

# TRAVEL PATTERNS OF SUBURBAN HIGH SCHOOL MALES AND PROGRAMS TO INCREASE THEIR MOBILITY

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A study of the travel behavior and mode preferences of 50 male teenagers documents their lack of dependence on public transit. They prefer private or personal transportation modes such as walking and automobile travel. Trip logs, budgets, and other information were collected during weekly panel discussions designed to investigate traveler characteristics, needs, and problems. Panelists were 15 to 18 years old, lived in three working-class Boston suburbs, and had varying degrees of access to public transit and automobiles. Similar conclusions about travel patterns were drawn in each town. Automobiles and walking were preferred modes even where good transit was available. Teenagers' responses to available transportation and their expenditures to achieve mobility reflected their degree of interest in travel. That is, currently mobile teenagers travel more than less travel-oriented, but otherwise similar, youth if transportation is provided. Maturing working-class travelers felt compelled to secure their own transportation, even at high cost, because their parents and communities seemed unwilling to provide transportation that permits informal, off-peak, and unchaperoned travel. Bus and rail transit service, dial-a-bus systems, and other forms of public transportation seem unable to accommodate teenagers' needs for short-range, fast, and spontaneous trip-making. Expanded programs to improve pedestrian facilities and ease access to automobile travel would most likely satisfy the travel requirements of the teenage subgroup.

\*THE LACK of general travel theory to guide planners creates problems for those who must develop and evaluate new transportation systems or improve existing operations. Proposed highways, rail transit, and other systems could be costly to users and non-users alike. The political and social impacts of making mistakes in location and design are apt to be great. An understanding of travel behavior and the variables affecting travel decisions is vital to the accurate prediction of the effectiveness of proposed transportation programs.

Many serious shortcomings in concepts of mobility and travel were dramatically revealed in the failure of the transportation-poverty programs of the late 1960s to attract and retain new transit riders. Planners attempted unsuccessfully to apply long-range planning methods to short-term transportation improvements required by the urban poor. These failures pointed to the need for disaggregating the population into homogeneous segments and considering each group's travel desires and requirements. The need for improved methods to plan and research short-run or innovative transportation improvements also became apparent. It seemed that the quality of research could be improved by focusing individually and in depth on each pilot subgroup rather than by conducting superficial, simultaneous examination of every group.

Teenagers were selected as the initial population segment for research for many reasons: They make up a large percentage of the population (about 13 percent) and

account for a substantial proportion of public transportation users. Teenagers had received little previous attention from transportation planners and policy-makers. Teenagers are counted among the potentially curious and interested consumers of new public transportation systems, even though their dependence on current public transit versus other modes has not been proved. Finally, the immobility of youth might limit their personality development and cause social problems.

### THE TEENAGER MOBILITY STUDY

The teenager mobility study (TMS) was conducted to examine teenagers' travel behavior by using a subgroup approach. Its principal objectives were to describe the travel patterns, attitudes, decisions, and problems of teenagers; to predict the short-run responses of teenagers to alternative transportation improvements, especially public transit; and to develop and evaluate exploratory methods to collect, measure, and analyze data on travel patterns and attitudes.

This paper summarizes the substantive results of the first two objectives. Some comments on methodology appear later and are detailed in the complete technical report (14). After the conceptual approach is outlined and the techniques of data collection are briefly introduced, the principal findings and conclusions on teenager travel behavior are presented. These generate recommendations for transportation planning and policy based on teenagers' mobility needs and desires.

#### The Organizing Concept

The demand-by-analogy concept, used to organize the TMS, estimates the effects of increased access to transportation by examining the differences in the travel patterns of similar populations with and without access. These differences approximate the volume and form of short-term travel behavior that might be expected if the constrained "immobiles" are given the same transportation access as the unconstrained "mobiles". The approach requires the identification of mobile and immobile populations, inventories of movement behavior of each group, and examination of the travel differences between the groups.

We concentrated on a mobile teenager population that had good public transportation or automobile access and a contrasting immobile population that lacked one or the other. To ensure that the travel desires of the two populations were similar, we chose a teenage population with similar demographic and economic characteristics.

