Travel Behavior and Attitudes: New Urbanist vs. Traditional Suburban Neighborhoods

Jennifer Dill
School of Urban Studies and Planning
Portland State University

ABSTRACT

Many planners and designers claim that New Urbanist neighborhoods will encourage residents to walk and bicycle more and increase their sense of community. However, there is little empirical evidence to support these claims. Moreover, while some studies show that people living in New Urbanist-style neighborhoods walk more, it is unclear whether the neighborhood influenced the behavior or if people who want to walk chose to live in such a neighborhood. An example of a New Urbanist neighborhood is Fairview Village, just east of Portland, Oregon. This paper presents the results of surveys of residents of Fairview Village and two control neighborhoods. The surveys asked about travel behavior and attitudes. The findings reveal that residents in Fairview Village drove significantly fewer miles in private vehicles. Some of this difference is explained by lower vehicle ownership rates and smaller households. The adults in Fairview Village also made significantly fewer vehicle trips and more walking and bicycling trips during the week before the survey. The responses to the attitudinal questions on the survey indicate that many Fairview Village residents were looking for a place to live that enabled them to walk and bicycle more, they found it, and they are now walking and bicycling more.

INTRODUCTION

Many growing regions throughout the United States are turning to concepts of "New Urbanism" to address problems of traffic congestion and suburban sprawl. Advocates of New Urbanism have labeled it "the most important planning movement this century" (www.newurbanism.org). The movement developed in the late 1980s and has garnered significant media and political attention. New Urbanist neighborhoods draw on characteristics found in many pre-WW II neighborhoods, including grid street patterns, front porches, and higher housing densities. New Urbanist neighborhoods are usually designed to encourage walking, have a more diverse range of housing, and include a mix of commercial and residential uses. Objectives include reducing reliance on private automobiles and enhancing sense of community. At the same time, the U.S. Surgeon General, the Centers for Disease Control and Prevention, and other health groups have pointed to the lack of physical activity in people's daily lives as a contributing factor in the high levels of obesity in the U.S. These groups also point to the change in land use patterns – more sprawl, less density, more single-use neighborhoods – as a contributing factor to this epidemic.

While policy makers are adopting smart growth and New Urbanist policies, the empirical evidence demonstrating that such policies will reduce vehicle travel is limited, mixed, and incomplete. In their recent book on the subject, Marlon Boarnet and Randall Crane (2001) conclude that “City building will always be linked to transportation, and vice versa, and the new design and planning strategies are, in many respects, brimming with promise. Yet understanding how those designs influence travel, how they might be implemented, and how to evaluate their transportation goals is a fundamental and still incomplete task” (page 180). Many researchers are examining the link between physical activity (primarily walking and bicycling) and urban form (Sallis et al, 1998). The existing research does indicate that urban form, including connectivity, density, land use mix, and pedestrian facilities, may influence the decision to walk (Saelens, et al 2003, Handy et al, 2002). Ewing and Cervero (2001) reviewed most of the recent empirical studies on travel and the built environment. While they drew some conclusions regarding relationships, they identified several outstanding issues.

One issue related to New Urbanist claims is “whether the disproportionate numbers of walking and transit trips in traditional urban settings *substitute for* or *supplement* longer automobile trips that otherwise would [have] been made out of the neighborhood or activity center,” (Ewing and Cervero, p. 4). For example, evidence may show that residents of traditional or New Urbanist neighborhoods make more walking trips to the local coffee house or bakery. But, if they lived in a less-walkable neighborhood, would they drive to make similar trips? Alternatively, they might make coffee at home or buy some while making an automobile trip for another purpose, e.g. grocery shopping. In terms of sustainability, substitution is the desired effect – using less-polluting modes instead of motorized vehicles. Some studies support the substitution theory (see, for example, Cervero and Radisch, 1996). Looking at walking

habits in Austin neighborhoods, Handy (1996) found that most of the walking trips to commercial areas did substitute for vehicle trips. But, she concluded that "even under the most optimistic of assumptions, however, the savings in vehicle miles will not be great," (p. 143). On the other hand, evidence examined by Crane and Crepeau (1998) suggested that increased mixed land uses may generate more non-work vehicle trips.

