

Transportation and Land Use: How do Urban Travelers view the Tradeoffs?

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1. Introduction

Finding ways to provide efficient intra-regional transportation within modern decentralized urban regions is one of the most difficult challenges facing planners and policy makers. Traffic jams have been proposed as an addition to Benjamin Franklin's dictum that the only things certain in life are death and taxes. (Plous, 2000) While traffic congestion in the downtowns of cities have been a fact of life for more than a century, traffic problems are now an everyday fact of life in the suburbs, to which people had fled in order to avoid the problems of the city. At the same time, the construction of the improved automobile transportation systems, in particular the interstate highway system, has been cited as one of the most important causes of suburban sprawl. (Jackson, 1985)

The only thing worse than the traffic congestion that plagues many American regions are attempts to deal with it. Westchester County, to the north of New York City, now has traffic problems that are every bit as serious as in the city itself, and with no end in sight. (Fairfield County Business Journal, 2000). In Westchester County, the Tappan Zee Bridge which spans the Hudson River at about the midpoint of the north-south axis of the county is a major source of traffic problems. Designed in 1953 to carry a maximum of 100,000 vehicles a day, the bridge now routinely carries 130,000 vehicles a day, with traffic back ups at its entry points in Westchester and Rockland counties regularly six to eight miles long. Yet when a Task Force appointed by New York's governor suggested replacement of the bridge with a new one which would include provision for light rail as well as autos and trucks, the first public reaction was reported to be unremittingly hostile. (New York Times, 2000)

Finding solutions to traffic problems that address what is, for many people, a serious deterioration in the quality of urban (in the sense of urban regions as opposed to cities per se) life is thus one of the top challenges facing planning in the next decade. The most important thing about the search for such solutions is that it is the politics of the issue that will be far more important than the engineering or technical aspects of possible solutions (Gifford, 1999). There is no shortage of innovative ideas to deal with traffic problems. Engineers are working on new public transit systems as well as intelligent transportation systems to speed traffic. Economists have routinely proposed that road travel be priced according to its marginal rather its average cost in order to smooth out flows. Reorganizing the social structure of automobile use through such programs as car sharing are also under development in the U.S. and Europe.

Coming up with ideas is one thing; implementing them quite another. Transportation projects typically elicit two types of political controversy. One is typified by the Tappan Zee bridge case cited above. A proposed new or expanded road or new bridge or other facility elicits vigorous opposition and even hostility among and residents of the area where the project would take place. Such "NIMBY" reactions are typical of the kinds of situation described by Olson (1965) in which the costs of the action are narrowly focused on a small group, who thus have a significant incentive to organize and face low barriers to organization. In contrast, the benefits of the proposal are dispersed across a very large group of people. Since individual benefits are less than the formidable costs of organizing to express their views, opponents to the project more easily become the center of attention and shape the political debates.

Controversy also arises when attempts are made to change the “demand side” of roads. Downs (1992) assesses the technical and political feasibility of various supply and demand side strategies for coping with congestion in urban areas. Supply side strategies include building or expanding roads, while demand side strategies focus on using pricing to reduce demand on over-stressed systems. He notes that the demand side strategies are much less likely to be politically acceptable than supply side strategies. This is born out in the failure of repeated attempts to implement demand side strategies, even where a pricing strategy does not involve new tolls and is primarily born by non-regional residents. (Colgan and Quinlan, 1998).

But as the Tappan Zee and numerous other examples from around the country have shown, implementing Downs’ supply side solutions is not necessarily easy either. Planners seeking to develop strategies for assuring that transportation and land use objectives are met need to be aware of the public’s perceptions of how these issues in order to build support for strategies that are both technically sensible and politically feasible.

Such was the motivation for this study, which considers evidence from a survey of residents in the Portland, Maine region conducted during 1999. The survey was conducted as a preliminary step in the formulation of a five year regional transportation plan by the Portland Area Comprehensive Transportation Committee (PACTS), a metropolitan planning organization (MPO) required by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1990.

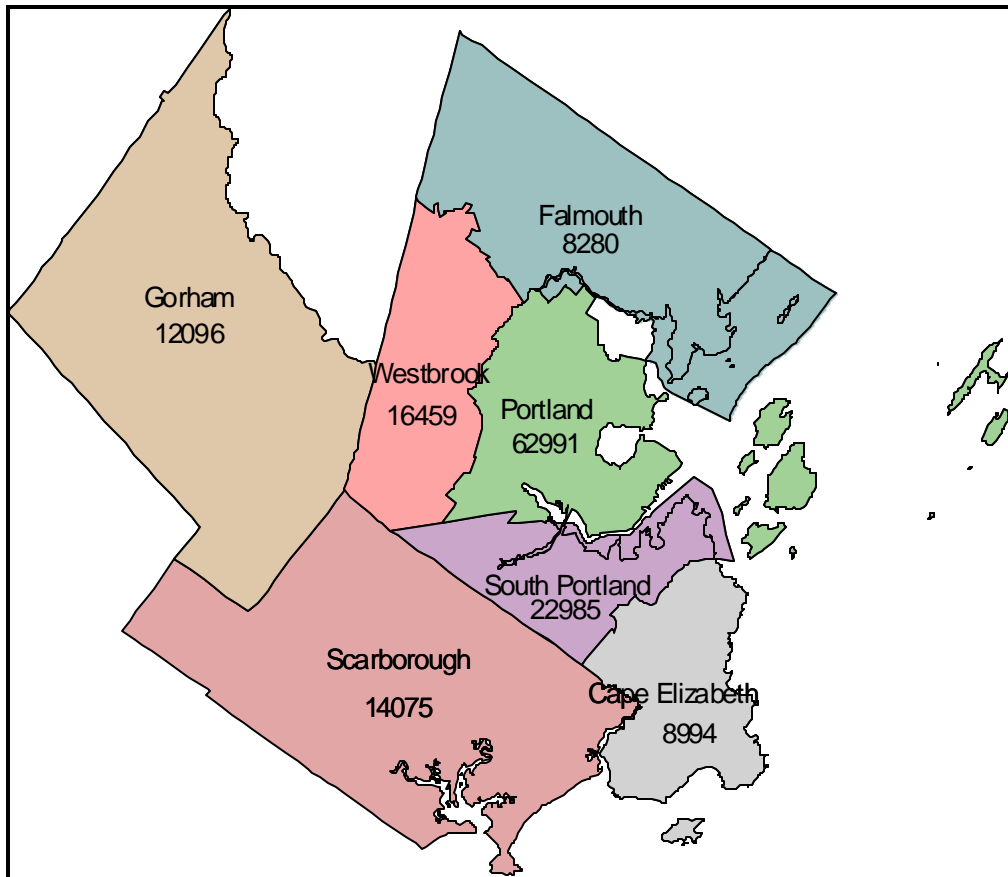
2. The Portland Region and the PACTS Survey.

Portland, Maine is a city of 63,000 people, and is the largest city in Maine. As such, it serves as the trade and service center for the state, and is thus the home of largest institutions serving Maine, including banks, hospital, wholesale and retail centers, and higher education. Like all other urban areas, it has steadily expanded its region over the past forty years. In 1960, the Portland MSA consisted of five communities. In 1990, it consisted of 20 communities; it will likely add five to seven more communities after the 2000 census is analyzed.

The area examined in this study comprises the PACTS region, which is seven communities including Portland. These communities, and their 1997 populations, are shown in Figure 1. The communities may be roughly characterized as follows:

Portland: The urban core. Downtown Portland (the peninsula between Back Cove and the Fore River contains the major office complexes, plus low to high income neighborhoods. Outside the peninsula, the city is predominantly single family residential, with retail and office space along the major arterials. I-295 splits the city as the major interstate route through the city. Population is relatively steady, largely due to large influx of foreign migrants.

