Attitudinal Market Segmentation for Transit Design, Marketing, and Policy Analysis

Timothy J. Tardiff*, Department of Civil Engineering and Division of Environmental Studies, University of California, Davis

The segmentation of a population into groups that have similar perceptions of transit attributes or similar outlooks on transportation issues could be very useful in the design, marketing, and operation of transit systems and in the analysis of transit policies. This paper uses a variety of statistical methodologies in the development of such market segments. The data are from a representative sample of households in the Sacramento metropolitan region. A set of 23 general transportation attitude items and a set of 30 specific transit attributes are the basic inputs into the analysis. Responses to items in each set are factor analyzed, and the resulting factor scores are input into a hierarchical cluster-analysis program. The outputs are the market segments. The segments are then examined for differences in objective characteristics and travel behavior patterns. Groups that have similar patterns of general or specific attitudes were found to emerge, and these groups differ in some objective characteristics and travel behavior. The market segmentation based on specific transit attributes appears to be useful for design and marketing decisions; the general market segments are primarily useful for analyzing support for transportation policies.

The design, provision, and marketing of transit services may be improved by focusing on differentiated transit markets rather than on an undifferentiated service market (1). The use of market segmentation tools developed in other marketing contexts may be useful in transit management (2-5).

At least three purposes for market segmentation have been identified:

1. Demand forecasting tools may be improved by development of separate models or sets of models for various segments (2, 4, 5),
2. Division of the population into homogeneous segments may be useful in the design and marketing of transit services (3), and
3. Market segmentation might help managers identify groups that support or oppose various transit policies, independent of their potential transit ridership (2) (e.g., various people may support public transit funding without actually using the system).

This paper focuses on the second and third purposes. Four criteria, or segmentation bases, have been suggested for dividing a population into market segments. These are

1. Demographic variables,
2. Measures of transportation opportunities (e.g., automobile and transit availability) (6, 7),
3. Travel behavior variables, and
4. Perceptions of transportation systems and issues (i.e., attitudinal variables).

The identification of groups that are sensitive to particular transit characteristics or to particular policies could be very important information for transit policymakers. For this reason, this paper will focus on market segmentation based on attitudinal variables.

METHODOLOGY

The techniques used to develop transit market segments based on attitudinal variables are similar to those used by General Motors researchers in a pioneering transportation market segmentation study (4, 5). The key inputs into the analysis are the responses to two sets of attitudinal items obtained from a household survey. By use of appropriate multivariate statistical techniques, the respondents are categorized into a small number of market segments based on similar responses to the attitudinal items. The segments are then examined for differences in objective individual and household characteristics and for differences in travel behavior.

The data were collected in the spring of 1975 in the Sacramento metropolitan area. A representative sample of 1280 households was contacted and a questionnaire containing items relevant to several transit planning and marketing issues was administered to one member of the household. Details of the study design and a copy of the questionnaire are available in Ingram (8) and Tardiff and others (9).

The first set of attitude items contains 23 statements designed to measure general feelings toward automobile and transit systems and policies relevant to those systems. The second set is a list of improvements in 30 specific transit attributes. Respondents were asked to indicate the likelihood of increased transit ridership with each of the 30 improvements. The two sets are used separately to yield a market segmentation based on general and specific attitudes, respectively.

Each set is factor analyzed to yield a smaller number of more basic attitude dimensions. Kaiser varimax rotation was used for principal components analysis. Factor scores for each individual are used as input into the Bimed hierarchical cluster-analysis program (10, 11). The output from the program is the classification of the sample into a small number of market segments. Finally, differences in objective characteristics and travel behavior are examined by the use of simple descriptive statistics. Discriminant analysis, a multivariate technique, can also be used to examine differences in objective characteristics. This was done elsewhere (9, 12), where it was found that the qualitative interpretation of group differences was the same as that derived from the simple statistics. Therefore, the results of the discriminant analyses are not reported here. More details on the methodology are reported elsewhere (9, 12). A complete set of computer programs has been developed and tested for market segmentation analyses by using survey instruments similar to the one used in the Sacramento study (13).

These procedures result in the division of the sample into groups that have similar general feelings toward transportation issues or similar perceptions of specific transit attributes. By observing differences in objective characteristics, it is possible to determine whether groups that have similar attitudes also have similar

Table 1. Pattern of mean responses for the general market segments on the five input factors.