A second unresolved issue involves separating the impact of density from the land use characteristics that often accompany density – mixed land uses, good transit service, parking constraints, etc. Handy (1996b) summarizes the issue well: "Many studies focus on density, but is it density that matters? No, probably not. Probably what matters is what goes along with density…" A third major issue regarding evidence linking land use and vehicle travel involved the influence of people's personalities and preferences. This is partly a question of the direction of causality. Are people's travel decisions influenced by land use or are people's travel preferences influencing where they live? For example, a household may live in a transit-oriented development (TOD) and drive their vehicles less than a household in a more suburban neighborhood without transit access. After controlling for factors such as income and household structure, if the difference in vehicle use still holds, can we attribute this reduction in driving to the TOD? Perhaps. However, the direction of the cause-effect relationship is unclear. Did the household choose to live in the TOD neighborhood because they wanted to drive less (e.g. for environmental reasons) or did they choose to live there for other reasons, and later found that they could drive less? In addition, if a person living in a compact, mixed-used neighborhood can reduce their driving for some trips (e.g. shopping) are they more willing to drive further or more often for other trips? While some researchers focus on determining the direction of causality, others think that this focus is misplaced. Levine (1999) argues that there is a segment of the population that wants to live in walkable neighborhoods with mixed uses and that the market, as influenced by public policy, is not providing those neighborhoods. Building New Urbanist or transit-oriented neighborhoods is justified not by the potential to reduce vehicle travel, but to provide access to a choice that households want to make.

Few studies address the causality issue directly. Kitamura et. al. (1997) surveyed 200-300 households in each of five San Francisco Bay Area neighborhoods with varying land use characteristics. Using regression models, they found significant relationships between land use factors, including parking availability (at home) and distance to transit, and the number of person, transit, and non-motorized trips. However, the researchers concluded that attitudes (such as being pro-environment or a workaholic, measured using factor scores developed from a series of survey questions) "are certainly more strongly, and perhaps more directly, associated with travel than are land use characteristics" (p. 38). Prevedouros (1992) found significant links between three dimensions of personality – sociability, materialism, and suburbanism – and vehicle ownership and travel characteristics. He found a degree of association between personality and the type of suburb a household chose to live in, even controlling for income. Not surprising, people with an affinity for suburban living tended to reside in lower density neighborhoods.

Fairview Village is a New Urbanist development located in the City of Fairview, just east of Portland, Oregon. It has received numerous awards and recognition. The 95-acre development was designed to include a mix of land uses including a post office, fitness center, city hall, library, 136 single-family detached homes, 120 attached single-family homes (rowhouses, town homes, and duplexes) 252 apartments, over 160,000 square feet of office space, and over 150,000 square feet of retail space. An elementary school is adjacent to the development. While most of the office and retail space is not built yet, there is a mix of land uses. In the center of the Village is a mixed-use area with small retail shops on the ground floor and living space above. The library is at one end of the street and city hall is at the other end. The post office is a block away. There is a health club, pre-school and Target discount department store within the development. These destinations are within a quarter-mile walking distance of most residential units. Almost all of the housing units are built and occupied. There is a large park near city hall and "pocket parks" within a short walk of all homes. The single-family homes have front porches and narrow setbacks. The traffic impact study for the development assumed a 23% reduction in trip generation for the residential uses based on the land use features of the development (Kittelson & Associates, 1997).

Figure 1: Fairview Village homes

Figure 2: Fairview Village shops

METHODOLOGY

Two nearby developments were selected as controls: Cherry Ridge and Hampton Pointe (Figure 3). The developments were built at approximately the same time and have houses approximately the same size and value (Table 1). The major differences between Fairview Village and the other two neighborhoods stem from the New Urbanist features. Because of the townhomes, rowhouses, and duplexes, there are smaller homes and lots in Fairview Village. The other two neighborhoods only have detached single family homes. The range in value is also wider in Fairview Village, though the median is not that much lower. The other primary difference is access to retail

and other services. Unlike Fairview Village, there are no shops or services within either of the other two developments. There is a shopping center with a grocery store and other shops within walking distance of the developments, but the walk requires crossing major streets. All three neighborhoods have relatively narrow streets (24 feet) with sidewalks and no or few cul-de-sacs.