Figure 1
The PACTS Region (with 1997 Populations)



South Portland The fifth largest city in Maine. Dominated by single family residences, with offices, a large retail mall, and an industrial complex in the western part of the city. Population has been slowly declining.

Falmouth Suburb to the north and west of Portland. Very fast growing, predominantly low density single family residential. One major retail center just north of Portland

Scarborough Very fast growing suburb, with equally fast growth in office and retail area adjacent to the South Portland office area. Predominantly low density to very low density single family residences.

Cape Elizabeth Slow growing suburb with very low density single family housing and generally high income population. No major office or retail complexes.

Westbrook Slow growing city. Predominantly medium-high density single family houses.

Home to a large paper mill, which has recently closed its pulp making operation.

Gorham Fast growing suburb. Some industrial, plus one campus of the University of Southern Maine. Predominantly low density single family housing. The gateway community to the fast growing suburbs further west.

Traffic in Portland is not nearly as serious a problem as it is in larger metro areas. Daily backups during commuting hours are rare. Average commuting time in the region is 24 minutes, compared with a statewide average of 20 minutes (Colgan, 2000). Portland and South Portland run bus service, but there is other public transit in the region. Like most of Maine, transportation is heavily dependent on the automobile, though the differences between the Portland area and other regions in auto use is not great. The huge growth in auto use in virtually all other metro regions over the past thirty years has made the rest of the U.S. look very similar to Portland in terms of modal choices. (Pucher, et. al. 1998)

The seven towns comprise a coherent travel region. Ninety one percent of those employed in the region live and work within the seven towns. Only ten percent of the region's residents, however, live and work within the same town (and half of these are in the city of Portland). Eighty one percent of residents live in one of the seven towns and work in another of them. There is substantial commuting to every community, except Cape Elizabeth. Only 4% of respondents commuted to another community within Cumberland County, and the balance commuted to jobs beyond Cumberland County. (Colgan, 2000).

The most serious problems in regional transportation occur at certain bottlenecks in the network where roads designed for traffic levels of twenty-thirty years ago are not capable of handling today's traffic. From the perspective of national traffic management in urban regions, the Portland region may be considered a place where the next set of decisions are critical. This is the reason why the Portland Area Comprehensive Transportation Committee wanted to have a sense of where the public was on issues related to regional transportation.

The survey that was conducted took place in February and March, 1999 using random sample telephone interviews. Samples were drawn from available telephone numbers by a commercial sampling firm. The PACTS committee wanted to have statistically valid samples of each town, but the costs of conducting the ~400 interviews needed for a 95% confidence level, 5% confidence interval was beyond available resources. It was decided to select a 90% confidence level, which required ~280 interviews per town. The total sample of 1952 interviews exceeds the 95% confidence level and 3% confidence interval for the region as a whole.

Results

The survey contained five questions that address the issue of transportation improvements and concern about sprawl. Figure 2 shows the responses for the entire sample to these questions. The questions are:

Sprawl

In recent years, most of the population and new residential growth has taken place in communities outside of Portland and South Portland. Many people argue that this has resulted in loss of rural character and open space and has contributed to increasing traffic. How concerned are you that this trend will continue?

Very concerned

Somewhat concerned

Not at all concerned

DK

No Op

For purposes of presentation of results, "very concerned" is reported as "high", "somewhat concerned" as "medium" and "not at all" as "low". Some level of concern is expressed by slightly more than three quarters (76%) of respondents indicated some level of concern, with just under one third (31%) expressing a high level of concern.

Transportation v. Rural Character

Some people say that changes should be made to the transportation system to make it easier to travel around the Portland region even if these changes contribute to increasing growth in rural areas, while others say that preserving rural character is more important than easy transportation. Which of these views is closest to the way you feel?

Transportation > Rural Character

Rural Character > Transportation

A majority of respondents (53%) expressed greater agreement with preserving rural character is more important than easy transportation. Thirty four percent favored transportation over rural character. The balance had no opinion.

Transportation v. Neighborhoods Character

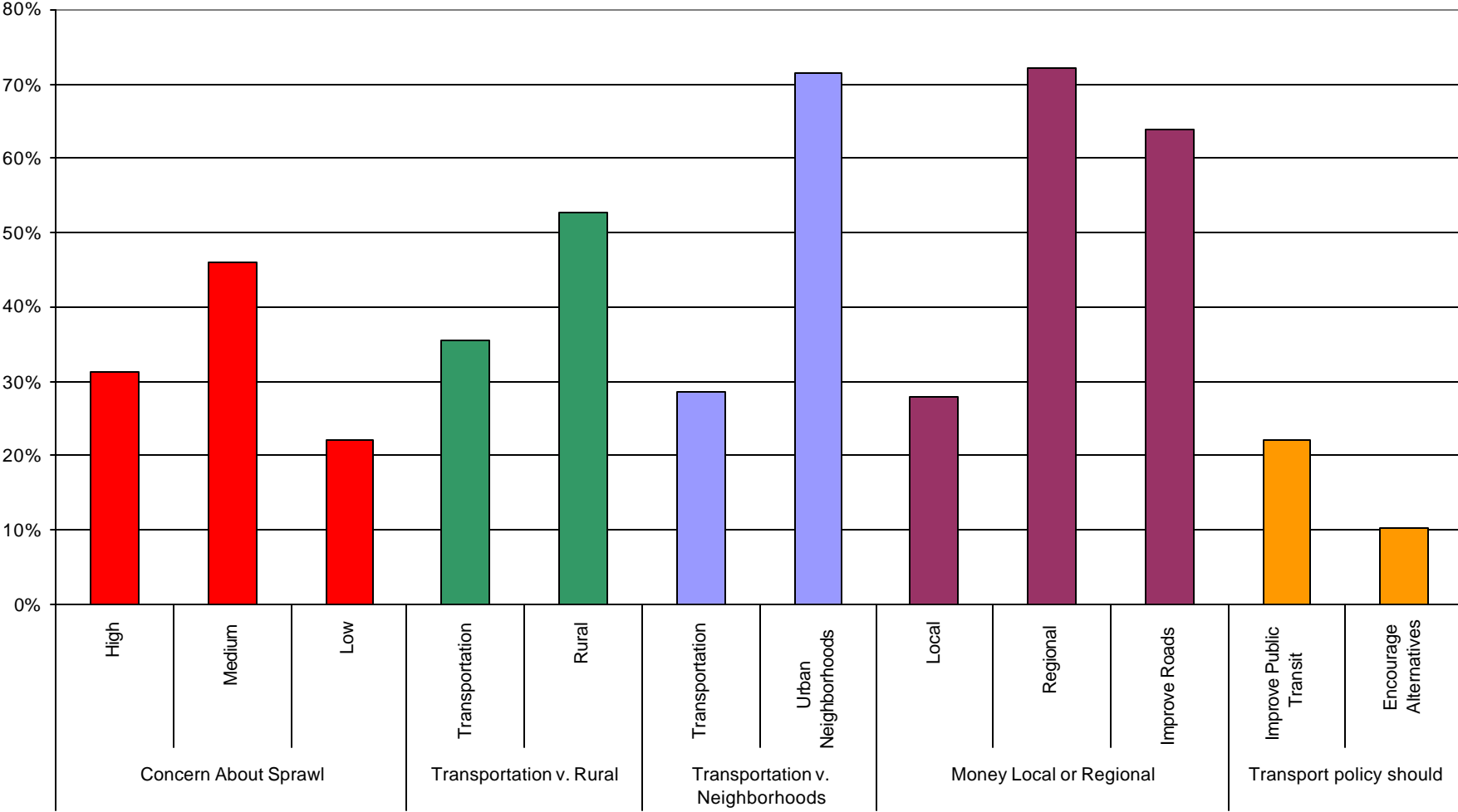
On a scale of 1 to 10 where 10 indicates very strong agreement and 1 indicates very strong disagreement, please indicate whether you agree or disagree with this statement:

Changes such as making roads wider or straighter that are critical to making it easier to get around the Portland region should be made even when these improvements result in neighborhood changes such as cutting down trees, reducing yards, or removing fences.