Factor Number	Factor Label	Segment 1 Proautomobile Restrictions (N=136)	Segment 2 Transportation Supporters (N=490)	Segment 3 Antitransit (N=106)	Segment 4 Antifreeway Expansion (N=135)	Segment 5 Satisfied with Status Quo (N=120)	Segment 6 Miscellaneous (N=216)
1	Buses cause problems		*	x		*	x
2	Profreeway improvements		x		**		
3	No serious automobile problems	x	*			xx	
4	Increased transit role	*	x	**	x		
5	Automobile restrictions necessary	x				*	

Notes: xx = much stronger than average agreement; x = stronger than average agreement; blank = about average; * = stronger than average disagreement; and ** = much stronger than average disagreement.

objective characteristics, which allows the analyst to more clearly identify the segments. The differences in travel behavior reveal the extent to which attitudes are related to behavior.

Market Segments Based on General Attitudes

Responses to the 23 general attitude items were measured on a five-point agreement-disagreement scale, ranging from strongly agree to strongly disagree. A factor analysis of these items yields a five-factor solution that explains about 43 percent of the variance of the input variables. Based on interpretation of factor loadings, the factors are labeled:

1. Buses cause problems,
2. Profreeway improvements,
3. No serious automobile problems,
4. Increased transit role, and
5. Automobile restrictions necessary.

Only the 1203 respondents who responded to all 23 items are included in this and subsequent analyses in this section.

The five-factor scores for each individual were input into the hierarchical cluster-analysis program. The solution with five groups plus a sixth miscellaneous group, which contained respondents not easily classified into any of the five larger groups, is the most satisfactory. The mean responses for the six market segments on the five factors are represented in Table 1. The segments are labeled based on interpretation of the pattern of mean factor scores (i.e., the pattern of agreement or disagreement with the themes represented by the factors). For each factor, the differences in means for the segments are highly statistically significant, using the standard F-test.

By observing the profiles of mean factor scores for each segment, the attitudinal features of each group can be identified. Because of very large average values on one of the factors, the third, fourth, and fifth segments have fairly straightforward interpretations. Members of the third segment tend to disagree strongly with an increased role for transit. The stronger than average agreement with the belief that buses cause problems is consistent with the general profile. Based on this reasoning, the third segment is labeled "antitransit".

The fourth segment exhibits a much larger than average disagreement with freeway improvement. Also, members of this segment tend to agree with an increased transit role. This pattern suggests a label of "antifreeway expansion" for this segment.

People in the fifth segment tend to agree strongly that no serious transportation problems are caused by the automobile. In addition, they tend to disagree with the contentions that buses cause problems and that automobile restrictions are necessary. This profile suggests relative satisfaction with the existing transportation situation. This group is close to the average on the two factors that indicate expansion of either freeways or transit, which is consistent with the relative satisfaction interpretation. Therefore, this segment is labeled "satisfied with status quo".

Because of a lack of very high average scores on any of the factors, the remaining three segments are somewhat more difficult to label. The sixth segment is made up of numerous individual cases and small clusters. Probably the miscellaneous label is most appropriate; however, there does appear to be some concern about the problems caused by buses. This suggests a subtitle of "concerned about bus problems".

The first segment has moderately large average factor scores on the third, fourth, and fifth factors. The profile that emerges is one of agreement that there are no serious automobile-related transportation problems, disagreement with an expanded role for transit, and agreement with the need for automobile restrictions. Although this pattern seems somewhat inconsistent at first, if it is noted that the automobile-related problems in the third factor are primarily congestion and parking problems, the agreement with automobile restrictions might be for other reasons. At any rate, this segment is labeled "proautomobile restriction".

Because the second segment is much larger than the others, it is not surprising that average scores are not as extreme. The strongest sentiment seems to be one of disagreement with the contention that there are no serious automobile-related transportation problems. This fact, together with the tendency to disagree that buses cause problems and agree with expanded roles for both freeways and the bus system, suggests a label of "transportation supporters".

Differences in Individual and Household Characteristics

The market segments are examined for differences in six characteristics: (a) age, (b) sex, (c) income, (d) education, (e) the ratio of automobiles to licensed drivers in the respondent's household, and (f) a transit level-of-service index. The last variable was developed

Table 2. Means and standard deviations for the general market segments on six objective characteristics.

