

Vanpools in Los Angeles

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A survey of vanpool coordinators and riders was conducted in Los Angeles during 1988–1989. The specific issue was to understand the commuting behavior of the existing vanpool members and to identify the major concerns of vanpool program coordinators. The benefits of vanpooling to the rider, the employer, and the community are considerable. The family role may also be increasing vanpool program attractiveness.

The California Department of Transportation and FHWA conducted a vanpool survey to better understand vanpool programs operated by employers in the Los Angeles metropolitan region. The survey was developed with the assistance of the Association for Commuter Transportation (ACT) and pretested at one job site with more than 40 vanpools. In order to gain the participation of a broad, diverse group of vanpools, every major employer in Los Angeles known to operate a vanpool program was contacted. Information was sought from the vanpool coordinator (who was also the van driver in more than 90 percent of the cases) and the commuters riding in the vans. Mail-out surveys to vanpool program coordinators and riders served as the primary means of data collection. Surveys included more than 700 vans operated by 16 employers and carrying about 10,000 riders. (A sample of the survey questionnaire can be obtained from M. Moilov.)

Results of the first step in a continuing research effort to assess the potential of vanpooling are presented. The characteristics of vanpoolers have been researched less thoroughly than those of carpoolers or transit riders. However, the different modes differ substantially in their appeal to commuters. For example, a decision to vanpool involves much longer commitment and greater attitudinal adjustments. In addition, vanpoolers tend to travel farther to work than other commuters, an average of 72 mi round trip, compared with 45 mi for carpoolers and 19 mi for all commuters (1, p.15).

Specifically, the objectives of this study are

1. To understand the demographic characteristics and commuting behavior of the existing vanpool members, and
2. To identify the specific issues faced by vanpool program coordinators or drivers.

Understanding the commuter characteristics provides a necessary input to identifying more effective ways to encourage vanpool participation and to develop guidelines for future use. In addition, the evaluations will help determine the extent to which the program relates to commuter goals, such as comfort, speed, convenience, savings, reliability, and suitability of service. This paper can assist prospective vanpoolers as an information source on programs already under way, and it

will further the exchange of information among vanpool leasing companies, employers with vanpool programs, vanpool coordinators or drivers, ridesharing agencies, riders, and various government organizations.

SURVEY METHODOLOGY

Traditional surveys try to incorporate a random selection method to reduce sample bias. This survey, however, had a limited universe and therefore required investigation of employers and van providers to reach the appropriate vanpool user audience.

The regional rideshare agency was unable to assist in the selection of survey participants because of its desire to maintain client confidentiality. Therefore, the research team had to rely on the local transportation network and the Southern California chapter of ACT. A list of major employers compiled by the Los Angeles Times was the initial list from which 22 companies with vanpool programs were contacted. Sixteen companies agreed to participate in the distribution of the vanpool survey. The participating employers included representatives from manufacturers, government agencies, utilities, and service industries. (A listing of the participating vanpool programs can be obtained from M. Moilov.) There were 728 vanpool groups contacted, representing a total of 9,789 riders.

The survey instrument was extensive. Two surveys were prepared. One was directed exclusively to vanpool coordinators; it asked specific administrative questions. The second survey was completed by all riders, including the coordinators. Its questions asked riders about their perceptions of the benefits of vanpooling and their personal experiences.

A pretest was administered in spring 1988; the revised survey was conducted by direct mail in late summer and early fall 1988. Prepaid envelopes sent with the survey encouraged responses. The response rate was high: 2,400 responded to the rider survey, a 25 percent return. The coordinator surveys had 320 returned surveys, a 44 percent response rate.

In this study, the sample surveyed were obviously committed to vanpooling and biased the sample. However, without a survey of this nature, the important findings could not have been revealed.

PRESENTATION AND INTERPRETATION OF RESULTS

Personal Characteristics

In order to obtain the vanpool rider's profile in Los Angeles, questions were asked about age, sex, marital status, income, occupation, and vehicle ownership.

The hypothesis is that family role and demographics greatly influence the choice of vanpool as a commuting mode.

Age, Sex, and Marital Status

Table 1 presents the frequency distribution of the age of vanpool riders. The vanpool program appears to be more popular with the middle-aged and older population. The mean age of riders is 44 years. Only 12 percent of the riders are under 30 years of age; 11 percent are between 30 and 35; almost 75 percent of the riders are more than 35 years old. The age distribution of vanpool riders contrasts sharply with those of bus riders. Bus passengers tend to be fairly young: 70 percent are below 30 years (2).