On this 1 to 10 scale, the mean response was 4.32, meaning a tilt in preferences towards

disagreement with the statement that transportation improvements should be made even when they negatively affect neighborhoods.

Figure 2



Local or Regional Transportation Investments

If additional money for transportation were to be made available from state or federal governments in the next five years, do you think that highest priority should be placed on projects that address needs in the community where you live or that address needs in other communities that would make it easier to get around the Portland region?

Town in which I live
Portland region
Don't Know
No Opinion

Nearly three quarters (73%) of respondents indicate that they would rather see new transportation money spent on improving transportation in the region rather than in their own community. This support for regional projects is actually somewhat understated. The strong majority for regional rather than local spending is consistent across six of the seven communities. The only community where there is a majority preference for local spending is Gorham. That town is the location for perhaps the most serious and consistent bottleneck in the region's road network, and Gorham residents suffer from that bottleneck more than any others.

Transportation Improvements

*As officials think about transportation improvements in general, which of the following do you think they should use the **most** to improve travel:*

Improving roads
Improving public transportation
Encouraging alternate transportation such as bicycling

About two-thirds of respondents chose roads over other modes. Twenty two percent selected improving public transportation, and ten per cent chose alternative transportation. It should be noted that 4.2% of respondents indicate they actually use public transit.

This summary presentation of the data on these questions points immediately to a basic finding: there appears to be strong support for both transportation improvements, particularly roads, and a desire that such improvements have little or no impact on either urban neighborhoods or rural character. Of course, the one-way distribution of answers to these questions does not by itself point to such a conclusion. However, as Figures 3-4 show, when the data is cross-tabulated, the conclusions is reinforced.

Figure 3 shows the distribution of responses to the question of where the respondent prefers to have money spent on transportation and whether their concern about sprawl is high, medium, or low. Whatever their level of concern about sprawl, there is about a two to one preference margin for regional v. local spending.

Figure 4 compares concern about sprawl with the respondent's preference for transportation improvements. There is a strong preference for improving roads over public transportation and alternative transportation regardless of level of concern about sprawl. Among those that prefer roads, there is a tendency for the roads preference to decrease with increasing sprawl concern. Among those that prefer public transport, there is a tendency to increase support for public transportation with concern about sprawl. Both of these may be considered to be in the logical direction. But the magnitude of preference for roads, still overwhelms the preference for other types of transport.

Given this set of conflicting desires, is it possible to identify factors that might better disaggregate the data to show which portions of the population lean one way or another. To do this, several potential correlates of the responses to these questions are examined. These include personal characteristics, such as income, gender, and age, as well as some characteristics of travel patterns, including commuting patterns and auto ownership. These are explored in the following section.

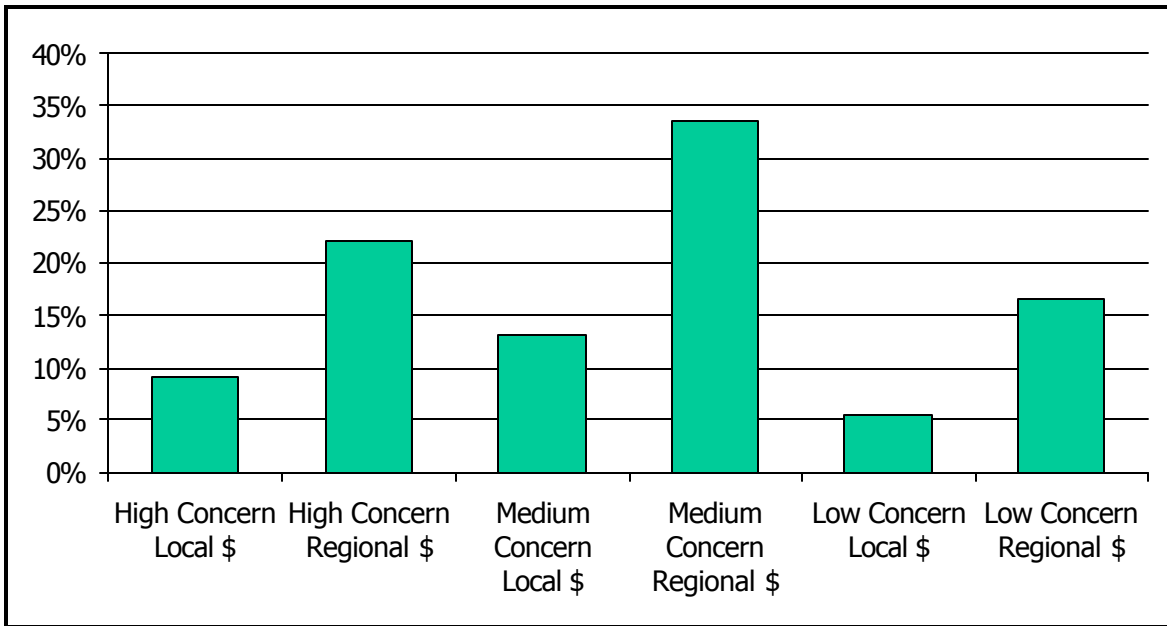


Figure 3 Concern about Sprawl and Preference for Regional v. Local Transportation Spending

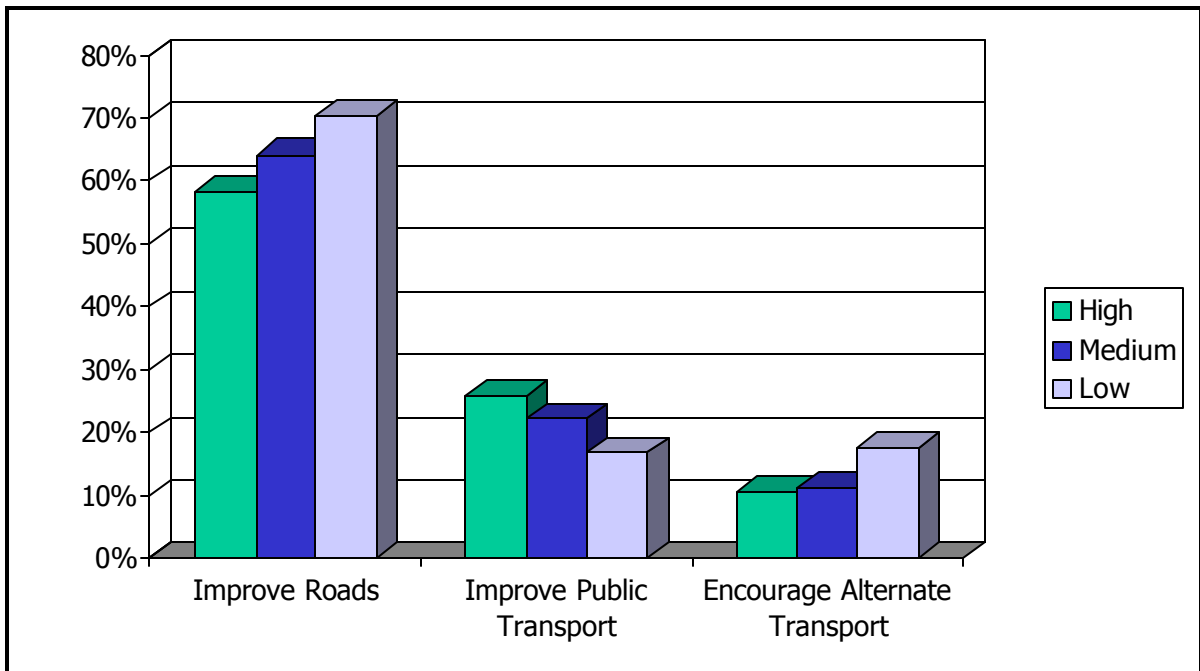


Figure 4 Concern about Sprawl and Preferred Type of Transport Investment

Correlates of Attitudes on Transportation and Sprawl.