Segment		Age[a]		Sex		Income		Education[a]		Automobiles per Licensed Driver[a]		Level of Service Index	
Number	Label	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Proautomobile restrictions (N=114)	43.34	15.86	1.66	0.48	3.23	1.60	3.66	1.39	0.82	0.50	1.75	0.85
2	Transportation supporters (N=431)	40.06	15.30	1.61	0.49	3.13	1.53	3.89	1.49	0.87	0.36	1.56	0.83
3	Antitransit (N=88)	46.30	17.52	1.53	0.50	3.40	1.74	3.80	1.36	0.96	0.37	1.57	0.87
4	Antifreeway expansion (N=122)	40.55	15.16	1.57	0.50	3.38	1.68	4.71	1.76	0.86	0.33	1.56	0.88
5	Satisfied with status quo (N=107)	47.57	14.67	1.49	0.50	3.64	1.67	3.94	1.76	0.95	0.39	1.71	0.85
6	Miscellaneous (N=181)	42.27	16.19	1.60	0.49	3.19	1.78	3.82	1.72	0.81	0.33	1.75	0.89

Notes: Sex 1 = male, 2 = female; income 1 = 0 - $5000, 2 = $5000 - $10 000, 3 = $10 000 - $15 000, 4 = $15 000 - $20 000, 5 = $20 000 - $25 000, 6 = $25 000 - $30 000, 7 = over $30 000; education 1 = 0 - 8 grades, 2 = 9 - 11 grades, 3 = 12 grades, 4 = some college, 5 = junior college graduate, 6 = 4-year college graduate, 7 = postgraduate; level of service index 0 = no transit service, 1 = below average service, 2 = good transit service, 3 = excellent transit service. Age is measured in years and automobiles per licensed driver is as defined.

[a]Differences in segment means significant at $p < 0.01$.

by transportation planners to summarize transit availability in the Sacramento region.

Table 2 lists the means and standard deviations for the six market segments on the characteristics just defined. All differences are based on respondents who gave a complete set of answers for all six characteristics. This results in some reduction in sample size. The differences in means for the age, education, and automobiles per licensed drivers variables are all highly significant. Also, when income is used as a categoric variable, statistically significant differences in income distributions appear (9). Therefore, differences among the market segments on these four variables are noted.

First, the largest segment, the transportation supporters, appear to be about average on most of the characteristics examined, with the exception of below average age and income. The same is basically true for the miscellaneous segment, with the exception of somewhat below average automobile availability.

The first segment, the proautomobile restrictions group, appears to include respondents who have average income but are somewhat older, have lower automobile ownership, and have lower educational status than average. Perhaps the support for automobile restrictions arises from the lower than average automobile availability.

The antitransit and the supports-the-status-quo segments (3 and 5) have very similar patterns of characteristics. Both exhibit high automobile availability, higher than average income, and tend to contain older respondents. The difference is in the education level; the status quo segment has about average education and the antitransit segment has below average education. The higher level of education may be the cause of the difference between the conservative antitransit position and the moderate or establishment status quo position.

The antifreeway expansion segment appears to have a unique profile. The lower than average age arises from a high representation of people in the 21-39 age categories and the moderately high income represents a high concentration in the $15 000-$20 000 categories (9). These features and the very high level of educational achievement all suggest a concentration of young professionals. The antifreeway expansion sentiment is also accompanied by a higher than average level of support for an increased transit role. Therefore, this segment appears to be the strongest ally of active and innovative transportation planners.

It is interesting to note that the differences in the transit level-of-service index are not significant, which suggests that general attitudes toward transportation systems are not related to currently available levels of service. Finally, although there are some distinct differences in average characteristics, correspondence is not perfect between objective characteristics and attitudinal variables (i.e., there is overlap among the segments in their objective characteristics). Consequently, attitudinal market segmentation is different from segmentation based on objective characteristics.