#### Study Locations

Three communities in the Boston region were selected for TMS data collection: Cambridge, an inner-city suburb; Arlington, a 1920s single-center suburb; and Burlington, a 1950s sprawl suburb. The towns have different development histories and land use patterns, but planners, school officials, and local residents agree that these towns represent blue-collar, middle-American communities. Only about 40 percent of each town's public high school graduates go to college or vocational schools. The towns vary in transportation facilities and services: Cambridge has networks of sidewalks and frequent, inexpensive bus and rail transit service that few communities in the United States can match and few suburbs can expect to provide; Arlington has some sidewalks and good bus service, mostly along one main road; and Burlington has few sidewalks and little public transportation except school buses.

#### Data Collection Methods

Our principal means of collecting travel information was a series of local weekly panel discussions with teenagers; these meetings were held for several months. This method had been recommended by several studies (5, 11). This approach combined the advantages of classroom survey research and in-depth interviews by permitting easy, efficient collection of personal, survey-like data. It created a social and physical environment that facilitated open-ended discussions and questions about a range of mobility topics. Weekly sessions permitted us to explore travel resources and trip-making over time.

Written records were kept of panelists' social, economic, and personality characteristics and their past and current travel activities and attitudes. Trip frequency estimates were obtained, detailed trip logs were kept for 4 days during one autumn week, and budget data were collected.

### Sample Population Characteristics

We selected a small sample of paid volunteers rather than randomly chosen individuals. We assumed that a study of volunteers would include a higher proportion of both knowledgeable teenage travelers and teenagers with travel problems. Also, we felt that, because we wanted to study travel behavior over time, uninterested participants could not be compelled to produce complete and honest information for the duration of the study. A small but relatively homogeneous sample was desired to ease data collection administration. This nonrandom, small sample prevented statistical generalizations to the total teenage population in our study communities but allowed considerable refinement of the basic descriptive categories of teenagers and their behavior, which should be used in future, large-scale survey research on subgroup travel.

Our study population, recruited from public and parochial high schools in each study town, consisted of 50 white males. This demographic group seemed most likely to include the highly mobile population needed to implement the demand-by-analogy approach. Most panelists were 16 or 17 years old, although some 15- and 18-year-olds were also included. About half the sample had some kind of job. Median personal weekly cash income was about \$25. Based on several studies (2, 10, 11), the 26 panelists who expressed no expectation of continuing their education after high school were considered working class; college- or vocational school-bound students were considered lower middle class. Other household data reinforced our impression that the sample included youth from blue-collar families.

Estimated annual family earnings were \$10,000 to \$15,000 and were produced by several workers in each household. The average family size was almost six people. Home living conditions were described as crowded and noisy. Most families had lived in the same town for more than 10 years and had relatives living nearby. Median parent education level was high school, and most fathers and mothers worked in craft, service, or lower management occupations.

We inventoried each teenager's access to transportation; comparisons of travel-pattern differences reflected access differences and provided clues about the travel patterns that would result from improved transportation access. Forty of our 50 panelists lived within a 10-minute walk of a transit stop. Only one teenager's family did not own a car. An average of 2.4 drivers in each household shared 2.0 automobiles. Parental chauffeuring was more available to college-bound, middle-class youth than to working-class teenagers. Twenty-six of 34 panelists old enough to have licenses had already obtained them, and 13 panelists above and below the minimum driving age of 16½ had driving permits. Only three teenagers reported having neither automobile access nor friends who could provide car rides.

Automobile access among licensed drivers varied. Ideally, this access would have been measured for each specific trip reported on the trip logs, inasmuch as access fluctuated for some teenagers on an hourly, daily, or weekly basis. An alternative measure might have estimated the degree of automobile availability per week as a continuous function, e.g., the percentage of trips for which a car was available. Since cars per household or drivers per household car seemed to be unsatisfactory personal access measures, we evolved a four-category measure of household car access among our sample: Eleven panelists owned cars; 10 had restricted use of family cars; five had unrestricted use of family cars; and 24 were unlicensed or had permits but had no access to cars for individual travel.