The vanpool program also appears to be popular among married males. In a sample of 2,174 respondents, about 50 percent of the riders are married men, only 20 percent are married women. Four possible explanations can be given for the greater popularity of vanpooling as a commuting mode among men. First, men are more willing to leave early to save money than women. Second, men are more interested in avoiding repairs to their personal vehicles by vanpooling. A similar conclusion was made in an earlier study by Misch et al. (1,p.80). Third, women are more likely to prefer the use of their cars for travel to work to enable them to take care of household errands and to drop off and pick up children on the way. The need to link trips makes solo driving a more attractive choice. That women make more nonwork trips is shown in another study by Gordon et al. (3). Fourth, vanpools generally operate over long distances (more than 30-mi one-way trips). Men are more likely to work farther from home, making vanpooling more practicable. Earlier studies have indicated that a high proportion of women work closer to home (3,4).

Income, Education, and Occupation

The income distribution of vanpool riders is presented in Table 2. The mean income of vanpool riders in Los Angeles (\$55,000 a year) appears to be much higher than the county average. Approximately 50 percent of the riders earn more than \$50,000; only 5 percent earn less than \$20,000.

The education distribution shows that almost 75 percent of the vanpool riders have a college or graduate degree. This

TABLE 1 AGE DISTRIBUTION OF VANPOOL MEMBERS

Age	Percentage
15 - 20	0.4
20 - 25	2.7
25 - 30	9.2
30 - 35	10.7
35 - 40	14.2
40 - 45	15.4
45 - 50	14.1
50 - 55	12.5
> 55	20.6
Mean age	43.6 years

Note: n = 2230

TABLE 2 INCOME DISTRIBUTION OF VANPOOL MEMBERS (IN DOLLARS PER ANNUM)

Income	Percentage
< 10,000	1.2
10,000 - 19,999	4.2
20,000 - 29,999	14.1
30,000 - 39,999	15.1
40,000 - 49,999	15.5
50,000 - 56,999	14.0
60,000 - 69,999	11.8
70,000 - 79,999	8.7
> 80,000	15.0
Mean Income	\$55,000

Note: n = 2400

amount is much higher than the educational level observed for bus riders, only 15 percent of whom have attained a college degree (2).

Education Level of Vanpool Members	Percentage (n = 2,400)
Grade or high school	17.3
Vocational school	6.8
College	47.9
Graduate	27.8

The majority of vanpool riders hold senior positions. Almost 65 percent of the 2,400 respondents belong to the professional or executive class. Only 8 percent of the riders are blue-collar workers. (However, it remains to be seen whether the blue-collar workers are not more responsive to economic incentives. Future research will address this issue.) More than 70 percent of the bus riders are housewives, students, retired, or unemployed persons (2).

Occupation of Vanpool Members	Percentage (n = 2,400)
Executive/managerial	15.3
Professional/technical	51.3
Administrative support	20.6
Sales/field staff	0.6
Production/skilled/unskilled	7.6
Other	4.6

Automobile Ownership

Vanpool riders were asked about the number of household vehicles and whether a vehicle was available for commuting on a regular basis. More than 80 percent of the riders had two or more vehicles in the household, and almost the same proportion reported having a private vehicle available for use on a regular basis. This fact indicates that the decision to vanpool is by choice for most riders.

Number of Household Vehicles	Percentage (n = 2,445)
1	19.3
2	45.3
3	21.6
4	8.5
5	3.5
> 5	1.8

Commuting Characteristics

Responses were elicited from the vanpool riders and coordinators on various aspects of travel. The questions addressed were duration of stay in the vanpool, travel mode before joining the vanpool, travel mode from and to the vanpool pick-up or drop-off point, distance (duration) to reach the pick-up point, time saving after joining the vanpool program, average monthly fare, and distance and duration of travel.

Period in Vanpool

The distribution of durations in the vanpool program was analyzed. The average duration is more than 3 years. About 40 percent of the vanpoolers have been in the program for more than 3 years; about 70 percent for more than 1 year. It appears that people who join the vanpool program see advantages in continuing to stay with it.

