NEIGHBORHOOD DESIGN & MODE CHOICE

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ABSTRACT:

How much does neighborhood design influence the mode choice of residents? Using survey data about the transportation choices of residents of three neighborhoods this study attempts to answer that question. The neighborhoods selected for study are all in East Multnomah County, Oregon. The first, Fairview Village, is an award winning new urbanist community designed to encourage walking trips. The other two neighborhoods, Cherry Ridge and Hampton Point, are designed in the typical style of most suburban developments in the United States. The three neighborhoods are similar in mean property value, building square feet, and year built. However, the design of Fairview Village is significantly different from the other two neighborhoods. The data is summarized and analyzed using regression models to estimate trip frequency by mode.

THE NEIGHBORHOODS

- Garages in back
- Narrow Streets
- Front Porches
- Many pedestrian Destinations

- Garages in front of the house
- No front porches
- Few pedestrian destinations
- Homes set back From street

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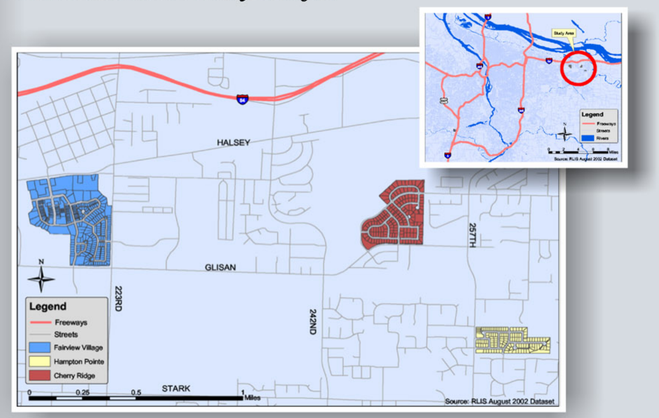

The project neighborhoods are located in East Multnomah County.

The survey was mailed out, and residents mailed them back. The response rate was about 25%. The survey asked residents about the trips they made during the previous week, from home. Each trip was categorized by mode. **Figures 1 and 2** show the summary of the trip data.

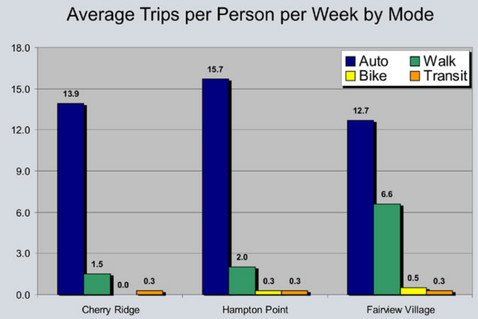

Figure 1

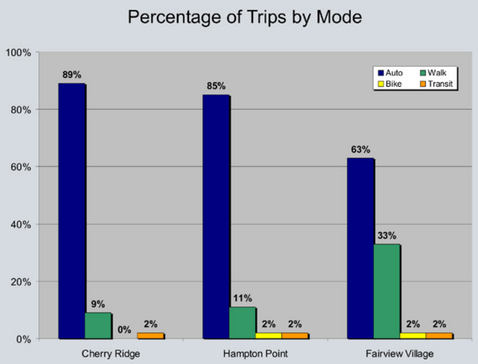

Figure 2

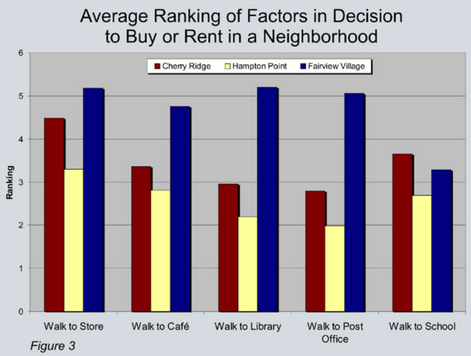

Figure 3

Critics of New Urbanism often argue that the increased walking trips are a result of resident self selection rather than a result of neighborhood design. The idea that people who like to walk will be attracted to communities where they can walk is supported by **Figure 3**. **Figure 4** shows some of the other factors residents considered before moving into their respective neighborhoods. There is little difference in the rankings of non-walking related factors among the different neighborhoods.