## FINDINGS AND CONCLUSIONS

This section summarizes some of the principal conclusions about panelists' travel behavior, focusing on mode choice and design considerations for improved teenager transportation systems. We reinforced the reliability and validity of our observations about working-class teenaged boys and their travel by repeating measures of behavior,

using several measures and questions, and comparing our data with data from other studies of youth and youth travel (1-3, 5-9, 11-13).

### Trip Generation

Panelists were active travelers, regardless of their access to transportation or the definition used to count trips. They made an average of 9.6 trips per day including walking and vehicle trips on 2 midweek school days, a Friday, and a Saturday. This figure varied from a high of 11.2 among car owners to a low of 8.4 among unlicensed travelers. Licensed teenagers generally made about 20 percent more trips per day than both young or old unlicensed panelists. Average trip levels were lower weekdays than on Fridays or Saturdays, but car owners and restricted car users still typically made more than nine trips on weekdays. Our data showed no relation between transit access and trip generation.

We also calculated a daily trip generation rate, which discounted walking trips, to compare our data with those of other studies, which typically neglected pedestrian travel. The vehicle trip generation rate was 5.6, higher than rates in other youth travel studies (5, 11, 13). This trip generation rate may be a more valid indicator of trip generation of older teenaged boys; other studies included female travelers with lower trip generation rates, made few attempts to obtain complete and honest trip generation rates, made few attempts to obtain complete and honest trip reports, and neglected teenagers' increased travel activity on weekends.

Panelists indicated that the quality of their relationships with their families greatly influenced their trip-making and, indirectly, the degree of automobile access. Daily trip generation appeared to be highest among panelists who had the greatest problems with their families, and, presumably, many of their trips were made to avoid conflicts at home. This same group tended to be car owners, have restricted access to family cars, and have action-seeking adolescent behavior. Panelists who reported good family relations also reported making many trips because of parental encouragement, unrestricted family-car access, and more frequent chauffeured rides. These teenagers were well-behaved and adult-like in their activities and attitudes. Teenagers having neither strong negative nor strong positive relations with parents had relatively low trip generation rates and only moderate access to household cars.

### Travel Expenditures

The study teenagers spent approximately \$5.70 per week on transportation, which amounted to approximately 20 percent of their weekly budgets. These averages conceal wide variations among drivers and nondrivers: Car owners spent \$15.40 per week or 47 percent of their budgets on transportation; family-car borrowers spent roughly \$4.00 or 16 percent of their budgets; unlicensed youth spent \$2.00 or 10 percent of their budgets. Budget percentages seemed to be better indicators of trip generation than absolute expenditure levels: Frequent trip-makers spent a high percentage of their budgets on travel, and infrequent travelers spent only a small share. Almost all drivers considered automobile expenses as top-priority budget items, whereas only one-third of the panelists who used transit most often considered transit expenses as important budget items.

### Trip Distances

Our teenagers generally made short trips. Median trip length by all transportation modes was 1.2 miles and 5 minutes. The average trip distance for drivers was 2.7 miles at an average trip speed of 19 mph. This contrasts with the comparative figures for unlicensed panelists, 1.8 miles at 9 mph. Average trip times in all four automobile access categories were under 10 minutes, suggesting widespread preferences to keep trip times short.

### Trip Purposes

Trip purpose breakdowns showed differences among licensed and unlicensed older panelists (Table 1). When we examined the possible effects of age on trip purposes of

Table 1. Percentages of trip purposes.

Trip Purpose	Trip Share	Trip-Maker Age and Licensing		Apparent Effects of Age on Trip Purpose	
		Younger Than 16 $\frac{1}{2}$	Older Than 16 $\frac{1}{2}$		
		Unlicensed	Licensed		
Home	23.5	24.8	24.2	22.7	No change
Social-recreation	22.0	23.1	27.4	20.6	No clear pattern
Personal business	15.2	12.9	15.1	16.3	Increase with age
Change mode	13.6	18.8	10.6	11.8	Decrease with age
Education	9.8	12.7	10.0	8.4	Decrease with age
Serve passenger	9.8	2.2	4.5	14.2	Increase with age
Work	5.2	3.7	7.3	5.7	Increase with age
Overall	100.0	28.0	10.7	61.3	
N	1,658	464	179	1,015	

Note: Column percentages may not add to 100 percent because 13 "other" trip purposes are not shown.

teenagers, homebound trips accounted for about one-fourth of all trips; trip shares for personal business, serving passengers, and work increased; trip shares for education and changing modes fell, and social-recreation travel shares showed no clear pattern.