Commuting Mode Before Joining Vanpool

One of the survey questions sought to understand the usual means of travel to work before joining this vanpool and the principal reasons affecting the decision to vanpool. Almost 60 percent of the respondents drove alone to work before joining this program; 18 percent carpooled; only 7 percent used public transit. This suggests that most vanpoolers had little prior ridesharing experience. This finding is especially relevant considering that almost 50 percent of the riders have not changed either their home or work location since joining this vanpool (Table 3). About 40 percent of the respondents joined a vanpool program in response to changes in work or home location.

Changes in Commuting Time Since Joining Vanpool Program

The hypothesis examined is that joining a vanpool results in considerable time savings because of the use of high-

TABLE 3 DISTRIBUTION OF FACTORS INFLUENCING DECISION TO JOIN VANPOOL PROGRAM

Factors	Percentage
Change employer	5.0
Change work location	16.2
Change home location	21.5
Change employer and work location	5.3
Change employer, work, and home location	1.9
Change work and home location	1.6
No change in any location	48.4

Note: n = 2180

occupancy lanes during the peak period. Table 4 displays the frequency distribution of changes in commuting time after joining the vanpool program. Although almost 50 percent of the riders did not experience any change in travel distance, 20 percent actually took less time in commuting; about 30 percent increased travel time. Increase in travel time may be associated with commuting longer distances in response to changes in home or work location—an observation borne out by analysis of trip speed, discussed in a later section. A similar analysis was also conducted only for the 48 percent of the respondents who did not register any change in residence or work location after joining the vanpool program. Although about 60 percent reported no change in travel time, 29 percent reported a decline in commuting time after joining a vanpool program. Only 12 percent observed an actual increase in commuting time after joining the vanpool program (see last column in Table 4).

Distance, Duration, and Mode of Travel from Home to Van Pick-Up Point

Information was sought on distance, duration, and mode of travel from home to vanpool pick-up point in the morning (Tables 5 and 6). Average distance of travel is 4.8 mi and duration is 9.7 min. More than 50 percent of the members travel less than 5 mi to the van pick-up point in the morning, and take less than 10 min.

The most dominant access mode to van pick-up point in the morning is driving alone (68 percent), followed by walking (12 percent) and kiss-and-ride (7 percent). At the destination end, about 46 percent of the riders are dropped off at the work place and about 47 percent are dropped off close to the work place.

Distribution of Vanpool Riders Living in the Same Household or Working for the Same Employer

Although most of the riders work for the same employer (69.2 percent), very few live in the same household (4.8 percent). This finding is not surprising, but it is important in formulating vanpool programs in the future.

The survey highlights the importance of employer-oriented programs. Most of the riders work at the same place or within a few miles of each other. Employer-oriented matching greatly improves the success of a vanpool program, which can be provided by a transportation coordinator. Other studies have also reached a similar conclusion (1).

Trip Length, Duration, and Speed

Vanpool coordinators were asked for the following information about the morning and evening commute: distance and duration from the overnight storage location to the last pick-up point; line-haul distance and duration; and distance and duration from first drop-off point to daytime parking location (Figure 1). Similar information was obtained for the afternoon commute. From this information, trip speed for each segment as well as the total commute was calculated.

TABLE 4 DISTRIBUTION OF CHANGE IN COMMUTING TIME AFTER JOINING VANPOOL PROGRAM FOR ALL RESIDENTS

Time change (in minutes)	Proportion All Residents	Proportion Residents with unchanged Work/Home Location
L < -30	7.4	
E -30 to -20	3.1	
S -20 to -10	5.1	2.1
S -10 to -1	3.2	26.7
SAME 0	48.3	59.2
M 1 to 10	1.2	7.8
O 10 to 20	15.2	4.2
R 20 to 30	6.8	
E < 30	9.6	

Home-End Trip The first two columns in Table 7 display the distribution of travel distance from overnight storage location to the last pick-up point in the morning. Approximately 45 percent of the vans pick up the passengers within a distance of 5 mi, 17 percent travel 6 to 8 mi, and 40 percent travel more than 9 mi. These data indicate that origins are dispersed over a large area. Access to an expanded labor pool is one of the advantages to an employer of organizing vanpool programs.

Looking at the trip duration (Table 8), about 45 percent of the vans pick up passengers within 10 min at the home end, 21 percent between 11 and 15 min, and 35 percent take more than 15 min.

Line-Haul Trip The distributions of line-haul trip distance and duration are presented in the third and fourth columns in Tables 7 and 8. Almost 50 percent of the vans commute more than 30 mi and take more than 40 min. Generally, vanpools operate over distances of 25 mi or more, so this is not a surprising finding.