Three standard personal characteristics examined in this and other surveys are income, gender, and age. Several tests of income against these questions failed to reveal any statistically significant relationship. However, gender was clearly related to concerns about sprawl and transportation. Figure 5 shows the distribution of the answers to the sprawl concern question by gender. Women are more likely than men to indicate a high level of concern about sprawl (35% v. 26%). At the other end, men are more likely than women to have low concern about sprawl. The relationship is statistically significant (Chi square $p < .0001$).

When gender is compared with the preferences regarding transportation and effects on rural character or urban neighborhoods, women are less likely to choose transportation. On the question of preserving urban neighborhoods, women had a mean score of 3.76, compared with a mean for men of 4.64. The scale for this question shows a stronger preference for urban neighborhood preservation the lower the score. The difference between men and women was statistically significant (t-test $p < .0001$). Figure 6 shows the difference between men and women on the question of preserving rural character v. transportation. Again, women are more likely to prefer preserving rural character, and again the difference is significant (Chi Square $p < .0001$).

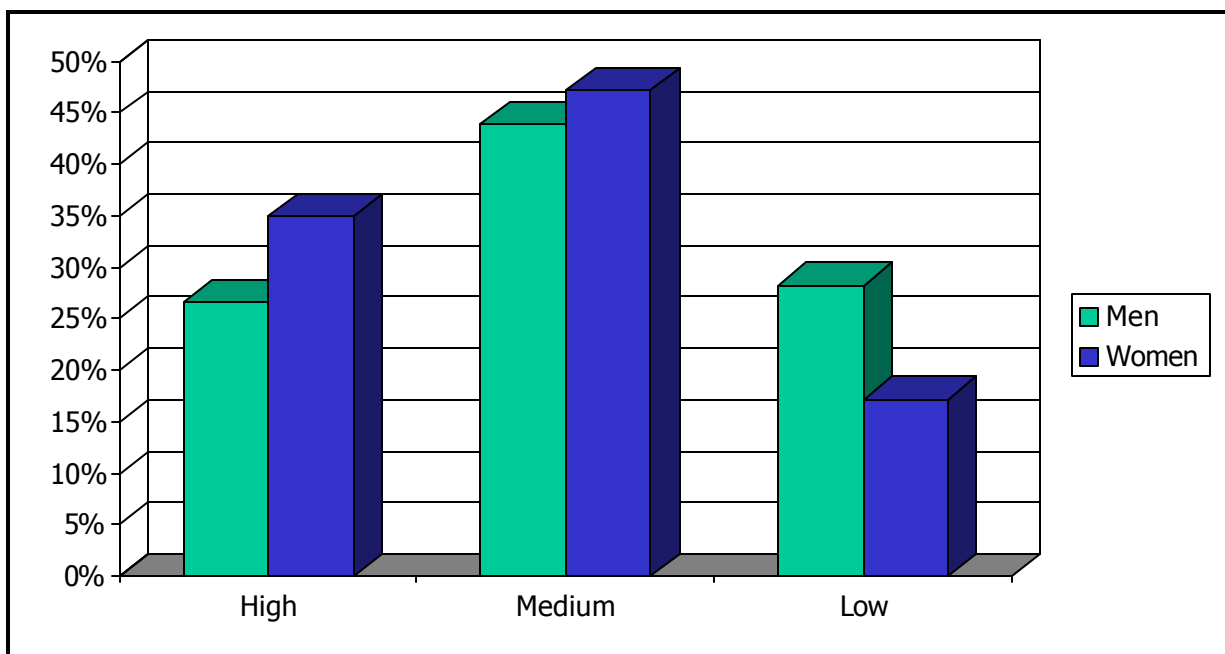


Figure 5 Concern About Sprawl v. Gender

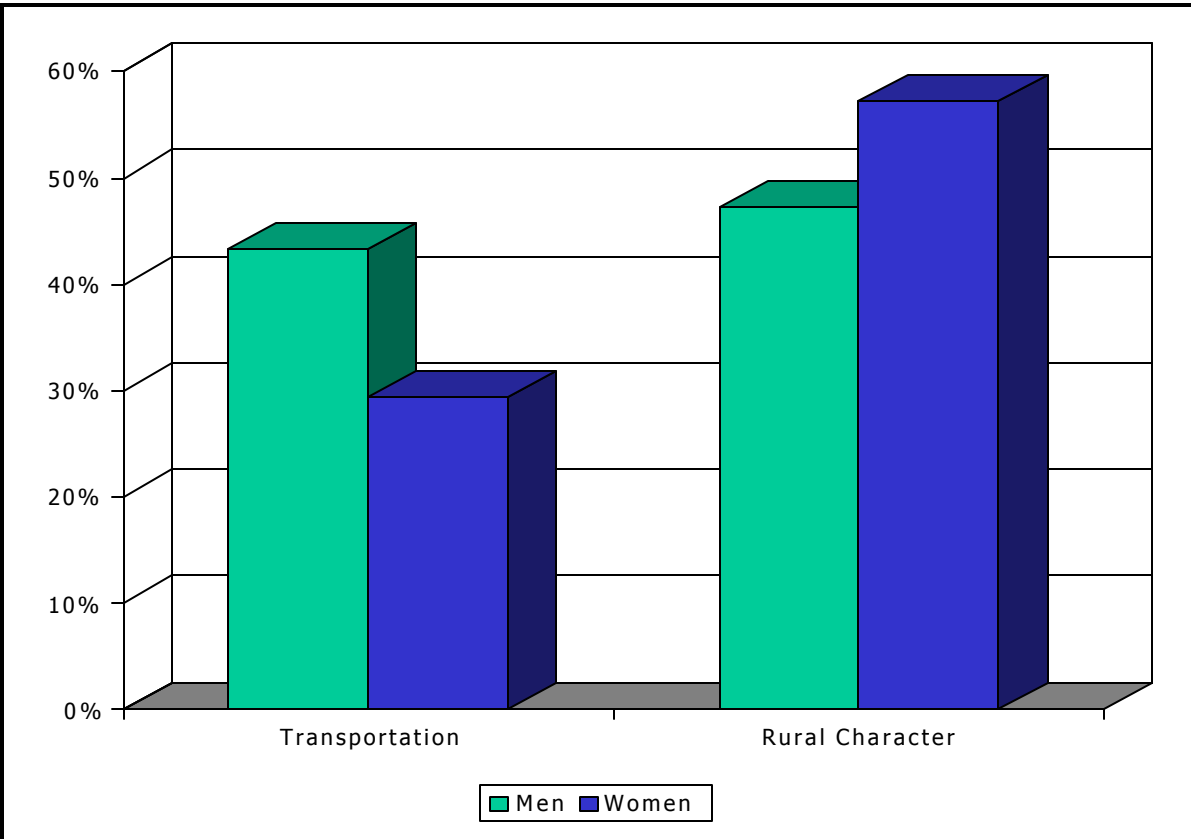


Figure 6 Gender and Preferences for Rural Character

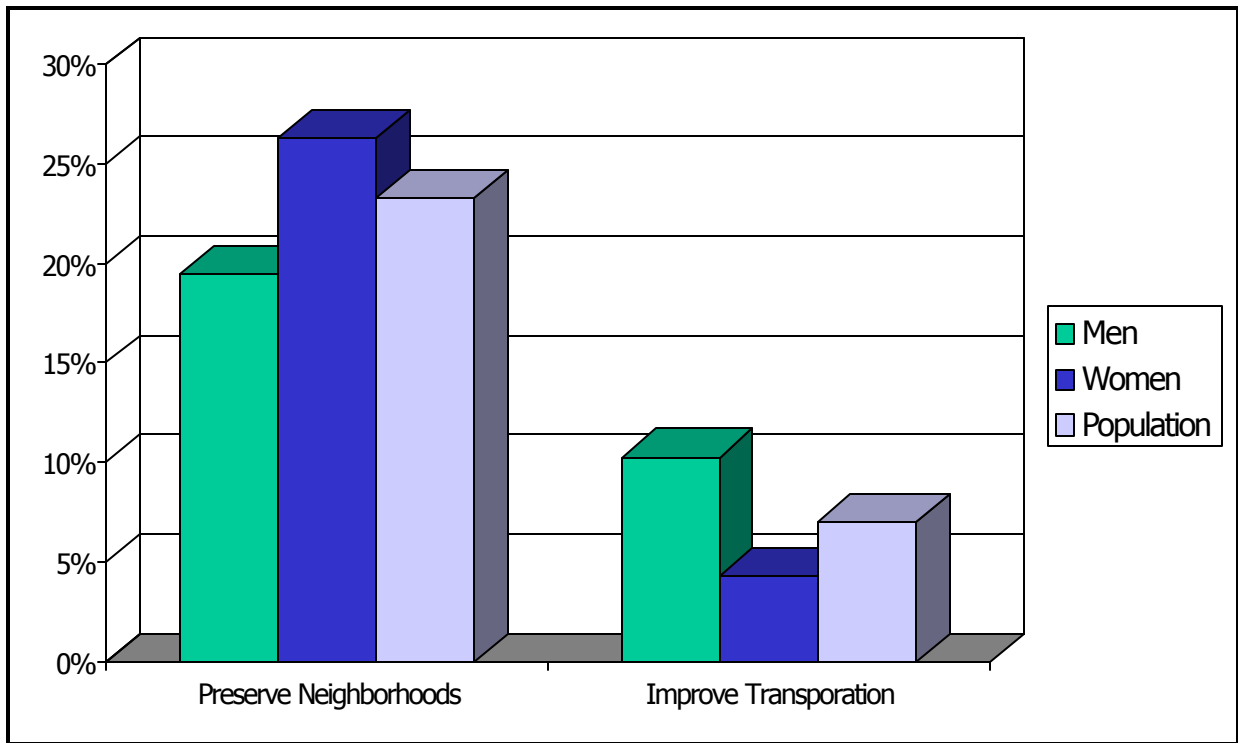


Figure 7 Extreme Scale Responses by Gender

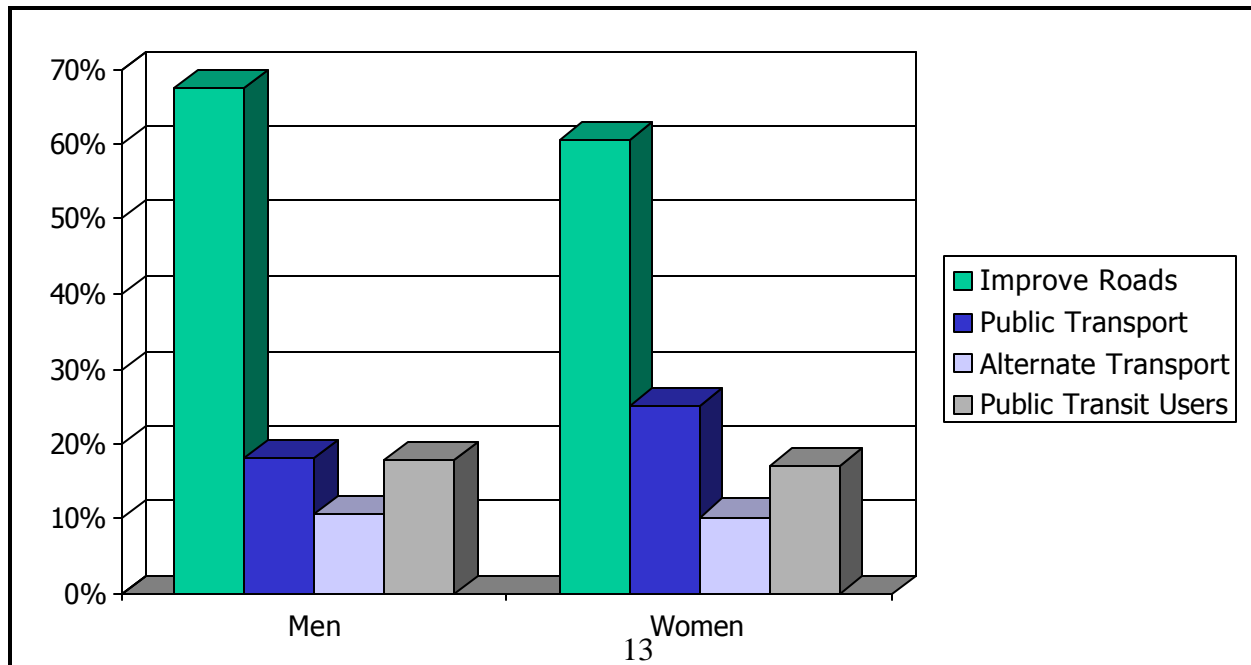


Figure 8

Figure 7 shows another perspective on the influence of gender. The question regarding the tradeoff between transportation and neighborhood effects asked for a response on a 1-10 scale, with 1 being the most strongly supportive of neighborhood preservation and 10 being most strongly supportive of transportation improvements. The mean scores tell one part of the story, but so does the distribution of responses at the extreme ends of the scale. Only the "1" and "10" responses are shown in Figure 7.