The most frequent trip purposes were home, social-recreation, and personal business; fewer trips were made to change mode, for education, to serve passengers, and for work. Licensed drivers reported relatively more serve passenger, family chauffeuring, and errand trips and fewer social-recreation trips than their older, unlicensed peers. Generally, maturation led to more complex school, job, and social-recreation trips than the routine, local trips of early adolescence. Transportation was desired that could meet the most stringent travel requirements of later adolescence, such as those associated with dating or the fast, after-school-to-work trips of the student in vocational training programs.

### Mode Choices

Panelists' mode preferences were examined by looking at mode use collectively and among panelists with differing mode access. Either way, the teenagers were not dependent on public transit; the basic mode choices were walking and automobiles. Transit accounted for 8 percent of all trips, 11 percent of the trips by unlicensed young panelists, and 18 percent of the trips by unlicensed older panelists (Table 2). Walking accounted for 40 percent of all trips and 63 percent of trips by younger unlicensed panelists; even licensed youth made more than one-fourth of their trips on foot. Panelists used automobiles on 51 percent of their trips as drivers, passengers, or hitchhikers.

Table 2. Percentages of mode use.

Mode	Trip-Maker Age and Licensing			Mode Share
	Younger Than 16 $\frac{1}{2}$	Older Than 16 $\frac{1}{2}$		
	Unlicensed	Unlicensed	Licensed	
Walk	62.5	47.0	27.8	39.9
Transit	11.4	17.8	4.8	8.1
Automobile	24.4	35.2	64.3	51.0
Driver	2.6 <sup>a</sup>	16.8 <sup>a</sup>	46.9	31.2
Passenger	17.5	18.4	17.4	17.6
Hitchhiker	4.3	0.0	0.0	2.2
Overall	28.0	10.7	61.3	100.0 <sup>b</sup>
N	464	179	1,015	1,658 <sup>b</sup>

<sup>a</sup>Most of these trips were made by panelists with driving permits or under a parent's supervision.

<sup>b</sup>Twenty-three bicycle trips are included in column total percentages and total counts.



Young unlicensed panelists rode automobiles twice as much as transit. Overall trip levels remained about the same for older and younger unlicensed teenagers, but both transit and automobile trip shares increased with age. Inasmuch as transit was equally available to young and old panelists, its increased use by older nondrivers suggests increased vehicle travel caused by changes in behavior due to maturation. (The easing of parental travel restrictions, less fear of strangers, and the availability of more spending money also enabled older teenagers to increase their use of transit.) With licensing, driving substituted for both walking and transit trips. The data in Table 2 suggest that hitchhiking and bicycle use were extremely low among the panelists.

Mode choice patterns of the study group differed from commonly held conceptions of teenager travel. Transit, motorcycles, hitchhiking, and bicycles were used by only a small fraction of the teenagers, whereas walking and automobiles were used daily by almost everyone. Transit use was not high even among youth living within a 3-minute walk of a transit stop (although the nonhome orientation of many teenager trips may invalidate access distance as a measure of teenager transit availability). Diversion rates away from transit were not equal among all older youth; they seemed greater for adolescent action-seekers than for well-behaved, adult-like teenagers. Perhaps the most surprising fact about panelists' mode availability and choice was the high reliance placed on car rides provided by friends rather than parents. Young panelists made only 27 percent of their car trips as passengers with family adults. Family chauffeuring increased slightly with age among unlicensed panelists, as needs for vehicular travel increased; but, even among this group, friends provided more than twice as many car passenger rides as parents did. Overall, chauffeured travel accounted for just 13 percent of panelists' automobile trips and 6.5 percent of their total travel.