Work-End Trip The last columns in Tables 7 and 8 exhibit the trip distance and duration from the first drop-off point to the daytime parking location. Almost 70 percent of the vans drop off the passengers within 2 mi and take less than 5 min. That most van members have a common destination supports the earlier finding of a common employer.

Total Trip Speed Trip distance was divided by duration to obtain trip speed for each trip segment as well as for the total commute, during both morning and afternoon travel (Table 9). Three conclusions can be reached from this table. First, travel speed is much higher in the morning than afternoon, not a surprising finding in view of the increased traffic during the afternoon peak period.

Second, the travel speeds along the line-haul sector are much higher than at the pick-up or drop-off segments, again nothing surprising. Third, the average speed (37.4 mph) during the morning peak hour of the total commute is significantly higher than that observed for private cars (approximately 30 mph) in U.S. cities (4). This finding is important because it

TABLE 5 DISTRIBUTION OF DISTANCE FROM HOME TO VAN PICK-UP OR DROP-OFF POINT

Distance (In Miles)	Percentage	
	Morning	Afternoon
0	14.1	15.7
1	15.1	14.4
2 - 5	33.0	32.0
5 -10	19.7	19.2
10 -15	7.1	7.0
15 -20	2.7	2.6
>20	8.3	9.0
Average Distance	4.8 miles	

Note: n = 2325

TABLE 6 DISTRIBUTION OF TIME TAKEN TO TRAVEL FROM HOME TO VAN PICK-UP OR DROP-OFF POINT

Duration (In Minutes)	Percentage	
	Morning	Afternoon
0	8.8	10.3
1-10	42.4	8.3
10-20	33.8	28.1
20-30	7.4	21.5
30-40	2.3	12.3
>40	5.2	19.4

Average duration 9.7 minutes

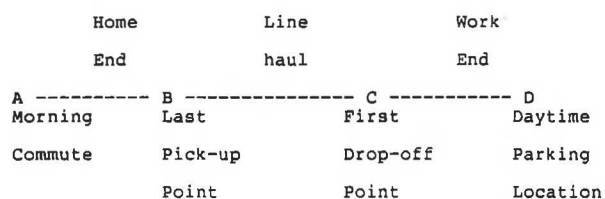


FIGURE 1 Morning trip segments.

TABLE 7 DISTRIBUTION OF TRIP SEGMENT DISTANCES, IN MILES

Home End		Line Haul		Work End	
Distance	Percentage (n = 291)	Distance	Percentage (n = 295)	Distance	Percentage (n = 315)
<2	18.2	1-20	18.0	0	28.3
3-5	25.4	21-30	36.6	1-2	42.9
6-8	17.5	31-35	11.5	3-4	14.6
9-10	11.7	36-40	12.5	5-6	5.7
>10	27.1	41-45	6.4	7-8	2.2
		>45	14.9	9-10	1.0
				>10	5.3

TABLE 8 DISTRIBUTION OF TRIP SEGMENT DURATIONS, IN MINUTES

Home End		Line Haul		Work End	
Duration	Percentage (n = 290)	Duration	Percentage (n = 296)	Duration	Percentage (n = 315)
<5	19.3	1-30	15.9	0	26.0
6-10	24.5	31-40	22.3	1-5	28.9
11-15	20.7	41-50	26.4	6-10	25.7
16-20	14.5	51-60	20.3	11-15	10.5
>20	21.0	61-70	7.8	16-20	4.4
		>70	7.4	21-25	4.1

TABLE 9 DISTRIBUTION OF TRIP SPEED DURING MORNING AND AFTERNOON COMMUTES

Morning	Mean Speed (mph)
Home end	32.1
Line haul	41.1
Work end	22.6
Total commute	37.4
Afternoon	
Work end	20.7
Line haul	36.7
Home end	28.4
Total commute	33.0

is often believed that multiple stops made by vans cause considerable delay in the trip. It appears that the use of HOV lanes along line-haul segments offsets any delay caused at the pick-up or the drop-off segments. Higher speed in the vanpools can be used as a promotional strategy with the reluctant drivers. This can form the basis for developing techniques to meet the commuting demands of those target groups to whom travel time is critical in their decision to drive alone.