First, there are many more people, both men and women, who feel strongly about neighborhoods than transportation. Twenty three per cent of respondents answer "1" under neighborhood preservation, while only seven percent answered "10". As with the other responses, women are more likely than men to have given the most "pro neighborhood" answer, and men more likely than women to have given the most "pro transportation" answer.

Women generally are more concerned about sprawl and would prefer to preserve rural character and urban neighborhoods. This concern is irrespective of whether women work outside the home or not; When work outside the home is controlled for, the patterns of answers given are the same. But when it comes to the future transportation system, the differences between women and men are much smaller. Figure 8 breaks down the answers to the question of the preferred mode for future investment by gender. The strong support for improving roads v. other modes is evident among both men and women. Women are somewhat more likely to want public transit (25% v. 18% for men), but the number of women who use public transit is only 1% higher than of men.

The other personal characteristic which is related to concerns about sprawl and transportation is age. Figures 9-11 show these relationships. Figure 9 shows that there is a definite tendency for concern about sprawl to increase with age. The proportion of those answering that they are "very concerned" about sprawl is nearly twice as high among those over 65 (40%) as those under 30 (20.2%), and those over 65 show a higher proportion of responses in the "very concerned" than in the "somewhat concerned" (medium) category, the only age group to do so.

The relationship between age and sprawl concern is also statistically significant (Chi square $p < .0001$).

When preferences for regional v. local spending on transportation are examined by age, there is relatively little difference among the age groups, except in the case of those under 29, where more than 77% prefer regional spending to local. Other age groups all cluster around 72% preference for regional rather than local. Given the lower level of concern about sprawl and greater desire for investments that will enhance regional mobility among young people, it might be expected that they would also be less likely to support preservation of rural character and urban neighborhoods, but this is not necessarily the case, as Figure 10 shows.