Figure 3: Map of Neighborhoods Surveyed

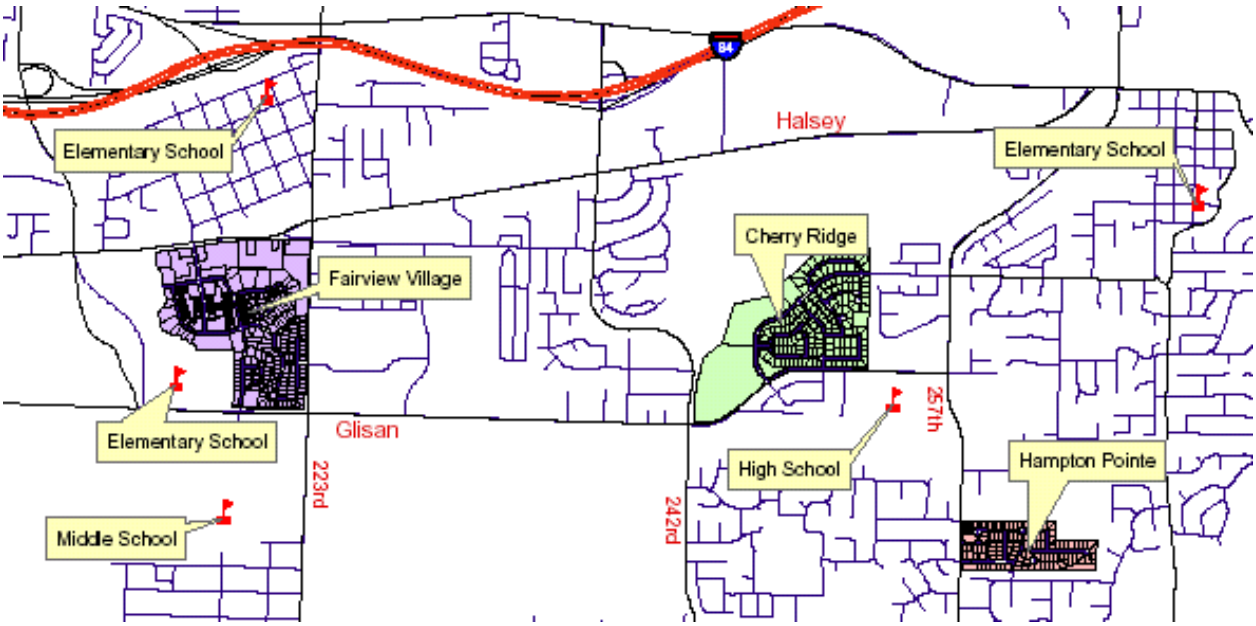

Table 1: Neighborhoods Surveyed

	Fairview Village (New Urbanist)	Cherry Ridge (Traditional Suburb)	Hampton Pointe (Traditional Suburb)
Lot size (square feet)	range: 900 – 15,132	range: 7,012 – 44,093	range: 2,541 – 10,491
	median = 5,132	median = 7,756	median = 5,813 sq. ft.
Assessed value (land & building)	range: $89,500 – 386,370	range: $162,800 – 338,510	range: $148,030 – 300,270
	median = $190,690	median = $201,605	median = $209,310
Home size (square feet, not including apartments)	range: 1,151 – 3, 309	range: 1,305 – 2,781	range: 1,296 – 2,867
	median = 1,734	median = 1,833	median = 1,809
Year built	range: 1996 - 2002	range: 1991 - 1999	range: 1997 – 2001

Surveys were hand delivered to each home in May 2003. Owner names were available for all parcels except the apartments in Fairview Village. When the owner address and site address were the same, the envelope and cover letter were addressed to the owner(s). Otherwise, the survey was addressed to "Current Resident." A total of 628

surveys were delivered, 352 in Fairview Village and 276 in the other two neighborhoods. A reminder postcard was sent in the mail a week later. Residents who did not respond were sent a second survey in June by mail. The response rates are shown in Table 2. Several of the postcards and second surveys were returned as undeliverable. In some cases the home or apartment was vacant. In others there was incomplete address information. The number of surveys received does not include the addresses with returned postcards or surveys and is used to calculate the response rate. The response rate was significantly higher in Fairview Village.