Fares and Savings

The monthly fare paid by vanpool members is presented in Table 10. On average, the riders pay \$71.80 per month. Considering an average one-way trip of 30 mi (round trip of 60 mi), and a 20 work-day month, the riders pay 6 cents/mi. This is much less than driving and maintaining one's own car which is about 20 cents/mi. In addition, each 15-passenger vanpool is capable of removing up to 14 vehicles from the road, if all the riders were driving alone to work before vanpooling.

It is possible to estimate the saving in vehicle-miles traveled (VMT) by multiplying the total passengers in each van (excluding the driver) by total miles traveled. (The saving in VMT was calculated only for those riders who drove alone to work.) On average, the calculations indicate that more than 100,000 vehicle-mi are economized each day by the present vanpool program in Los Angeles. The subsidiary benefits of mitigating energy shortage, air pollution, congestion, and transportation emergencies resulting from vanpooling can be well appreciated.

Issues Faced by Vanpool Coordinators

Information was sought from the vanpool coordinators and drivers concerning the type of vanpool program, the nature of administrative policies, number of home pick-up and drop-off points, riders' occupations during the trip, and the benefits offered to the driver of the van.

Types of Vanpool Programs

The distribution of types of van ownership and operation was analyzed. More than 50 percent of the vans are owned and operated by the employee; 34 percent by Vanpool Services Inc., and 15 percent by other operators. None of the vans are employee-operated vans. Employer-operated programs have a much greater chance of success because (a) van operation tends to be cheaper; and (b) at least one of the destinations is common. The employees also have a far greater faith in a program developed by the employer. The employer also gains from operating vans—he has a better access to expanded labor pools.

TABLE 10 DISTRIBUTION OF MONTHLY VAN FARE (IN DOLLARS PER MONTH)

Fare	Frequency
4	9.2
40-50	6.0
50-60	12.1
60-70	20.6
70-80	23.8
80-90	14.3
90-100	6.3
>100	6.7
Mean Fare:	\$71.8 per month

TABLE 11 DISTRIBUTION OF NUMBER OF HOME PICK-UP AND WORK DROP-OFF POINTS

# of Pick-up points	P r o p o r t i o n	
	Home pick-up	Work drop-off
1	36.2	28.0
2	18.4	33.1
3	14.1	16.8
4	14.8	8.8
5	7.7	6.2
6	4.4	2.6
>6	4.4	4.5

Vanpool coordinators were asked if there existed a formal set of rules governing the conduct and related issues for the members. The responses were evenly divided between vans with formal and informal sets of rules. The employer-operated vans were largely operated in an informal arrangement. The coordinators indicated that because a large proportion of the members were known to each other through a common employer, there was a greater tendency to cooperate.

Benefits to Vanpool Coordinators

The advantages to the vanpool coordinators and drivers included (a) free ride to workplace; and (b) use of vans during evenings and weekends. For about 30 percent of the vans there was a back-up driver who would drive if the primary driver was held up for some reason. But greater success was reported when one person assumed the responsibility of coordination and driving.

Number of Home Pick-up and Drop-off Points

The vanpool coordinator was asked about the number of home pick-up and work drop-off points made during the morning trip (Table 11). Approximately 55 percent of the vans make only one or two stops at the home end; 14 percent make three stops; 30 percent make more than three stops.

At the work end, the destinations are in greater proximity. About 60 percent of the vans make one or two stops; 17 percent make three stops; and 22 percent make more than three stops.

CONCLUSIONS

Considerable benefits of vanpooling accrue to the rider, the employer, and the community. The benefits to the riders include lower expenses (vanpooling costs 6 cents per mile), increased speed (37 mph in the morning and 33 mph in the afternoon), and reduced driving stress in sharp contrast to driving alone to work. The benefits to the employer include access to a wider labor pool and reduced parking require-

ments. The community gains through the alleviation of traffic congestion (more than 40,000 VMT saved per day) and subsidiary benefits of conserving energy and mitigating air pollution hazards.

Family role appears to be having considerable impact on the vanpool program attractiveness. The vanpoolers are patronized by a higher proportion of older, married men, in higher income brackets and with college or graduate degrees. Only a small proportion (35 percent) of the present vanpoolers had any prior experience with ridesharing. The differences can be effective in identifying target population as well as in developing incentives in the future vanpooling programs. A central issue in any future vanpooling development efforts relates to how best to accommodate the needs of younger, middle-income groups. Another issue facing vanpooling in the 1990s is the question of the relative roles and responsibilities of the federal, state, and local agencies in the delivery of vanpooling services.

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