Differences in Travel Behavior

Two types of travel behavior are used in this analysis. First, respondents reported the monthly frequencies of trips for school, work, shopping, and miscellaneous (medical, personal business, church, sports or entertainment, and dining) purposes. The total for these four purposes was used as a fifth trip purpose. Second, respondents were asked whether they were users of six nonautomobile driver modes: (a) frequent transit users, (b) occasional transit users, (c) carpool for work, (d) carpool for shopping, (e) carpool for recreational trips, and (f) walk or ride a bicycle to work or school.

Since the qualitative pattern of monthly travel frequencies is more informative than the actual numerical values, it will be noted without reporting numerical results. There are statistically significant differences in mean travel frequencies for school trips, work trips, and total trips.

The general pattern is interesting. The proautomobile restrictions segment and the antitransit segment both have substantially below average frequencies. The antifreeway and status quo segments have somewhat above average frequencies, and the remaining two segments are about average.

The general pattern shows that, although the antitransit and status quo segments are very similar on their personal and household characteristics, including automobile availability, they are very different in their behavior. The former segment is

much more similar to the proautomobile restrictions segment, with its low automobile availability, and the latter segment is similar to the antifreeway group.

The tests for differences in the proportions by use of various transportation modes result in only one relationship that is statistically significant—whether or not the respondent is a walking or bicycle commuter. The highest proportion of people who commute by walking or bicycle is contained in the antifreeway segment (14.1 percent); however, the following three segments are substantially less likely than average to contain such commuters: proautomobile restrictions (2.9 percent), antitransit (3.8 percent), and status quo (3.3 percent). The other two segments, transportation supporters (10.6 percent) and miscellaneous (6.9 percent), have proportions closer to the sample proportion. Although the differences in the proportions of frequent transit users are only significant at the 0.12 level, it is interesting to note that the antitransit segment has the lowest proportion of frequent transit riders. This finding is consistent with the antitransit attitudes of this segment.

In many cases, the segments do not appear to differ substantially in their behavior. This is especially true for the various indicators of nonautomobile driver modal use, where one might expect substantial differences. In particular, there were no statistically significant differences among the market segments with respect to frequent or occasional transit use. Such a finding may indicate that general feelings toward transportation modes may not be strongly related to modal selection. This is consistent with Johnson's (14) findings and suggests that segments based on general attitudes may be more useful in identifying groups that support or oppose particular transit policies than in explaining travel behavior.

The behavioral patterns for the various segments offer new insights into their characteristics. The antitransit group and the proautomobile restrictions group are quite similar in their behavior. Both groups exhibit low mobility, even though the former group has higher than average automobile availability and the latter group is below average. The antifreeway and status quo segments are similar in their behavioral patterns. Both groups have high mobility. The remaining two segments, the transportation supporters and the miscellaneous group, both were fairly average in their travel behavior.

MARKET SEGMENTS BASED ON SPECIFIC ATTITUDES

The purpose of developing market segments based on specific transit attributes is to identify groups of people who are especially sensitive to particular attributes. In the General Motors study (4, 5) the segmentation was based on responses that indicated the importance of specific attributes in current modal choice decisions. These data are not available in the Sacramento study. However, respondents were asked to indicate the likelihood of increased transit use if improvements were made in 30 specific attributes. The responses were recorded on a four-point scale, ranging from very likely to not likely at all. These responses may be used as an indication of the current importance placed on particular transit attributes rather than as accurate indicators of future behavior. With this interpretation, the variables yield information similar to the importance data used in the General Motors study.

The factor analysis of the data for specific transit attributes uses the 966 cases that have complete responses on all 30 items. The analysis yields three factors that explain about 57 percent of the total variance in the input variables (12). These factors are relevant to actions transit managers may take to design, market, or improve their systems. Items that have loadings greater than 0.5 are given primary attention in factor interpretation.

Factor 1 appears to be an indicator of the sensitivity of future transit use to the overall quality of the system. The specific items that have loading greater than 0.5 all refer to the ease or pleasantness of using the system (bus routing, scheduling, fare levels and collection, information availability, safety, and cleanliness).

The second factor contains high loading items that focus on the overall time requirements for a transit trip. Of the 12 items that have loadings of at least 0.5, 9 are related to time. Specifically, the items that cover the overall travel time relative to the automobile, walking time, transfers, directness of bus routes, and frequency all are consistent with a concern for trip time. The remaining items can be interpreted as comparing the quality of the transit ride to that of the automobile. Therefore, although the dominant theme in factor 2 is transit trip time, there might be an underlying comparison of transit to automobile.