Table 2: Survey response rate

	Fairview Village	Control Neighborhoods	Overall
Sample Size	352	276	628
Surveys received	290	269	559
Surveys returned	131 (45%)	79 (29%)	210 (38%)

The survey included three different forms. The "Household Survey" was to be filled out by the "head of household." It included questions on the following topics:

- Length of time at address
- Own or rent home?
- Rating of importance of factors in deciding to purchase or rent their current home
- Number of vehicles
- Vehicle type, model year, parking location, and weekly mileage for up to three vehicles
- Number of adults and children in household
- 2002 income (9 categories)

There were 130 valid surveys from Fairview Village and 79 from the control neighborhoods.

There were three identical "Adult Survey" forms with questions on the following topics:

- Number of trips made *from home* to various places by mode (personal vehicle, bike, walk, transit) for the previous week (Sunday through Saturday, dates indicated)
- Whether the respondent walks, bicycles, or uses transit more often than where they used to live and why
- Valid drivers license?
- Level of agreement with a series of statements about their neighborhood
- Demographic information (age, sex, race/ethnicity, education level, and work status)

There were 185 valid adult surveys from Fairview Village and 136 from the control neighborhoods. The surveys were almost equally split between May (53.6%) and June (46.4%). Moreover, the split between May and June was almost identical for each neighborhood – 53.5% of the Fairview Village adult surveys were completed in May, and 53.7% of the control neighborhood adult surveys were completed that month as well. Therefore, any differences in travel mode between the two months should not influence the results when comparing the two groups.

There were also three identical "Child Survey" forms with the same questions as the adult form, except that the neighborhood opinion questions were omitted. There were not enough valid child surveys to analyze at this time.

DESCRIPTION OF RESPONDENTS

The demographics of the neighborhoods are very similar, except for household structure. There is no significant difference in the income distribution between the two groups (Table 3). Income levels are generally high, with nearly a third reporting an income of $90,000 or higher. The average age of the adult respondents was 46.3 in Fairview Village and 44.7 in the control neighborhoods – not significantly different. The education level of the Fairview Village adult respondents was higher than the control neighborhoods – 14.8 vs. 14.2 years. The difference is significant ($p<0.05$). There was no significant difference in race/ethnicity; 88.6% of the Fairview Village and

87.8% of the control neighborhood adult respondents were white. There was also no significant difference in work status, with 60.6% of the Fairview Village and 57.3% of the control neighborhood adult respondent working full-time and almost identical shares (13.8% and 13.3%, respectively) working part-time. A higher share of the Fairview Village adult respondents were women (59.9% vs. 50.4%).

Table 3: Income distribution

	Fairview Village	Control Neighborhoods
Under $20,000	4.4%	2.0%
$20,000 – 29,999	6.6	4.1
$30,000 – 39,999	15.4	4.1
$40,000 – 49,999	9.9	10.2
$50,000 – 59,999	5.5	10.2
$60,000 – 69,999	12.1	16.3
$70,000 – 79,999	9.9	12.2
$80,000 – 89,999	5.5	8.2
$90,000 or more	30.8	32.7
n	91 (70% of respondents)	49 (62% of respondents)

The households in Fairview Village tended to have fewer adults and children (Table 4). This difference is explained only partly by the presence of apartments and rowhouses in Fairview Village. Fairview Village households living in detached single-family homes also had fewer adults and children.

Table 4: Household Composition

mean	**Fairview Village (all homes)**	**Fairview Village (detached homes)**	**Control Neighborhoods**
# of adults	1.74	1.85	2.15
# of children 5-17 years old	0.22	0.29	0.58
# of children under 5	0.06	0.01	0.26
n	117	68	72

FINDINGS

There were some significant differences in the factors that were important to the different households in choosing their home (Table 5). Fairview Village residents placed more importance on having stores, cafes, restaurants, a library, and a post office within walking distance. Of the 23 factors listed, having stores within walking distance ranked 12th in importance to Fairview Village residents and 16th in importance to residents in the control neighborhoods. The difference for other services within walking distance was even greater. Fairview Village residents ranked having a library, post office, and cafes/restaurants within walking distance 13th, 14th, and 15th, respectively. Residents in the control neighborhoods ranked these factors 22nd, 23rd, and 20th. Clearly, the residents of Fairview Village were attracted to the New Urbanist feature of having destinations within walking distance. This supports the theory of self selection. The difference in household size, particularly the smaller number of children in Fairview Village households, explains the difference in importance of school quality, and the lack of importance to Fairview Village residents of having schools within walking distance. Fairview Village residents also ranked being close to public transit higher, though transit is limited in the area. There are two bus lines that connect to nearby Gresham and the regional light rail system.