Other data lend support to the teenagers' nondependence on public transit for mobility. Trip generation rates, the percentages of weekly budgets spent on transportation, and the popularity of automobiles and walking were all very similar among panelists, in spite of the varying availability of transit service. Trip generation was reported to be highest in the evenings, on weekends, and during summers, when transit service was least available. Transit was used primarily for the most routine and familiar trip purposes of going to school and home, whereas walking and car travel were used for all trip purposes. Panelists traveled with other people on 60 percent of their trips in groups that averaged 2.4 people and often involved three or more friends; transit, unlike walking or cars, has many features, such as individual fares and crowds, that discourage peer group trips. Furthermore, fears of unwanted interactions with strangers inhibited panelists' use of transit for individual trip-making; when panelists traveled alone, they used transit for 7 percent of their trips, walking for 51 percent, and car driving for 38 percent.

#### Transportation Availability as a Dependent Variable

Generally, teenagers considered transit service, walking facilities, and hitchhiking rides as independent, exogenously determined variables of transportation supply. Bicycles and almost all forms of car access, on the other hand, were within at least partial control of individual teenagers, especially those in car-owning households. Many exogenous factors affecting transportation supply were not absolute in restraining teenager travel, however. Given personal motivation to travel, teenagers appeared to be resourceful in expanding their transportation options to overcome these constraints.

The degree of travel motivation and the general importance that teenagers place on mobility were indicated in economic, educational, and social behavior patterns. People who worked to earn money for transportation expenses or who spent high percentages of their incomes on travel or vehicles seemed to value mobility more than their non-working, transportation-cost-sensitive peers. Teenagers who cultivated positive social relations among people from whom they might have received transportation assistance (in the form of information, rides, or gifts) seemed more concerned with travel possibilities than those who made few such efforts.

Perhaps the clearest indicators of mobility importance were those relating to automobile operation and access. Possession of a driver's license clearly involved an

active role for teenagers, who had to decide whether the learning efforts and financial costs would be worthwhile. Teenagers were responsible, to some extent, for deciding how early they learned to drive and how early they secured their licenses. Presumably driving was more important to drivers than to nondrivers at any age level.

The preceding suggests that access levels to private transportation significantly reflect individual travel demand and cannot always be considered as independent variables in travel analysis. Rather, high individual access to transportation modes other than transit may be an indication that personal mobility is important to the traveler.

If we relax the assumption of homogeneous travel demand among TMS teenagers, we conclude that improved access to transportation may not increase teenagers' total trip levels or distances significantly. Likewise, it may not change most of their trip purposes or mode choices. The travel patterns of the mobile TMS teenagers probably represent the upper bounds on the magnitudes or proportions of trips that will be generated by improved access to transportation. Older teenagers who have poor transportation access already make essential trips to school and to home. They may just have less interest in self-initiated travel than teenagers who take steps to obtain good transportation. Young motivated teenagers with improved transportation will still tend to make local trips, although they may make slightly more trips and travel slightly further and faster than young, unmotivated travelers.

### PROGRAMS TO IMPROVE TEENAGER MOBILITY

Mobility programs involving transit, para-transit such as taxis or dial-a-bus, walking, and automobiles were evaluated primarily from the viewpoint of the TMS panelists, although the attitudes and resources of their parents, community residents, and transportation planners received some consideration. Short-run teenager responses to various programs reflected their expressed travel and expenditure behavior and attitudes. TMS forecasts assumed that planners are unlikely to provide activities that would divert teenagers from the unstructured informal activities that currently generate most of their trips.

#### An Ideal System for Teenagers

Program evaluation in the TMS relates proposed transportation improvements to the attributes of a transportation system that panelists suggested would be ideally suited to their travel, social, and psychological needs and those of other teenagers. This ideal system would fulfill travel requirements for all trip purposes and be available at all times, especially late at night, on weekends, and in the summer. It must be readily accessible with no preplanning, allow occasional intersuburban and long-distance recreation travel, and minimize stress during exploratory travel and travel in dangerous neighborhoods. It would enable routing and speed control by the traveler and provide operating challenges for certain optional but enjoyable movements.

Some form of personal transportation seemed important to maturing working-class panelists in particular. They felt compelled to secure their own transportation, even at high cost, because their parents and communities appeared reluctant or unwilling (legally and morally) to provide family or public transportation for their trip purposes such as dating. Working-class panelists reported negative outlooks on future marriage and full-time work and felt pressure to have travel adventures and the excitement of vehicle ownership and control while they were still single. The ideal system would also provide what families, schools, public transportation, and other societal institutions cannot or will not provide: feelings of freedom, adulthood, equality, masculinity, physical or emotional security, and, in some cases, status; a means of nonverbal self-expression; and an ability to help other people.