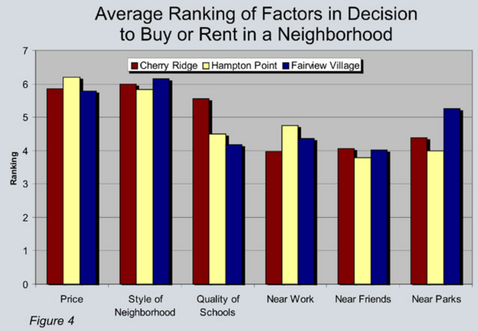

Figure 4

Estimation of Trip Frequency by Mode

Regression Type	All Modes OLS		Personal Veh.Trips OLS		Walking Trips Poisson		Bicycle Trips Poisson		Transit Trips Poisson	
	B		B		B	E	B	E	B	E
Constant	17.294		13.874		0.942	0.610	-1.492	-3.446	0.514	0.402
Hampton Point	-3.249*		2.406*		-1.318*	-2.736	-0.847*	-1.333	-0.297	-0.346
Cherry Ridge	-6.369*		0.192		-1.685*	-4.392	n/a	n/a	-0.192	-0.212
Vehicles Available	2.534*		0.872		0.313*	0.682	-0.578*	-1.260	0.543*	1.184
Age	-0.0456		-0.068*		0.008*	0.371	-0.029*	-1.344	-0.012	-0.556
Male	-0.274		0.438		-0.243*	-0.275	1.101*	0.667	-0.07	-0.073
Children	0.419		0.283		0.018	0.010	0.127	0.074	-0.205	-0.119
R-Squared	0.096		0.070		0.248		0.115		0.058	
N	244		244		244		244		244	

* Statistically Significant at the .05 level of significance. Two Tailed Test

Table 1

Dependant Variables	Independent Variables
All Trips-All Modes	Vehicles Available
Personal Vehicle Trips	Age
Walking Trips	Children
Bicycle Trips	Hampton Point (Dummy Variable)
Transit Trips	Cherry Ridge (Dummy Variable)
	Male (Dummy Variable)

Table 2

Descriptive Statistics

Variable	Mean	Standard Deviation	N
All Trips/All Modes	18.40	9.32	244
Personal Vehicle Trips	13.50	6.91	244
Walking Trips	4.25	6.71	244
Bicycle Trips	0.26	1.13	244
Transit Trips	0.37	1.25	244
Vehicles Available	2.18	0.81	244
Age	46.34	13.51	244
Children	0.58	1.05	244

Table 3

Figures 5-9 show the frequency distribution of the dependant variables used in the five regression models. Figures 5 and 6 have an approximately normal distribution while 7-9 suggest the use of a Poisson regression model.

Table 1 shows the results of the five models used in this study. In the first model, estimating all trips for all modes, the neighborhood variables have the most influence with significant, negative coefficients. Having more vehicles also increases the likelihood of a trip. In the second model, estimating personal vehicle trips, only age and the Hampton Point neighborhood are significant. Living in Hampton Point has a positive effect on auto trips. The model estimating walking trips shows that, as expected the neighborhood variables are both negative and significant. However, the number of vehicles available suggests that if a person has more cars they make more walking trips. Men are also less likely to walk. The walking trips model has the highest R-squared value among the five used.

The models for bicycle and transit trips have a very low frequency of trips from which to estimate, which may result in unreliable results. Taking that into consideration, the most notable result is a positive, significant relationship between the number of vehicles available and the number of transit trips.

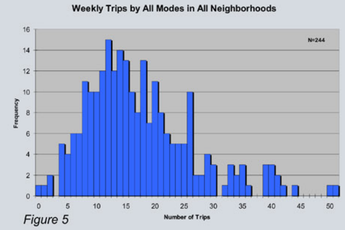

Figure 5

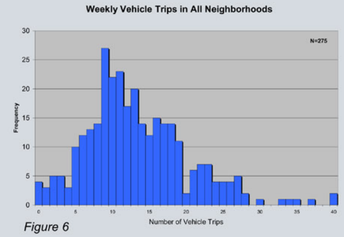

Figure 6

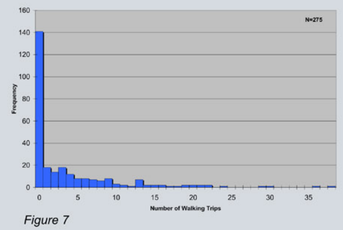

Figure 7

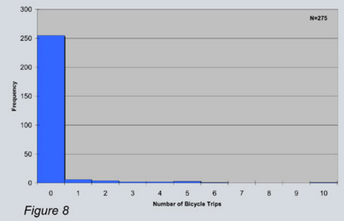

Figure 8

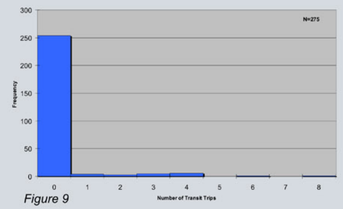

Figure 9

CONCLUSION:

Residents of Fairview Village make more trips than the residents of the other two neighborhoods. However, they make a larger share of those trips by walking.

The survey data suggests that people who like to walk choose to live in Fairview Village, where they can walk.

The results of the regression models indicate that the neighborhood in which a person lives is a significant factor in mode choice.