Table 5: Ranking of Importance of Factors in Choosing Home

Factors in home decision, mean score 1 = Not at all important 7 = Extremely important	**Fairview Village**	**Control Neighborhoods**	**sig. (2-tailed t-test)**
Size of house/apartment	5.58	5.80	0.19
Size of the yard	**4.55**	**5.47**	**0.00**
Price/rent	5.91	6.03	0.46
Property taxes	**4.46**	**5.41**	**0.00**
Style of house/apartment	5.75	5.66	0.59
Style of the neighborhood	6.15	5.96	0.15
Sense of community	5.69	5.59	0.58
Quality of schools	**4.17**	**5.14**	**0.00**
Neighborhood safety	6.32	6.32	0.99
Having stores within walking distance	**5.15**	**4.00**	**0.00**
Having cafes/restaurants within walking distance	**4.72**	**3.11**	**0.00**
Having a library within walking distance	**5.13**	**2.73**	**0.00**
Having a post office within walking distance	**5.02**	**2.57**	**0.00**
Having schools within walking distance	3.30	3.29	0.98
Location relative to work	4.48	4.35	0.62
Location relative to family/friends	4.09	4.00	0.72
Neighborhood parks	**5.23**	**4.28**	**0.00**
Amount of car traffic on my street	5.66	5.77	0.62
Layout and size of the neighborhood streets	5.33	5.13	0.43
Being close to public transit	**4.10**	**2.98**	**0.00**
Quick access to the freeway	5.58	5.19	0.07
Having bike lanes and paths nearby	**4.51**	**3.53**	**0.00**
Having sidewalks in my neighborhood	5.84	5.47	0.10
n	129	79	

Factors that are significantly different ($p<0.05$) between the two groups are in bold.

The households in Fairview Village had fewer vehicles and drove them fewer miles per week than the control neighborhoods (Table 6). Some of the difference may be explained by the difference in household size. Households in Fairview Village reported that their vehicles were driven a total average of about 200 miles per week, compared to just over 300 miles for respondents in the control neighborhoods. When the weekly mileage is divided by the number of adults in the household, the difference between the groups is smaller, but still fairly significant. When the mileage is divided by the total number of people in the household, the difference is no longer significant. However, household size is also significantly and positively correlated with the number of vehicles in the household. After controlling for the number of vehicles in the household, there is no significant correlation between VMT and the number of adults or number of children between 5 and 17 years (Table 7). There is, however, a significant positive correlation between VMT and the number of children under five and a significant negative correlation with whether the household lives in a New Urbanist neighborhood (Fairview Village). This indicates that the difference in VMT may be due to both demographic differences (household size and number of vehicles) and neighborhood features. Whether the neighborhood features are causing a reduction in travel – or allowing people who want to reduce their travel to do so – is unclear.

Table 6: Difference in vehicle ownership and weekly VMT

mean	Fairview Village	Control Neighborhoods	sig. (2-tailed t-test)
# of vehicles in household	1.70	2.32	0.00
# of vehicles per adult	0.99	1.11	0.02
Total weekly vehicle miles traveled (VMT) (up to 3 vehicles)	199.9	304.0	0.00
Total weekly VMT per adult	121.8	151.2	0.07
Total weekly VMT per person	108.3	115.4	0.59

Table 7: Correlation of VMT, controlling for # of vehicles in household

partial correlation coefficients, controlling for # of vehicles (sig.)	# adults	# children 5-17	# children <5	New Urbanist	Income
Total weekly VMT	-0.089	-0.085	0.352	-0.199	0.024
	(0.31)	(0.34)	(0.00)	(0.02)	(0.79)
n = 130					

