there are significant differences across groups, we find the only differences exist between residents who like versus don't like driving, living in a traditional neighborhood (Table 21). There are no significant differences by driving preference among those living in suburban neighborhoods, providing further evidence that the suburban environment has a homogenizing effect on travel behavior. That is, environment overrides preferences in the suburbs, or does not enable the realization of preferences. In contrast, those living in traditional neighborhoods who don't like driving find ways to make fewer driving trips. Interestingly, we also find that for those who like driving, there is no significant difference in the frequency of driving trips among those living in suburban versus traditional neighborhoods. This suggests that placing an auto-prone person in a traditional neighborhood may not reduce number of driving trips (although it may lower VMD, as shown in Figure 2 and Table 19). Meanwhile, putting a non-auto-prone person in a suburban environment may increase her driving, suggesting that driving levels can decrease by building enough traditional

neighborhoods to satisfy demand. In the next section we explore whether similar patterns hold for walking levels.

**Table 21. Results of tests for differences in share of respondents making at least twice-weekly driving trips to the store, across neighborhood-type and driving-preference groups**

| *Comparison* | *Description* | *p-value*[a] | *N* |
|---|---|---|---|
| All groups | | 0.034 | 1213 |
| Group 1 vs. 2 | Suburban: likes driving vs. doesn't like driving | 0.164 | 564 |
| Group 3 vs. 4 | Traditional: likes driving vs. doesn't like driving | 0.281 | 573 |
| Group 1 vs. 3 | Likes driving: suburban vs. traditional | 0.019 | 649 |
| Group 2 vs. 4 | Doesn't like driving: suburban vs. traditional | 0.555 | 973 |
| Group 2 vs. 3 | Suburban, doesn't like vs. traditional, does like driving | 0.520 | 240 |

[a] *P*-value is for $\chi^2$ test for independence of driving-level distribution from neighborhood-type/driving-preference distribution.

## 3.4. Walking levels by walking preferences and neighborhood type

In this section we conduct a similar analysis for walking preferences and walking behavior. Because many people report liking to walk, but do not necessarily choose to walk as a means of transportation very often, we consider two different sets of responses by which to judge walking preferences. First, we categorize respondents into two groups similar to the groups formed for the driving preferences: those who like walking and those who don't like walking, based on responses on a five-point scale to the statement, "I like walking." Again, we discard all "neutral" responses, which amount to 168 and 105 responses, or 22 and 12 percent of the total suburban and traditional samples, respectively. As shown in Table 22, according to this metric, many more people (93 percent) report liking walking than not liking walking (7 percent). For this reason, we also consider a more stringent assessment of walking preferences, based on responses to the statement, "I prefer to walk rather than drive whenever possible." We discard all neutral responses, which are 212 and 208 responses, or 28 and 23

percent of the total suburban and traditional samples, respectively. The distribution of responses for this statement is much more balanced than for the "like-walking" statement, with about 45 percent of the sample indicating a negative response (Table 22). Note that traditional-neighborhood respondents are more likely than suburban respondents to report that they like walking (a $\chi^2$-test of independence of like-walking and neighborhood-type produces $p = 0.029$) and that they prefer walking over driving (a $\chi^2$-test of independence of prefer-walking and neighborhood-type produces $p = 0.000$).

**Table 22. Number of respondents by neighborhood and walking preference**

| *Preference category* | *Suburban* | *Traditional* | *Total* |
|---|---|---|---|
| *Based on "I like walking"* | | | |
| Doesn't like walking | 50 | 43 | 93 |
| Likes walking | 539 | 739 | 1278 |
| Total | 589 | 782 | 1371 |
| *Based on "I prefer to walk rather than drive whenever possible"* | | | |
| Doesn't prefer walking to driving | 314 | 243 | 557 |
| Prefers walking to driving whenever possible | 236 | 436 | 672 |
| Total | 550 | 679 | 1229 |