The third factor appears to be psychological well-being or comfort. The six items that have loadings greater than 0.5 contribute to a feeling of being at ease while riding the bus. Four of these items refer to the desirability of other passengers, one to the courtesy of the driver, and the remaining item refers to the ease of bus use for the physically disabled.

The three factor scores for each individual are input into the hierarchical cluster-analysis program. A four-group solution, which contains 964 of the 966 cases, is the most satisfactory (12). The remaining two cases are not easily classified into any of the four groups and are excluded from subsequent analyses.

The mean responses for each cluster on the three factors are represented in Table 3. The differences in mean factor scores among the segments are all highly statistically significant.

The profile of mean factor scores for the first segment shows a general pattern of relative unresponsiveness to transit improvements. The high negative average for the time factor and the moderately high negative average for the transit quality factor suggest that this segment is especially unresponsive to the types of actions transit managers can make to improve the physical performance of the system. This segment is labeled "unlikely transit ridership growth segment".

The average factor scores are all positive for the second segment, which indicates a general pattern of responsiveness to transit improvements. The fact that the psychological comfort factor has the highest average value suggests that people in this market segment could be especially responsive to improvements in the psychological environment. Based on the general pattern of responsiveness, this segment is labeled "potential transit ridership growth segment".

The third market segment is characterized by a high positive average value for the trip time factor but moderately negative averages for the other two factors. This pattern suggests that people in this group are relatively quite responsive to improvements that reduce overall transit trip times but relatively unresponsive to changes in transit characteristics related to the other two factors.

Table 3. Pattern of mean responses for the specific market segments on the three input factors.

Factor Number	Factor Description	Segment 1 Unlikely Transit Ridership Growth Segment (N=241)	Segment 2 Potential Transit Ridership Growth Segment (N=387)	Segment 3 Travel Time Minimizers (N=203)	Segment 4 Transit Quality Seekers (N=133)
1	Transit quality	*	x	*	xx
2	Transit trip time	**	x	xx	*
3	Psychological well being or comfort	*	x	*	*

Notes: xx = much more responsive than average to transit improvements; x = more responsive than average to transit improvements; * = less responsive than average to transit improvements; and ** = much less responsive than average to transit improvements.

Table 4. Means and standard deviations for the specific market segments on six objective characteristics.

Segment Number	Description	Age[a] Mean	Age[a] SD	Sex[b] Mean	Sex[b] SD	Income[b] Mean	Income[b] SD	Education[a] Mean	Education[a] SD	Automobiles per Licensed Driver Mean	Automobiles per Licensed Driver SD	Level of Service Index[b] Mean	Level of Service Index[b] SD
1	Unlikely transit riders (N=203)	45.16	17.64	1.52	0.50	3.36	1.81	3.74	1.51	0.88	0.36	1.82	0.83
2	Potential transit riders (N=349)	40.11	15.65	1.61	0.49	3.18	1.48	3.93	1.52	0.87	0.40	1.65	0.81
3	Travel time minimizers (N=181)	43.06	14.79	1.57	0.50	3.50	1.76	4.49	1.73	0.90	0.35	1.65	0.90
4	Transit quality seekers (N=116)	41.55	15.24	1.68	0.47	3.03	1.45	3.84	1.77	0.84	0.36	1.50	0.90

Notes: Sex 1 = male, 2 = female; income 1 = 0 - $5000, 2 = $5000 - $10 000, 3 = $10 000 - $15 000, 4 = $15 000 - $20 000, 5 = $20 000 - $25 000, 6 = $25 000 - $30 000, 7 = over $30 000; education 1 = 0 - 8 grades, 2 = 9 - 11 grades, 3 = 12 grades, 4 = some college, 5 = junior college graduate, 6 = 4-year college graduate, 7 = postgraduate; level of service index 0 = no transit service, 1 = below average service, 2 = good transit service, 3 = excellent transit service. Age is measured in years and automobiles per licensed driver is as defined.

[a] Differences in means significant at $p < 0.01$.

[b] Differences in means significant at $p < 0.05$.

For this reason, the segment is labeled "travel time minimizers".