The adult surveys collected information about trips taken the previous week from home. As with VMT, there were significant differences between the neighborhoods. Adults in Fairview Village made fewer vehicle trips and more trips on foot and bicycle. The difference in walking trips is most significant and results in Fairview Village adults making more total trips. The adults in Fairview Village reported that about 30% of their trips were made walking, compared to about 9% for the adults in the control neighborhoods. Residents in both groups said that they walk more in their current neighborhood than where they used to live – 53% for the control neighborhoods and 71% for Fairview Village. The survey had an open-ended question asking why they walked more in their current neighborhood. Forty-percent of the Fairview Village residents that walked more and stated why said that it was because there were places to walk to, compared to 21% for the control neighborhoods. Residents in the control neighborhoods were more likely to be walking more for lifestyle reasons, such as wanting to improve their health or getting a dog. Fairview Village residents were also more likely to give a reason related to the aesthetics of the neighborhood, such as "cute," "cleaner," or "nicer scenery" (compared to their previous neighborhood).

Table 8: Number of trips by mode by neighborhood

mean for survey week	Fairview Village	Control Neighborhoods	sig. (2-tailed t-test)
# personal vehicle trips	**12.37**	**14.62**	**0.005**
# bike trips	0.41	0.14	0.051
# walking trips	**6.55**	**1.66**	**0.000**
# transit trips	0.33	0.33	0.985
Total trips reported	**19.66**	**16.76**	**0.007**
Personal vehicle trips to work	3.25	3.21	0.874
Walk trips to work	**0.17**	**0.01**	**0.033**
Personal vehicle trips for personal business	1.91	2.09	0.491
Walk trips for personal business	0.15	0.04	0.071
Personal vehicle trips for shopping	**2.02**	**2.44**	**0.035**
Walk trips for shopping	**0.44**	**0.17**	**0.006**
Personal vehicle trips to restaurants/cafes	**1.03**	**1.46**	**0.014**
Walk trips to restaurants/cafes	**0.67**	**0.09**	**0.000**
Personal vehicle trips to visit friends/relatives	1.19	1.50	0.094
Walk trips to visit friends/relatives	**0.19**	**0.04**	**0.023**
Personal vehicle trips to library	**0.07**	**0.18**	**0.034**
Walk trips to library	**0.51**	**0.00**	**0.000**
Personal vehicle trips to post office	0.46	0.38	0.461
Walk trips to post office	**0.66**	**0.01**	**0.000**
Personal vehicle trips to health club	0.43	0.65	0.140
Walk trips to health club	**0.60**	**0.02**	**0.000**
Personal vehicle trips to park	0.07	0.14	0.115
Walk trips to park	**1.02**	**0.25**	**0.000**
Personal vehicle trips for recreation	0.30	0.41	0.343
Walk trips for recreation	**1.87**	**0.89**	**0.002**

Means that are significantly different ($p<0.05$) between the two groups are in bold.

Where were the Fairview Village residents walking? Just about everywhere. They made significantly more walking trips to work, shopping, restaurants/cafes, visiting friends/relatives, the library, the post office, parks, health clubs, and recreation. There were no significant differences in the number of walking trips to school, daycare, entertainment, or other. There were significant correlations between the number of walking trips and the household ranking for having stores, cafes/restaurants, a library, and post office within walking distance.

CONCLUSIONS

The survey results indicate that adult residents of the New Urbanist neighborhood own fewer vehicles, drive them less, and walk more than residents of two control neighborhoods with more typical suburban features and no mix of land uses within the development. The responses to the attitudinal questions also indicate that "self-selection" is occurring to some extent. Some households chose to live in Fairview Village because they wanted to be able to walk to destinations. This is not surprising. The marketing materials for Fairview Village stress the walkability and mixture of land uses. The adult respondents in Fairview Village made an average of almost one walking trip per day (6.6 per week), significantly higher than the 1.7 trips per week for the control neighborhoods. They walked to many of the destinations provided within the Village. While residents of both neighborhoods claimed to be walking more, the proximity of destinations was the more significant reason for the Fairview Village residents. While some of the difference in vehicle miles traveled is explained by smaller households and fewer vehicles, some may be attributed to the development itself. The households in Fairview Village had fewer vehicles per adult. This may indicate that some households are able to own fewer vehicles because of the walkability and/or that they choose to own fewer vehicles because they want to walk. In addition, after controlling for vehicle ownership, there was still a significant negative correlation between VMT and whether the household lived in Fairview Village. The fact that there were fewer vehicle trips per adult supports this finding. Additional analysis of the data may reveal whether the households are substituting walking for driving trips.