Next we compare amounts of walking for each of these groups using respondents' write-in answers to the question, "How many times in the last 30 days did you walk from your residence to a local store or shopping area?" Because these responses are heavily skewed to the left, with 40 percent of respondents reporting zero, and 50 percent reporting one or fewer, we collapse these responses into just two categories: whether or not the respondent walked at least once in the last 30 days. The share that has done so is about 43 percent among suburban respondents and 75 percent among traditional-neighborhood respondents, clearly a significant difference by neighborhood type (a $\chi^2$ test confirms this, with $p = 0.000$). In addition, we find that a preference for walking, using either measure of walking preferences, is also associated with a greater

probability of having chosen to walk at least once. (On average, 68 percent versus 27 percent walked among those who like walking versus don't like walking, respectively; and 79 percent versus 38 percent walked among those who prefer walking to driving versus those who don't; $\chi^2$ tests are statistically significant with $p = 0.000$ in each case.) Thus both liking to walk and living in a traditional neighborhood are associated with higher chances of having walked to the store at least once in the last 30 days.

Next we compare walking levels among all four possible combinations of like-walking preference and neighborhood type, as well as among all four combinations of walking-preferred-to-driving preference and neighborhood type. Again we hypothesize that the highest shares of walking occur among respondents who have a positive attitude toward walking and live in a traditional neighborhood and that the lowest shares of walking occur among suburban residents who have negative attitudes toward walking. Results are shown in Figure 4 and Figure 5.

**Figure 4. Share of respondents walking to a store at least once in the last 30 days, by neighborhood type and "like-walking" preference**

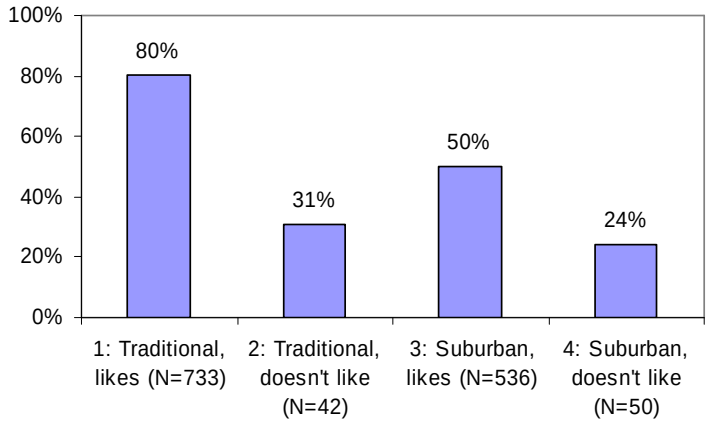
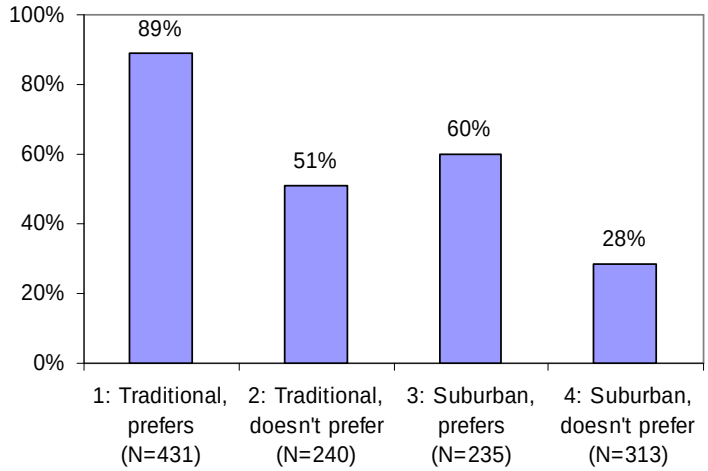


**Figure 5. Share of respondents walking to a store at least once in the last 30 days, by neighborhood type and "walking-preferred-to driving" preference**




We test for significant differences across groups using $\chi^2$ tests, finding that a preference for walking is associated with higher levels of walking in both neighborhood types (Table 23). Furthermore, among residents who don't like walking (based on the "I like walking" statement), there is no difference in propensity to walk in the two neighborhood types. This suggests that for those who really don't like walking, neither neighborhood type forces them to do it. However, among residents who sometimes prefer driving to walking the traditional-neighborhood residents are more likely to have walked than the suburban residents. This provides evidence that traditional neighborhoods are more conducive to walking for those who are on the fence. Finally, we note that walking preference dominates neighborhood type in the comparison between walking levels of traditional-neighborhood residents who don't like walking versus suburban residents who do: the suburban residents are significantly more likely to have walked.