#### Transit

Evaluation of housing and other social services of a caretaking nature suggests that the provision of new services valued by middle-class planners does not change the values and behavior of those working-class and lower class people who are offered the

services. This finding supports our observation that the provision of increased transit is unlikely to generate much response from working-class youth who do not place a high value on public transportation.

The TMS found low transit use among its participating teenagers, regardless of the quality of public transportation. It has identified many basic technical and conceptual problems of transit that discourage its use by teenagers, especially for recreation and courtship travel. Most problems that discourage use, however, are a function of the basic concept of public transportation as adult-driven, -supervised vehicles for adolescents whose behavior is incompatible with adult norms. Transportation is still seen by planners only as a means to an end; passengers' desires for independence, privacy, and spontaneity are not considered in transit system design, which must cluster together unrelated groups of strangers. The inconvenience and impersonality of transit are particularly annoying to teenagers who are struggling to strengthen and develop social relationships among their friends, families, classmates, and others. Transit use is also lowered by complex information requirements for nonroutine travel, stresses due to unfamiliarity with system operations, and feared interactions with vehicle drivers or passengers. Major changes in service will be required, then, before transit service will be competitive with automobile transportation.

Several programs to encourage future suburban transit use seem likely to help only the upwardly mobile, ambitious teenagers—not the majority. Information about the region's transit system and how teenagers can use it could be introduced into high school or junior high school classrooms. Regulatory agencies should distribute current information about all bus lines in an area, so travelers can know how to make transfers and connections. Bus schedules and maps should be redesigned so that they are easy to use. Other information systems such as local phone directories, school and community newspapers, direct home mailings, and multiple listings in phone books (of transit company names, nicknames, and abbreviations) should all be evaluated from the perspective of shy teenagers who are reluctant to ask people (in person or on the telephone) for information.

Several improvements could be made by transit management. Suburban fare collection need not be structured to require exact fare, which irritates teenagers. Doing away with flat fares and instituting fares that vary with distance appeal to teenagers, whose trips tend to be short. From the teenagers' viewpoint, buses should run at least every 10 to 15 minutes during off-peak periods and late at night. They should maintain scheduled headways. Enough buses should be provided to avoid crowding. Simple shelters at bus stops would be appreciated in suburban areas where there are no nearby buildings in which to wait. Teenagers seemed to like new facilities and equipment because they were associated with functional performance, but, if old equipment and buildings were well-maintained and operated reliably, teenagers would not be discouraged from using them.

A few transit problems might be corrected by spending money for additional vehicles or services. These increased expenditures are unlikely to occur, however, if they must come from further taxation of working-class parents who have opposed educational innovations and other community services for teenagers. Unless parents show more concern about their children's social welfare, it is unlikely that transit companies will direct programs at young riders.

### Para-Transit

Panelists' nonuse of taxis suggests that working-class male teenagers are unlikely to respond favorably to improved taxis or to new shared-ride para-transit systems such as dial-a-bus. Panelists' negative attitudes toward taxi-like modes must somehow be altered before they will take advantage of a personalized but prearranged service driven by adults or nonfriends. Because these systems usually do not meet privacy, late-night, and nonlocal requirements of dating and recreation trips, they seem unlikely to reduce older male teenager desires for personal car access. We suspect that the behavioral restrictions imposed by adults in the vehicle plus the inconvenience of the required telephone access and waiting time will outweigh the appeal of the door-to-door service of these systems.



If para-transit is to increase its market appeal among working-class teenagers, several features of the system must be modified or developed (4). Young, nonlocal, tolerant vehicle drivers on rotating shifts would increase rapport between teenage males and the driver and still preserve some anonymity for passengers. Service should be available until about 1 or 2 a.m. on Fridays and Saturdays. Free telephones and a posted system phone number should be located where teenagers might want to summon a vehicle. Rates per person or per group should be stated over the phone if exact destinations are known. A reasonable response time should be estimated over the phone and rides should be provided free or at a reduced rate if the pickup vehicle arrives late. Teenagers should have the option to pay extra money to choose their travel companions. The operating jurisdiction of a para-transit system should be broad enough to include nonlocal places where teenagers travel for commercial or social-recreation purposes, e.g., major shopping centers, sports fields, rock concert halls, and non-neighborhood movies. Vehicles should have plenty of leg room and should permit teenagers to sit beyond the driver's hearing range. Billing should be in cash, or credit could be offered to local teenagers who would be billed directly or through their high schools without parental interference. These basic bills would not have to contain all the timing and other trip data recorded for the trip; bills would only show the data a traveler might want to appear on his bill.