There are limitations to the survey. Respondents may not remember exactly how many trips they made for each purpose by each mode for the previous week. Research has shown that people often forget to report walking trips, particularly those without specific destinations. If respondents in each neighborhood were equally and randomly forgetful, the interpretation of the results is not significantly different. However, if the Fairview Village residents are more attuned to walking, they may remember more of those trips than the other respondents. Even if this were the case, it is unlikely that that reasoning explains the extra five walking trips per week. In addition, self-reported mileage figures are often inaccurate. Again, if the inaccuracy is similar in each neighborhood, it does not change the findings significantly. The focus should be on the difference in the VMT, rather than the absolute numbers.

REFERENCES

Boarnet, Marlon G. and Randall Crane (2001). *Travel by Design*, Oxford University Press: New York, NY.

Boarnet, Marlon, and Sharon Sarmiento (1998). "Can land-use policy really affect travel behavior? A study of the link between non-work travel and land-use characteristics." *Urban Studies*, 35(7), 1155-1169.

Cambridge Systematics, Calthorpe Associates, and Parsons Brinckerhoff Quade Douglas (1992). "The LUTRAQ Alternative / Analysis of Alternatives: An Interim Report." 1000 Friends of Oregon, Portland, OR.

Cervero, Robert and Carolyn Radisch (1996). "Travel Choices in Pedestrian Versus Automobile Oriented Neighborhoods," *Transport Policy*, 3: 127-141.

Crane, Randall and Richard Crepeau (1998). "Does Neighborhood Design Influence Travel? A Behavioral Analysis of Travel Diary and GIS Data," *Transportation Research-D*, 3(4): 225-238.

Crane, Randall. (1996). "On Form versus Function: Will the New Urbanism Reduce Traffic, of Increase It?" *Journal of Planning Education and Research*, 15(2), 117-126.

Ewing, Reid and Robert Cervero (2001). "Travel and the Built Environment – Synthesis," presented at the 80th Annual Meeting of the Transportation Research Board, Washington, DC, January 7-11, 2001.

Handy, Susan (1996a). "Urban Form and Pedestrian Choices: Study of Austin Neighborhoods," *Transportation Research Record*, 1552: 135-144.

Handy, Susan (1996b). "Travel Behavior Issues Related to Neo-Traditional Developments – A Review of the Research," TMIP Conference on Urban Design, Telecommuting, and Travel Behavior, Federal Highway Administration, Washington, DC.

Handy, Susan L., Marlon G. Boarnet, Reid Ewing, and Richard E. Killingsworth (2002). How the Built Environment Affects Physical Activity. American Journal of Preventive Medicine, 23(2S), 64-73.

Kitamura, Riyuchi, Mokhtarian, Patricia, and Laidet, Laura (1997). "A Micro-Analysis of Land Use and Travel in Five Neighborhoods in the San Francisco Bay Area." *Transportation*, 24, 125-158.

Kittelson & Associates, Inc., "Updated Fairview Village Traffic Impact Study," Portland, OR, January 6, 1997.

Levine, Jonathan (1999). "Access to Choice." *Access*, 14, 16-19.

Parsons Brinckerhoff Quade & Douglas. (1997). *Making the Connections, Technical Report, Volume 8*. 1000 Friends of Oregon, Portland, OR.

Prevedouros, Panos D. (1992). "Associations of Personality Characteristics with Transport Behavior and Resident Location Decisions," *Transportation Research-A*, 26A(5): 281-291.

Saelens, Brian E., James F. Sallis, and Lawrence D. Frank (2003). Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures. Annals of Behavioral Medicine, 25(2), 80-91

Sallis, James F., Adrian Bauman, and Michael Pratt (1998). Environmental and Policy Interventions to Promote Physical Activity. American Journal of Preventive Medicine, 15(4), 379-397.