**Table 23. Results of tests for differences in the probability of walking, across neighborhood-type and walking-preference groups**

| *Groups based on responses to "I like walking"* | *p-value*[a] | *N* |
|---|---|---|
| All groups | 0.000 | 1361 |
| Traditional: likes walking vs. doesn't | 0.000 | 775 |
| Suburban: likes walking vs. doesn't | 0.000 | 586 |
| Traditional, doesn't like vs. suburban does like | 0.017 | 578 |
| Likes walking: traditional v. suburban | 0.000 | 1269 |
| Doesn't like walking: traditional vs. suburban | 0.455 | 92 |

| *Groups based on responses to "I prefer to walk rather than drive whenever possible"* | *p-value*[a] | *N* |
|---|---|---|
| All groups | 0.000 | 1219 |
| Traditional: prefers walking over driving vs. doesn't | 0.000 | 671 |
| Suburban: prefers walking vs. doesn't | 0.000 | 548 |
| Traditional, doesn't prefer vs. suburban prefers | 0.045 | 475 |
| Prefers walking: traditional v. suburban | 0.000 | 666 |
| Doesn't prefer walking: traditional vs. suburban | 0.000 | 553 |

[a] *P*-value is for $\chi^2$ test for independence of walking-level distribution from neighborhood-type/walking-preference distribution.

Thus, these results suggest that in contrast to driving, residents in both neighborhood types are able to realize their walking preferences regardless of neighborhood type. In addition, we find support for a touted advantage of traditional neighborhoods in that they appear to be more conducive to walking for those who might sometimes choose to drive over walking. However, these results also suggest that placing someone who does not like to walk in a traditional neighborhood will not affect his walking patterns.

With respect to the hypothesis established at the outset, the results seem to confirm that suburban neighborhoods have a greater homogenizing effect on travel, but only with respect to driving. Suburban neighborhoods seem to require a certain amount of driving, regardless of residents' preferences for driving. In contrast, traditional neighborhoods allow residents to adjust their driving levels more according to their preferences. However, contrary to expectations, both traditional- and suburban-

neighborhood residents show signs of varying their walking levels according to their walking preferences—that is, even suburban residents who like walking find ways to do it, but not to the same degree as do traditional-neighborhood residents.

# Chapter 4. Conclusions

The inspiration for this report is the debate among urban planners as to whether there are ways to extricate some of the environmentally and socially costly aspects of suburban development, such as those associated with auto-dependence, from other attractive features of the suburbs. In particular, can New Urbanist development attract former suburbanites, and does it fulfill an implied (if not expressed) promise of reduced auto dependence? To answer this question, we evaluate what suburban-dwelling versus traditional-neighborhood residents want in a neighborhood, by using survey data to estimate which neighborhood characteristics contribute significantly to their sense of satisfaction with their neighborhoods. Second, we classify survey respondents according to their travel preferences, and examine the extent to which these preferences are realized in suburban versus traditional neighborhoods.

### *What do suburban- versus traditional-neighborhood residents want in a neighborhood?*

We find that the neighborhood features contributing most to resident satisfaction are the same among suburban- and traditional-neighborhood dwellers, indicating that differences in preferences may not be as entrenched as differing residential choices might otherwise suggest. Perceptions of attractiveness (overall appearance, upkeep, architectural variety, big trees) and perceptions of safety (quiet, low crime, low traffic, safe for kids' playing) are the most important determinants of neighborhood satisfaction in both neighborhood types, after controlling for sociodemographic characteristics. On the other hand, there are some differences across neighborhood types. The number of businesses near home and features relating to socializing (including diversity, lots of

people out and about, interaction among neighbors) contribute to traditional-neighborhood residents' satisfaction but not to suburban-neighborhood residents'. While this may be due to the absence of these features in the suburbs, this result is also consistent with the conclusion that suburban dwellers are indeed uninterested in some of the perquisites often ascribed to traditional neighborhoods.