People in the fourth segment tend to be very responsive to changes in the general quality of the transit system (i.e., improvements in the ease or pleasantness of using the system that result from changes in bus routing, scheduling, fare levels and collection, information availability, safety, and bus cleanliness). On the other hand, respondents in this market segment tend to be moderately unresponsive relative to the sample average to changes in trip time and quite unresponsive to changes that improve the psychological environment. This profile suggests the label "transit quality seekers".

Differences in Individual and Household Characteristics

The same six variables that were used to examine the general market segments are used here. Table 4 contains the means and standard deviations for the market segments on these characteristics. Again, all differencee are based on respondents who gave a complete set of answers for all six characteristics, which results in some reduction in sample size. There are statistically significant differences for five of the six variables. Also, when the automobiles per licensed driver variable is treated as a categoric variable, significant differences emerge (12). Therefore, differences in the market segments on all six characteristics are noted.

By considering the labels for each segment with their objective characteristics, some insights into potential responses to changes in the transit system and marketing campaigns may emerge. The first segment, the unlikely transit ridership growth segment, tends to have older members, males, somewhat higher income, low average education, somewhat higher than average automobile availability, and higher than average regional transit service. In addition, respondents in this segment are least likely to ride transit. The combination of above average income, below average education, and above average age suggests that members of this segment may tend to be at the upper levels of nonprofessional job categories. All in all, changes in transit service levels or marketing appear to be least likely to generate transit ridership among this segment, which is 25 percent of the sample.

The potential transit ridership growth segment, which constitutes 40 percent of the sample, is primarily characterized by its low average age. Since this segment seems to be most responsive to the social and psychological environment of transit, marketing campaigns that emphasize this aspect of bus service, which are targeted to younger people, may be effective. The current Sacramento Regional Transit campaign, which emphasizes the nice people who ride the bus, might be a good example of such an approach.

The third segment, the travel time minimizers, tends to have people in the 30-59 age groups (12) and has the highest average income, education, and automobile availability. This combination suggests a high representation of people in professional job categories. Service improvements and marketing strategies targeted for this group probably should focus on direct and timely bus travel. This segment, which contains 21 percent of the sample, has the highest proportion of frequent transit riders, which indicates the possibility that this group would be quite responsive to improved transit.

The transit quality seekers are 14 percent of the sample. The segment has a higher than average representation of females and has below average values on the income, education, automobile availability, and transit level-of-service variables. In spite of its below average level of service, this segment has the highest proportion of occasional transit riders and the second highest percentage of frequent transit riders. Since the convenience and ease of using the transit system are much more important for members of this segment than for respondents in the other segments, any bus improvement program or marketing effort directed at this group should probably emphasize these aspects. An information campaign that emphasizes the convenience of bus travel might be effective with this segment. For example, Sacramento Regional Transit currently publishes a bus book, which is designed to make the bus system easier to use.

Differences in Travel Behavior

The same measures of travel behavior that were previously used are used here. For the variables that measure monthly travel frequencies, the general pattern is noted without presenting numerical results. Proportions that use various nonautomobile driver modes are also discussed.

For the monthly travel frequency variables, only the differences in school trip frequencies are statistically significant; the key difference is the low monthly frequency for the unlikely transit ridership growth segment. Although none of the other differences was significant, the general pattern for most purposes is that the unlikely transit riders have the lowest trip frequencies, the transit quality seekers have the second lowest frequencies, the potential transit riders have the second highest frequencies, and the travel time minimizers have the highest frequencies.

The tests of distributions in the modal selection variables result in the differences that involve whether the respondent carpools for shopping or recreational trips; commutes by walking or bicycle are almost negligible. The differences in frequency of transit use are highly significant. In order of increasing proportion of transit use, the segments are the unlikely transit riders (6.2 percent), the potential transit riders (12.9 percent), the transit quality seekers (15.0 percent), and the travel time minimizers (16.3 percent). Although the differences in the occasional transit use variable are not statistically significant, this general pattern also holds with the exception of a reversal in the two highest frequency segments. In increasing order the proportions are 8.7, 12.4, 12.8, and 15.8 percent. Also, consistent with the pattern for the two transit variables, the unlikely transit riders have the lowest proportion of members who carpool to work, although the difference is not quite significant even at the 0.10 level.