Younger people are more likely than any other age group to want to preserve rural character at the expense of transportation improvements. However, preference for urban neighborhoods increases with age. Using the mean scores on the question of urban

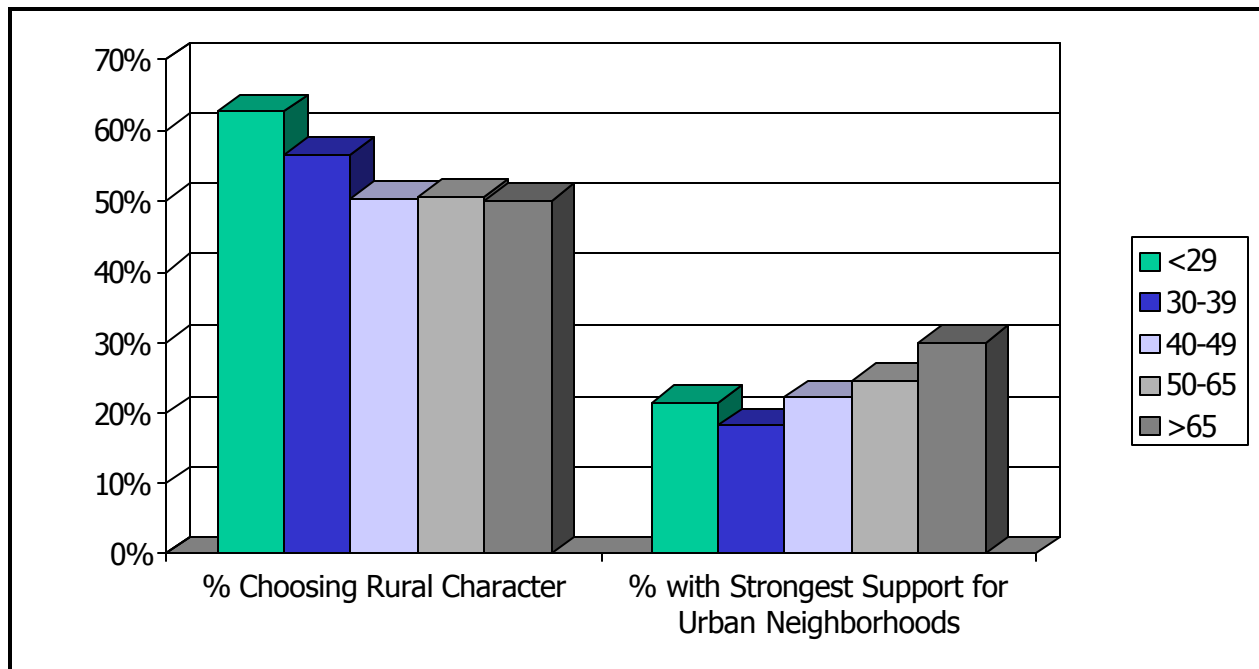


Figure 9

neighborhoods v. transportation, there is little difference among the age groups, though it is

consistent with this finding. But when those who indicate that they have the strongest preference for urban neighborhoods are broken down by age, the pattern of increasing support for neighborhoods with age increases is apparent.

Preferences for future transportation improvements are somewhat related to age (Chi square $p < 0.02$), but again the actual distribution is somewhat surprising. Those under 40 are somewhat more likely to prefer road improvements, and those under 30 are more likely to prefer alternate transportation modes. But those between age 40 and 49 are the most likely to prefer public transit and alternate transportation, while those over 65 are the second most likely to prefer improving roads.