Perhaps a more interesting finding than whether suburban- and traditional-neighborhood dwellers value the same neighborhoods features is evidence that in general, the neighborhood seems less important to suburban dwellers in their decision to stay in the suburbs. We reach this conclusion based on three different pieces of evidence. First, we find no neighborhood features that are uniquely important to suburban satisfaction. Notably, although suburban dwellers give higher importance scores, on average, to characteristics relating to safety and to outdoor spaciousness (yard size and parking), we find that once other features are accounted for, safety contributes just as meaningfully among traditional-neighborhood residents, and that outdoor spaciousness does not contribute significantly to resident satisfaction among those living in either type of neighborhood. Therefore, except to the extent that residents' perceptions of what is "safe" differ, neither the importance placed on safety nor a preference for yards and parking ultimately distinguish suburban preferences from those of people who have chosen traditional neighborhoods.

While it is possible that our analysis has failed to capture the attributes that would help explain why suburbanites like their neighborhoods, a second piece of evidence suggests that this is not so: We find that overall neighborhood satisfaction is lower, on average, among suburban dwellers, even after controlling for income, age, and other

sociodemographics that might affect residents' ability to secure a satisfying residential environment. This means that, for whatever reason, suburban residents choose to be in neighborhoods that are less satisfying than do their traditional-neighborhood counterparts. Several explanations can make sense of this, including that suburban homes are chosen for reasons other than suburban neighborhoods, as previously mentioned, or that suburbanites may not be able to find neighborhoods that better fit their preferences (for example, they may be even *less* satisfied if they were to move to a traditional neighborhood). Another explanation arises out of a third piece of evidence: Length of tenancy is associated with higher levels of satisfaction in traditional neighborhoods, but lower levels in suburban neighborhoods, meaning that the longer someone has lived in the suburbs, the less satisfied he is, after controlling for other sociodemographic characteristics such as age and income (which are associated with satisfaction in both neighborhood types). This suggests that suburban satisfaction levels are low because neighborhood preferences diverge from neighborhood characteristics over time. This may be because preferences change—parents have outgrown a suburban neighborhood, but are waiting to move until the kids move out, or the kids have already moved out, but the parents haven't gotten around to moving yet—or because the neighborhoods change, perhaps with more congestion and crowds than when the neighborhood was new and the family first moved there. Whatever the mechanism, it does not seem to be occurring to the same degree among those in traditional neighborhoods.

### *If we build New Urbanist developments, will people give up their cars and start walking?*

According to tentative evidence from this report the answer is, Not necessarily, but they may drive fewer miles and some may walk more. In particular, among those who indicate that they like driving, the frequency of driving trips is just as high among those living in traditional neighborhoods as those living in suburban neighborhoods, but the overall number of miles driven is lower. We also find evidence that, on average, only in traditional neighborhoods do those who do not like driving actually make fewer driving trips than those who like driving. With respect to walking, those who are anti-walking do not walk any more when they are living in a traditional neighborhood; but among those with moderate walking preferences (who sometimes prefer driving to walking), living in a traditional neighborhood *is* associated with higher levels of walking.

Therefore, if we build New Urbanist developments and people choose to live there rather than in suburban neighborhoods, residents who don't like driving won't get in their cars as often, and those who do like driving will still get in their cars, but they will not travel as many miles for the average trip, presumably because destinations are closer. In addition, New Urbanist developments will not make people walk who don't like to walk, but those with moderate walking preferences will walk more.

### *Policy implications and future research*

Our results suggest that if communities designed according to New Urbanist principles were particularly designed to create a sense of safety and attractiveness, they would be more likely to lure suburban residents (as well as traditional-neighborhood residents). At the same time, we find that suburban residents choose to live in suburban

neighborhoods despite the fact that they may not be satisfied there. If this is because there is not enough incentive to relocate once a household has grown out of its neighborhood (or vice versa), policies to encourage relocation, or to diminish the barriers to relocating, may be an effective strategy for enticing suburbanites to New Urbanist neighborhoods. However, because questions remain as to what motivates suburban-neighborhood location—a process not well captured by the models in this report—a more comprehensive understanding of residential location choices is necessary in order to design communities that satisfy preferences while achieving societal goals. In particular, while we have presented some evidence as to which characteristics matter to neighborhood satisfaction, is not clear to what degree neighborhood satisfaction and other factors matter for residential choice.

In addition, the interaction between perceptions of and preferences for neighborhood characteristics has not been fully explored. For example, it is possible that the longer a resident lives with a particular characteristic or travel habit, the more she comes to prefer it. It is also possible that she comes to prefer it less the longer she lives with it. At the same time, it is also possible that preferences influence the way that residents perceive the characteristics of their neighborhood. Again, this could work both ways: A resident who prefers a particular characteristic might perceive more of that characteristic than others do (a glass-half-full reaction) or less of that characteristic than others do (a glass-half-empty reaction). These interactions will influence satisfaction and may lead to growing or declining satisfaction over time.