For purposes of explaining current travel behavior, the general conclusion appears to be that market segments based on specific transit attributes are primarily useful for explaining transit use. The fact that the segment that tends to be the least likely to increase transit use with improved transit service also has the lowest proportion of current transit users certainly suggests a consistent pattern. On the other hand, differences in other travel behavior are generally insignificant.

SUMMARY AND CONCLUSIONS

The empirical results indicate that a sample may be divided into a reasonably small number of groups that have similar attitudes. Further, there are differences in both objective characteristics and travel behavior associated with membership in a market segment. Therefore, the results serve to further demonstrate the usefulness of market segmentation methodology in transportation planning contexts.

By considering both general and specific transportation attitudes as bases for market segmentation, a comparison of their usefulness for transit planning is possible. Because of the identification of attitudinal dimensions that suggest specific improvements in transit design, operations, and marketing and the formation of groups based on these dimensions, the use of specific market segments appears to have the most immediate practical application for transit managers. Particular marketing or design actions appear to be the most appropriate for particular segments. Further, because the segments tend to have different objective characteristics, there is some indication on how particular strategies may be targeted more effectively.

On the other hand, a general market segmentation may be useful if a transit official is interested in examining levels of support for transit policies. In this case, the concern is not so much one of whether public decisions will lead to changes in travel behavior but one of mobilizing support for public decisions. An official of a public transit system has the dual role of implementing public policies that at least indirectly affect the general public and of providing a service that currently reaches a relatively small segment of the public. The results of this paper suggest that different market segmentation approaches may be desirable for analyzing issues relevant to the two roles.

Unlike the findings in the General Motors studies (4, 5), there is a strong statistical association between membership in general and specific market segments. That is, for any particular general market segment, the members do not appear to be randomly distributed among the specific market segments and vice versa (12). A complete description of the pattern of association is beyond the scope of this paper. Some of the more interesting relationships are the higher than average proportion of people in the general antitransit segment who are members of the specific unlikely transit ridership growth segment and the high representation of antifreeway members in the travel time minimizers segment. The difference between this study and the General Motors study with respect to this finding could be caused by different sets of attitude items, different sample populations, and somewhat different methodologies.

Attitudinal market segmentation methodologies have the potential of offering useful information for the design and marketing of transit systems and for transit policy analysis. The results of this paper are best viewed as a preliminary demonstration of the potential usefulness of the market segmentation approaches. Further studies in other areas, using somewhat different survey instruments and methodologies, are necessary to a fuller assessment of the usefulness of the approach. Also, a post hoc assessment of the effectiveness of transit policies that are based on prior information from a market segmentation study would be the ultimate test of the efficacy of transit market segmentation.

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**T.J. Tardiff is now with Charles River Associates, Inc., Boston.*

The Transportation Manager: An Evolving Concept

Frank W. Davis, Jr., and Lawrence F. Cunningham, Department of Marketing and Transportation, Transportation Center, University of Tennessee, Knoxville

Solutions to the new transportation needs of the United States require the development of problem-solving skills, which augment the historical role of the highway engineer and highway planner. This new role, the transportation manager, is the direct result of several factors in our environment and, more particularly, in our transportation systems. For example, although vehicle kilometers of travel are projected to increase by 39 percent by 1985, resistance to new highway construction is increasing, and mass transit is severely limited in its ability to serve peak-hour commuter needs by using expensive vehicles and full-time labor. As a result, the focus of transportation activities is shifting to improved management techniques. The new transportation needs will require individuals who have a different perspective and approach than that of the traditional engineer or planner. The new management emphasis will address more day-to-day decision making and have the opportunity to initiate low-cost, incremental changes to systems that are reversible on short notice. Cost/benefit analyses of detailed planning efforts associated with such incremental efforts reveal that the transportation manager will consume less resources in examining the data and undertaking corrective action. The paper will trace the development of public involvement in transportation to demonstrate the evolving needs of transportation and the orientation toward the professional urban transportation manager.

Public transportation programs have changed in the last few decades, and in the 1980s we will witness a major shift in the emphasis of public transportation. At the turn of the century, public transportation frequently consisted of a county commissioner who supervised the construction and routine maintenance of roads. Maintenance was a very large expense because many dirt roads required constant care. During the first half of the century, emphasis was placed on construction of upgraded