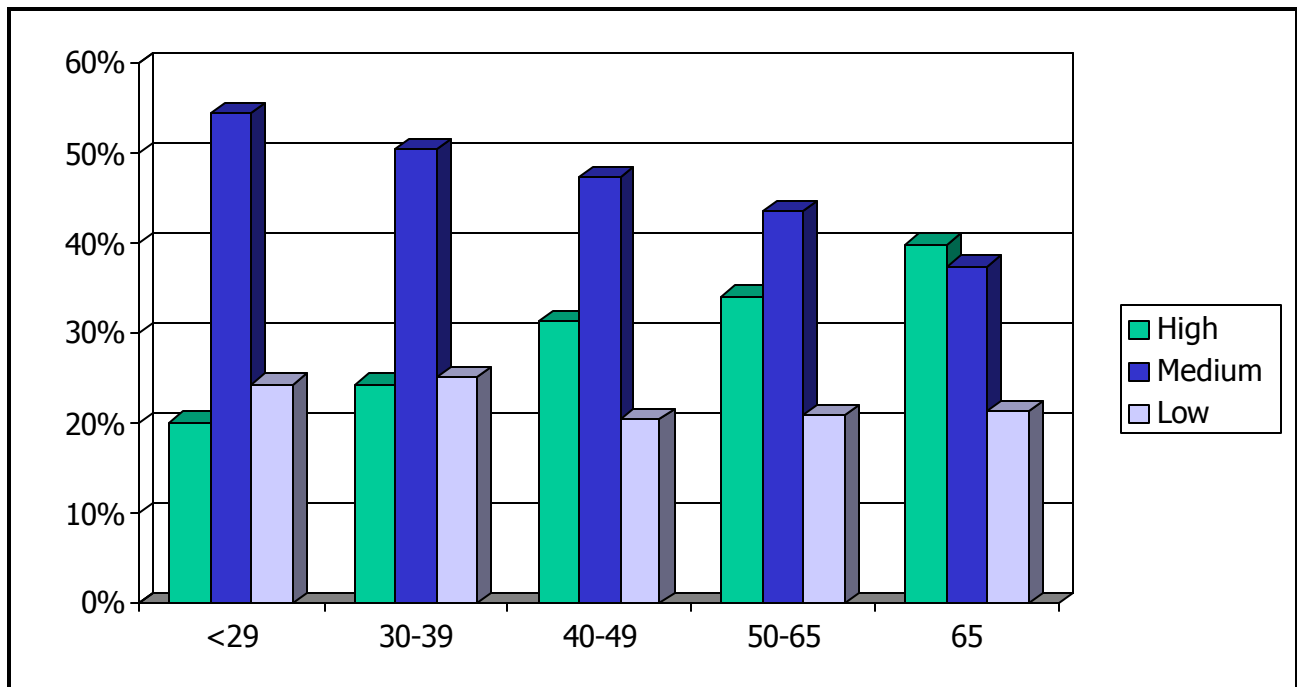


Figure 10 Concern about Sprawl and Age

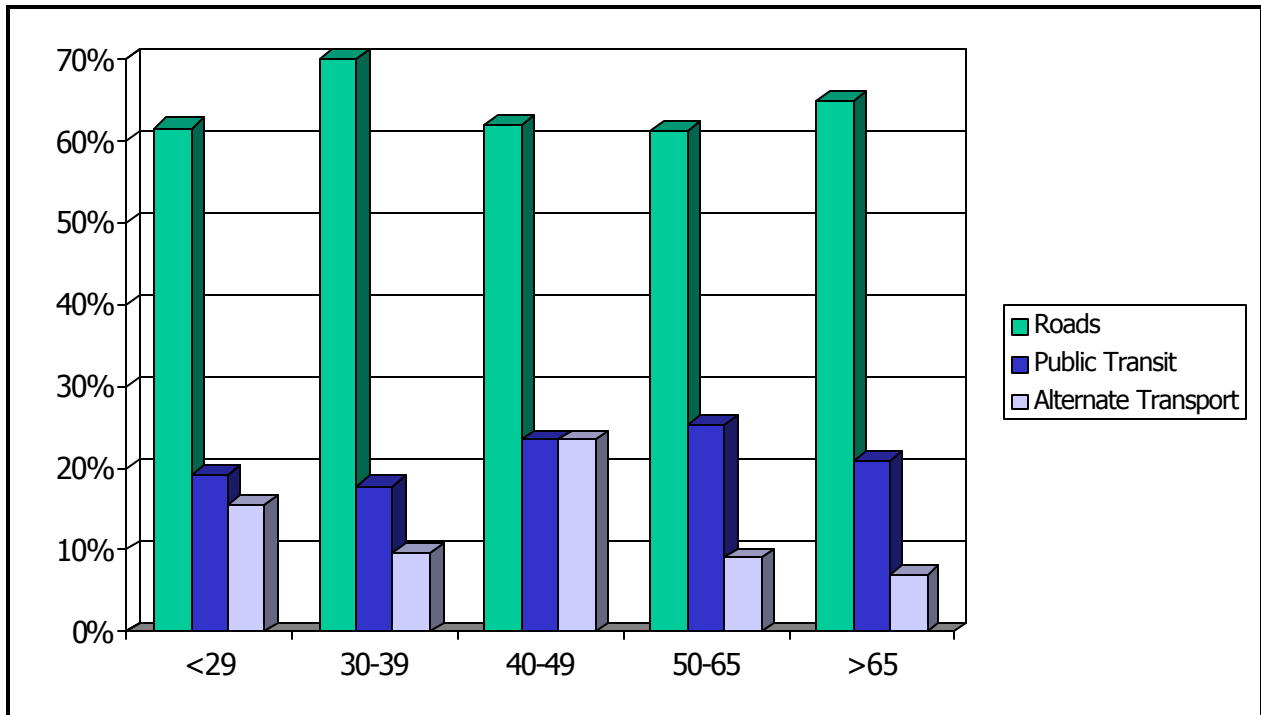


Figure 11 Preferences for Transportation Improvements v. Age.

Commuting and Auto Ownership Characteristics

Travel behavior may be related to attitudes about the relationship between transportation and sprawl. In general, it might be expected that those who are already heavy travelers will be more likely to support transportation improvements. This is examined in Figures 12-13, which looks at commuting behavior and auto ownership.

Respondents were asked to identify both the town in which they live and the town to which they commute for work. These answers were grouped into four categories:

- Live and work in same town
- Commute to another town within the seven town PACTS region
- Commute to another town with Cumberland County
- Commute to another location outside of Cumberland County.

The latter category includes those who routinely travel long distances for jobs such as sales or construction. When asked about their concern regarding sprawl, those who commute to another town within the PACTS region have a greater concern about sprawl (33% reporting high concern) than those who live and work in the same town (25%).

Figure 12 compares preferences for regional v. local transportation based on commuting patterns. The graph shows the proportion of respondents in each commuting group who selected regional v. local spending. While the strongest preference for local spending does, in fact, appear among those who do not commute outside the town of their residence, the preference for regional spending is much higher in this group as in all commuting groups. . There is also an increasing preference for regional spending as commuting distance increases, though the relationship is not consistent. Those who commute to other towns in Cumberland County have a lower preference than those who commute within the PACTS region, which is not entirely surprising given that the "regional" investments in the question are limited to the PACTS region itself. The overall relationship is also not statistically significant.

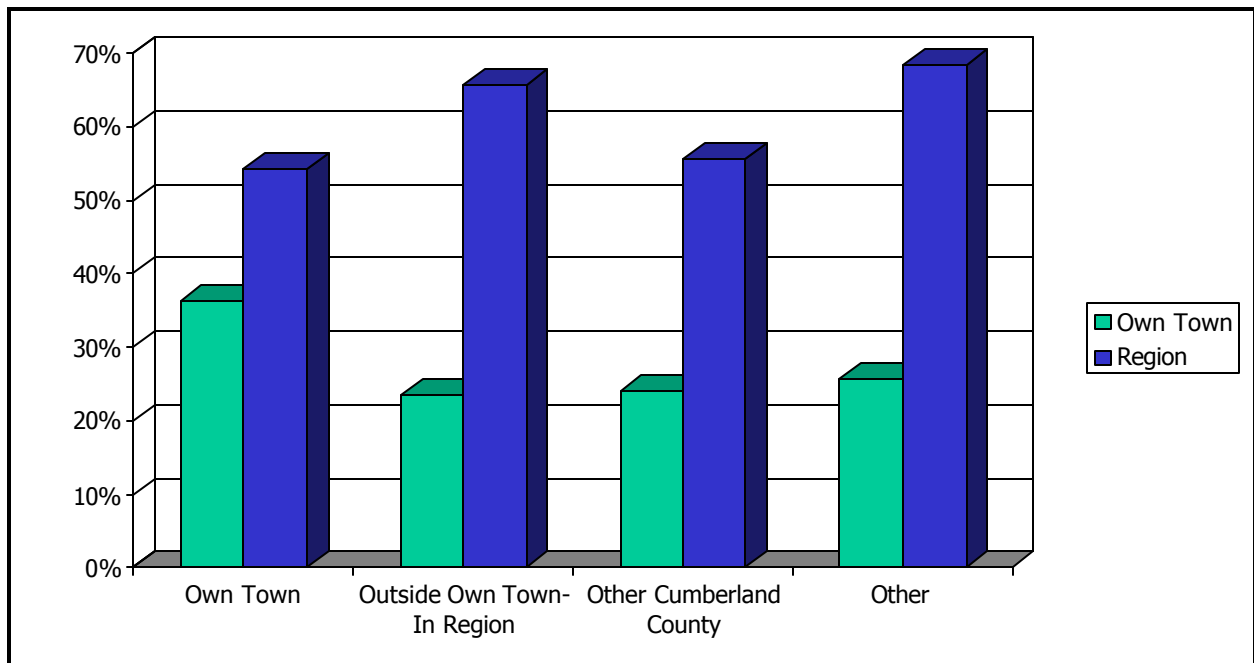


Figure 12 Commute Pattern by Preference for Regional Spending

Figure 13 shows the mean autos per household for respondents to the questions about sprawl concern and regional spending preferences. The variances in auto ownership for those who prefer regional v. local spending are in the expected direction, with those who prefer regional spending owning slightly more cars per household. However, those who are most concerned about sprawl own only slightly fewer cars than those who are least concerned.