With respect to travel behavior, if the purpose of New Urbanist neighborhoods is to reduce vehicle-miles traveled, it may work to some extent. But if the goal is to reduce

the number of auto trips or to convince everyone to walk more, it may not work as well, especially among those who like driving and among those who don't like walking, respectively. From the perspective of planning to increase residents' satisfaction, to the extent that traditional neighborhoods make it easier for residents to bring their travel preferences in line with their actual travel behavior (those who like driving drive more, those who don't drive less, and similarly for walking), traditional neighborhoods may offer more flexibility, providing one rationale for planners to either encourage the development of traditional neighborhoods or at least remove restrictions on their formation. However, in assessing whether suburban or traditional neighborhoods are more likely to satisfy the public, more information is needed on the relative size of the markets studied (those who like walking versus those who don't, and those who like driving versus those who don't). In addition, as explored in Chapter 2, other aspects of neighborhood type may be more important for residents' sense of satisfaction than those relating to travel. Finally, the reader should keep in mind the tentative nature of the travel-behavior results presented, due the fact that the method of analysis is cross-sectional and descriptive only.

Clearly, both residential choice locations and the determinants of travel are complicated dynamics to model and understand. This report shows that an important step in understanding these dynamics is to understand how these dynamics might differ across residents of different neighborhood types. This issue should be further explored within the growing body of literature on residential choice and the relationship between the built environment and travel behavior.

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## Appendix: Summary of results from previous studies on the determinants of neighborhood satisfaction

| *Explanatory variables found to be significant*[a] | *Sample studied* |
|---|---|
| *Physical environmental conditions* | |
| Housing quality | 60 U.S. metropolitan areas (Lee and Guest 1983); Single mothers in Twin Cities suburbs (Cook 1988); Gated community in Sao Paulo, Brazil (Carvalho et al. 1997); New York City (Miller, et al. 1980); U.S. nationwide sample (Campbell, et al. 1976); Pittsburgh, PA (Ahlbrandt 1984) |
| Type of housing unit | 11 counties in North Carolina (Gruber and Shelton 1987) |
| Property value | U.S. nationwide sample (Lu 1999) |
| Upkeep / attractiveness | U.S. nationwide sample (Campbell, et al. 1976); Ireland nationwide sample (Davis and Davis 1981); Inner-city New Orleans (Basolo and Strong 2002); Single mothers in urban Twin Cities neighborhoods (Cook 1988); 11 counties in North Carolina (Gruber and Shelton 1987); 11 counties in North Carolina (Gruber and Shelton 1987); New York City (Miller, et al. 1980) |
| Noise | New York City (Miller, et al. 1980); U.S. nationwide sample (Campbell, et al. 1976); Single mothers in urban Twin Cities neighborhoods (Cook 1988); Single mothers in Twin Cities suburbs (Cook 1988); 11 counties in North Carolina (Gruber and Shelton 1987) |
| Traffic / parking | Ireland nationwide sample (Davis and Davis 1981); 11 counties in North Carolina (Gruber and Shelton 1987) |
| Density in neighborhood / lot size | U.S. nationwide sample (Campbell, et al. 1976); 11 counties in North Carolina (Gruber and Shelton 1987) |
| City size | 60 U.S. metropolitan areas (Lee and Guest 1983); U.S. nationwide sample (Campbell, et al. 1976) |
| Climate | U.S. nationwide sample (Campbell, et al. 1976) |
| *Locational characteristics* | |
| Location in city | Gated community in Sao Paulo, Brazil (Carvalho et al. 1997) |
| Access to shopping | Single mothers in suburban Twin Cities (Cook 1988) |
| Proximity to work | Gated community in Sao Paulo, Brazil (Carvalho et al. 1997) |
| *Local services and facilities* | |
| Transportation | Ireland nationwide sample (Davis and Davis 1981) |
| Public services | Pittsburgh, PA (Ahlbrandt 1984); Inner-city New Orleans (Basolo and Strong 2002); 11 counties in North Carolina (Gruber and Shelton 1987) |
| Included amenities | Gated community in Sao Paulo, Brazil (Carvalho et al. 1997) |
| Recreation | 11 counties in North Carolina (Gruber and Shelton 1987) |