### Walking

Male teenagers probably have the highest tolerance for walking of any population subgroup, and this willingness explains why walking is competitive with transit for teenagers. The most frequent complaints about walking were slow speed, exposure to inclement weather, visibility to people along the route, and lack of the excitement of vehicle acceleration and control. However, according to most panelists, walking provided a quicker, more predictable, and more convenient mode than the bus for many local, off-peak, and group trips.

Walking problems exist in moderate- and low-density suburbs where walking is a practical mode. The principal barriers to male teenage pedestrians result from the absence of pedestrian facilities, such as sidewalks, and actual obstructions such as fences and drainage ditches. Programs to encourage walking would identify and eliminate these barriers, especially those within a 20-minute walk of high schools and commercial stores where teenagers are likely to go. Plans for housing subdivisions, shopping centers, highway bridges, and median barriers should be evaluated with eventual sidewalk or convenient crosswalk locations in mind. Builders may be asked to provide direct pedestrian sidewalks to and alongside major arteries to accommodate walk-trip desires. Provision for snow removal laws and their enforcement seems called for on all pedestrian paths in places with severe winter weather. New federal and state funding sources for suburban sidewalk construction and maintenance need to be found for working-class towns.

### Automobiles

From the panelists' viewpoint, planners' investigations of programs for automobiles seem wiser and more desirable than improvements for other vehicle modes, since teenagers are likely to want car access until a better alternative to the automobile emerges. New systems of transportation are unlikely to achieve desired public objectives and significant ridership among teenagers unless they are designed to permit the emotional and social outlets and the travel convenience that driving and car ownership now provide. Such basic adolescent needs as love, respect, and self-confidence will not go away if they are forgotten in planning new systems or programs limiting mobility and vehicle ownership. The fundamental attitudes, values, and hopes that lie beneath teenagers' activity, travel, and mode preferences seem liable to be changed only by maturation and experience unless there are dramatic societal and family structure changes.

To panelists, congestion, pollution, and energy consumption were not serious problems; after all, they drove mostly at off-peak hours, chose to spend free time in parking lots and gas stations, and made mostly local trips. Public policies that discourage

driving, car ownership, or gasoline purchases seem likely to have negative impacts on teenagers. According to panelists and youth counselors, alcohol and other drug consumption may increase, as may the frequency of gasoline and car theft, vandalism, and other crime and rebellious acts. Frictions between teenagers and parents, school and transit personnel, and other adults, are likely to intensify. School dropout rates may increase. These impacts may be far more destructive and costly to teenagers and society than current impacts of teenager automobile use.

The TMS approach recognizes the serious problems of car safety, pollution, and energy. Nevertheless, consideration of automobile programs would mean that transportation planning was not discriminating against the young whose travel needs cannot be met by transit. Our approach is to try to find ways to use personal vehicles and streets more efficiently and safely, while solutions to basic automobile-related problems are being found and implemented.

The first of our programs stresses efforts to help all car owners, not just teenagers. The program should reduce the costs and inconveniences of car ownership and operation such as insurance, fuel supply, poor car construction, and repair. If costs decreased, more parents might let their children drive family cars, cars per household might increase, and teenagers would have more chances for rides from their parents or friends.

Our second program would facilitate driving. It would overcome the problems and fears that prevent eligible people from driving. It would examine the driving behavior of teenagers in suburban settings where state laws already permit driving by teenagers who are younger than 16. If further evidence could be found to support recent findings that it is not youth itself, but inexperience or emotional adjustment problems at ages 18 to 20 that cause accidents among teenage drivers (9), driving license age requirements might be lowered. At the least, planners should oppose any legislation to raise the minimum driving age.