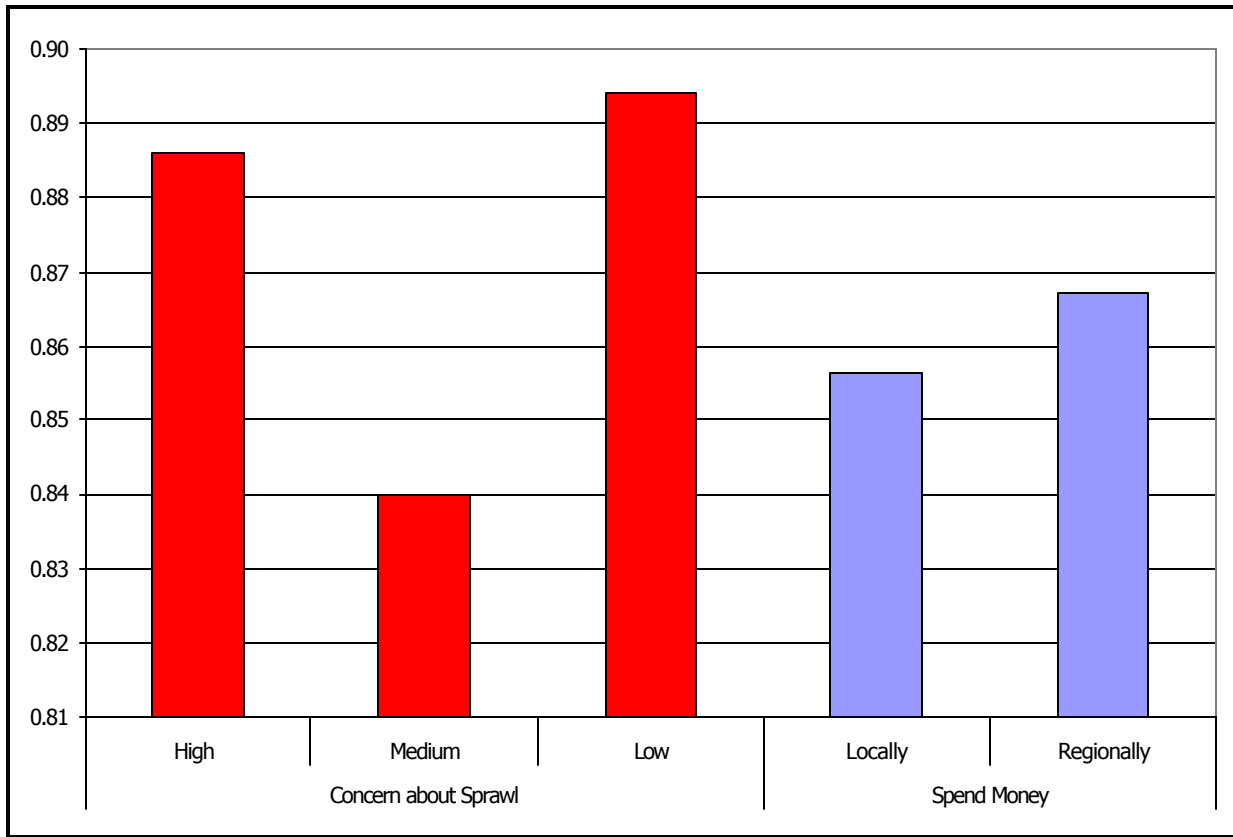


Figure 13 Mean Autos Per Household by Sprawl Concern and Spending Preference

Conclusions

The conflict between finding land use patterns that minimize inefficient over-consumption of land and the development of improved transportation, particularly improvements to the overwhelmingly dominant mode of auto transportation, is one of the most difficult problems facing planners, whether they focus on transportation or land use. While much of this conflict is played out in the debate over specific projects, this survey suggests that the conflict between land use and transportation is much more widespread than project-specific issues.

Overall, the respondents in the Portland area want to deal with sprawl, want improved transportation, and want the character of rural communities and neighborhoods preserved. These views are widespread, and are largely irrespective of personal characteristics or travel behavior. Planners seeking to deal with these issues will have to face the fact that there is no consensus about which is to be a priority. This will have to be done even while facing a variety of project-specific conflicts. As an example of the problems that will arise, the survey revealed a strong preference to solve such transportation problems as the bottleneck in the town of Gorham, particularly among residents of Gorham. But when the Maine Department of Transportation

recently brought ten different approaches to solving the problem to the town; virtually all were opposed.

Planners and political leaders seeking to find appropriate solutions will have to undertake several different strategies to assure public support for whatever solutions are proposed. The results from this research suggest the following elements:

1. Recognize the conflicts in people's desires and find solutions that address both transportation needs and land use. In many such discussions, the preferred solution is public transit. While this is an option in larger metro areas, the Portland region and similar small metro areas cannot turn to fixed rail systems and are unlikely to use the bus. Support for public transit in the theoretical realm of the survey does not translate into actual ridership in Portland, or elsewhere.

This means finding new ways of living with the automobile such as intelligent transportation systems, as well more traditional approaches to adding capacity. For this strategy to be successful, proposals for action on either or transportation or land use must follow a maxi-min approach. That is, they must be shown to have the maximum impact on the appropriate problem while minimizing impacts on the other. Gifford (1999) suggests that the failure to do this is precisely what gets many transportation project into trouble.

2. Clarify choices. Strategy one takes preferences- and their conflicts, as a given and attempts to shape policies to the preferences. The second strategy suggests the opposite. Recognize that the conflicting preferences exist at the relatively abstract level that can be explored in survey research, but that preferences can be reshaped as additional information is provided. At the survey level, it may be perfectly logical to prefer both minimizing sprawl and improving transportation. But as more information is provided to people about the possible tradeoffs, many people will be able to order their preferences and provide clearer guidance. However, this can only be done if planners structure communications with the public that permit preferences to be clarified and ordered.

Careful attention must also be paid to the way in which preferences are elicited so that issues such as voting paradoxes, starting point bias and presentation order bias are minimized. There is a large literature on the influence of various techniques in preference order elicitation on outcomes that arises in studies on referenda and contingent choice surveys. A good summary discussion of these biases may be found in Abrams (1980) and in Mitchell and Carson (1989).

3. Building Coalitions. The Olson model suggests that those who would benefit from a transportation improvement are much less likely to be effective in voicing their views in the political process. They face high costs of organizing compared with the small benefits to each individual. If those would benefit from a transportation project are to have a voice in the process, they will need to be identified and brought into the process deliberately. Deliberate efforts by executive branch agencies to assure balanced and effective representation in political processes are suggested by Kelso (1978).

In doing so, it will be necessary to take into account the kinds of differences discussed here. There are sufficiently clear differences among men and women, and older and younger citizens on the issues that they may form the basis for identifying and engaging people who might counterbalance the views of more narrowly focused interests. Unfortunately, the level of detail available in this survey is not sufficient to provide effective guidance in identifying the elements of such coalitions. Time constraints on the survey and the need to focus on other travel behavior questions of interest to PACTS precluded identifying other personal characteristics that might have been more informative about attitudes. These would certainly have included occupation as well as non-work travel behavior. Ethnicity would also be a key characteristic in many urban regions, though it is a relatively small one in Portland.

Moreover, telephone surveys of the type discussed here are by their nature crude tools for measuring public responses to controversial issues. They are particularly problematic when asking about inherently complex questions such as those discussed here. The findings here cannot be taken as evidence that transportation-land use conflicts are unresolvable, only that these conflicts cannot be seen as limited only to those narrowly interested in a particular project. The implication is that both transportation and land use planners must incorporate explicit strategies for helping the public understand the conflicts and make informed choices at both the plan and project stages.

REFERENCES

- Abrams, Robert. 1980. *Foundations of Political Analysis: An Introduction to the Theory of Collective Choice*. New York: Columbia University Press.
- Colgan, Charles S. and Gary Quinlan 1998. "The Catch-22 of Congestion Pricing" *Transportation Quarterly*, Spring.
- Colgan, Charles S. 2000. "A Profile of the Workforce in the Portland Region" Portland: University of Southern Maine Center for Business and Economic Research.
- Downs, Anthony. 1992. *Stuck in Traffic: Coping with Peak Hour Traffic Congestion*. Washington: The Brookings Institution.
- Fairfield County Business Journal, 07/24/2000, 'Just more traffic all the time' in Westchester. Vol. 39 Issue 30, pM26, 1p
- Gifford, Jonathan L. 1999. "Increasing the Social Acceptability of Surface Transportation Projects". *Transportation Quarterly* 53:4, Fall.
- Jackson, Kenneth. 1985. *The Crabgrass Frontier* New York: Oxford University Press.
- Mitchell, Robert Cameron and Richard Carson. 1989. *Using Surveys to Value Public Goods*. Washington, Resources for the Future.
- New York Times. 2000 "Hisses and Groans Greet Plan to Replace Tappan Zee Bridge". May 3, 2000.
- Olson, Mancur 1965. *The Logic of Collective Action; Public Goods and the Theory of Groups* Cambridge, Mass., Harvard University Press.
- Plous, J.K. 2000. "Taming the Traffic Tiger". *Planning*. August 2000 22-26.
- Pucher, John, Tim Evans, and Jeff Walker. 1998. "Socioeconomics of Urban Travel: Evidence from the 1995 NPTS". *Transportation Quarterly*. 52:3, Summer.