| | |
|---|---|
| Schools | Single mothers in Twin Cities suburbs (Cook 1988); 60 U.S. metropolitan areas (Lee and Guest 1983); U.S. nationwide sample (Campbell, et al. 1976) |
| *Sociocultural environment* | |
| Whether in public housing | U.S. nationwide sample (Lu 1999) |
| Use of neighborhood facilities | Pittsburgh, PA (Ahlbrandt 1984) |
| Neighbors and social ties | Inner-city New Orleans (Basolo and Strong 2002); Marshalltown and Fort Dodge, Iowa (Bruin and Cook 1997); Single mothers in urban Twin Cities neighborhoods (Cook 1988); Single mothers in Twin Cities suburbs (Cook 1988); New York City (Miller, et al. 1980); U.S. nationwide sample (Campbell, et al. 1976); Ireland nationwide sample (Davis and Davis 1981); Pittsburgh, PA (Ahlbrandt 1984); Inner-city New Orleans (Basolo and Strong 2002); 11 counties in North Carolina (Gruber and Shelton 1987) |
| Feeling of safety and security | Inner-city New Orleans (Basolo and Strong 2002); Marshalltown and Fort Dodge, Iowa (Bruin and Cook 1997); Gated community in Sao Paulo, Brazil (Carvalho et al. 1997); Single mothers in urban Twin Cities neighborhoods (Cook 1988); Single mothers in Twin Cities suburbs (Cook 1988); New York City (Miller, et al. 1980); U.S. nationwide sample (Campbell, et al. 1976); Ireland nationwide sample (Davis and Davis 1981); Inner-city New Orleans (Basolo and Strong 2002); 11 counties in North Carolina (Gruber and Shelton 1987) |
| Exclusivity | Gated community in Sao Paulo, Brazil (Carvalho et al. 1997) |
| *Personal characteristics of respondents* | |
| Homeownership | U.S. nationwide sample (Lu 1999); Pittsburgh, PA (Ahlbrandt 1984) |
| Employment | Single mothers in Twin Cities suburbs (Cook 1988); U.S. nationwide sample (Campbell, et al. 1976) |
| Length of tenancy | Rome, Italy (Bonnes et al. 1991); U.S. nationwide sample (Lu 1999); U.S. nationwide sample (Campbell, et al. 1976); Pittsburgh, PA (Ahlbrandt 1984) |
| Income | U.S. nationwide sample (Lu 1999); U.S. nationwide sample (Campbell, et al. 1976); Ireland nationwide sample (Davis and Davis 1981); Pittsburgh, PA (Ahlbrandt 1984) |
| Education | 60 U.S. metropolitan areas (Lee and Guest 1983); U.S. nationwide sample (Lu 1999); U.S. nationwide sample (Campbell, et al. 1976); Ireland nationwide sample (Davis and Davis 1981) |
| Age | U.S. nationwide sample (Lu 1999); Single mothers in urban Twin Cities neighborhoods (Cook 1988); Ireland nationwide sample (Davis and Davis 1981); Pittsburgh, PA (Ahlbrandt 1984); New York City (Miller, et al. 1980) |
| Marital status | U.S. nationwide sample (Lu 1999) |

| | |
|---|---|
| Presence of children / household size | Single mothers in urban Twin Cities neighborhoods (Cook 1988) |
| Race of respondent | U.S. nationwide sample (Lu 1999); U.S. nationwide sample (Campbell, et al. 1976); Pittsburgh, PA (Ahlbrandt 1984) |
| Racial composition / perceived racial discrimination | Single mothers in urban Twin Cities neighborhoods (Cook 1988); U.S. nationwide sample (Campbell, et al. 1976); 60 U.S. metropolitan areas (Lee and Guest 1983) |
| Attitudinal outlook | Single mothers in urban Twin Cities neighborhoods (Cook 1988); New York City (Miller, et al. 1980); Marshalltown and Fort Dodge, Iowa (Bruin and Cook 1997) |

* Note that this table does not show the potentially equally interesting findings on which variables were tested and found not to be statistically significant in each study.