Lowering the driving age could be done conditionally with rigorous skill and rules tests. Young drivers might be allowed to drive only in off-peak times, only within their hometowns, and only with family cars. Traffic violations could result in postponement of eligibility for regular licenses. These conditional licenses would offer incentives for careful use of existing cars. They could greatly facilitate mobility for working-class teenagers in moderate- and low-density areas, who now have no friends who can drive, yet who come from homes with underutilized cars.

Third, driver education programs require major reexamination regardless of changes in minimum driving age laws. Problems associated with driver education effectiveness, cost, scheduling, and other aspects need review, as does the equitable distribution of school driving programs. Ideally, driver education should include behind-the-wheel training; effective education on buying an automobile, preventive maintenance, and safe operation; and exposure to transport modes and communication systems that might make some automobile trips unnecessary.

Our fourth program would increase the supply of automobiles for young travelers by making it easier for safe drivers to rent or share nonfamily cars for evening or weekend use. Potential sources of vehicles would be commercial car rental companies and public agencies and businesses whose car fleets are not used continually. Programs to increase local hitchhiking safety for travelers and motorists need exploration. Increasing access to existing cars has the advantage of increasing automobile mobility for teenagers without major investments by teenage drivers, taxpayers, those lending their cars, or drivers who give rides to strangers.

The last set of programs would help people who want to put time and effort into car construction and maintenance but who lack the all-weather facilities or skills. Planners should encourage private, do-it-yourself repair and diagnostic facilities. They could arrange for the use of public or private garage or school shop facilities and provide courses in car maintenance. These programs might also encourage driving safety by providing public or private roadways or test track facilities for car hobbyists who enjoy skillful racing and driving. Alternatively, certain roads, parking lots, or little-used airport runways might be scheduled for enthusiasts' use, just as certain roads are now scheduled for bicyclists' use.

## SUMMARY

This paper has begun to describe existing mode use and preferences of participants in the teenager mobility study. Observations suggest that public policy for helping teenaged boys should be directed toward facilitating private and personal travel. Spending large amounts of taxes to preserve existing transit and taxi services, to upgrade conventional transit, to provide flexibly routed and scheduled dial-a-bus, or to extend rail transit into suburban areas seems unlikely to provide teenagers with transportation they will ride. The study teenaged males have negative attitudes toward existing analogous services. Their working-class parents would be unlikely to want to pay for public transportation construction and operating costs. These transit programs seem conceptually incapable of meeting the complete range of teenage traveler needs, regardless of the level of public expense. Unlike programs that are capital intensive and that use for-hire drivers and vehicles, the programs we have recommended to facilitate walking, automobile use, and other individual or small group travel require a minimum of additional public expense, regulation, and institutionalization; they could be modified or dropped if demonstration programs do not seem to help teenager mobility. Most important, they seem likely to be used and appreciated by the teenager subgroup that was studied.

The TMS has raised questions about the responsibility of planners to improve the lives of all people. The planning process must involve children of working-class families and other neglected subgroups, not just the visible, articulate adult middle-class majority. Improved methods are still needed to predict subgroup needs and priorities, response rates, incurred costs and benefits to transportation improvements, and implementation barriers to be encountered. Transportation system designers and managers need to learn how to modify construction or operation features in order to increase the marketability of their services.

The planning profession will have to grapple with inherent value conflicts among teenagers, parents, and other groups, as the profession becomes more pluralistic in its problem definitions, policy suggestions, and proposed programs. Age restrictions, like race and sex restrictions, have to be reexamined as fair criteria for limiting individual freedom and behavior. Planning will continue to improve as a profession only as it responds to the issues, ideas, and preferences of teenagers and other subgroups.

## ACKNOWLEDGMENTS

The research reported in this paper was sponsored by the Federal Highway Administration and the National Science Foundation. The author of this summary wishes to acknowledge the special contributions of Walter Bottiny, Daniel Brand, Florence Ladd, Lawrence Mann, and Edward Weiner and the editing assistance of Marion McCollom, Anne Freedman, and William Knight. However, the findings, conclusions, and opinions are those of the author and not necessarily those of the sponsors or individuals who have assisted in the project.

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