Total Travel Impact of Vanpooling

The bottom line in the evaluation of vanpooling's travel impacts is how much a vanpooler's household travel by private vehicle changed after the vanpooler began vanpooling. The basis for the comparison is the vanpooler's commuting mileage before versus the sum of the following:

1. Vanpooler's mileage by private vehicle to the vanpool pick-up location,
2. Vanpool's mileage, and
3. Mileage put on the vehicle left home.

For the purposes of this analysis, total travel impacts were calculated for the total group of respondents. The basic unit for comparison should be the travel associated with a vanpool's members before and after in order to properly account for the van's mileage. In addition, the sample collected has a representative number of vanpool drivers (10 percent of the total).

In the after case, mileage on the vehicle left home is calculated directly from the survey responses and added to the after-commuting total. Carpools were assumed to stay in operation after the vanpooler left it to join the vanpool. Calculated on this basis, the average survey respondent traveled 578 miles/month to work in a private vehicle before beginning to vanpool. After joining the vanpool, the vanpooler's average household private vehicle use consisted of the following:

1. 188 miles/month to work including access miles and van miles prorated to the survey respondent,
2. 28 miles/month for commuting in the vehicle left home per survey respondent (235 miles/month per automobile left home that is used x 10 percent of survey respondents who reported automobile left home is used for commuting trips), and
3. 23 miles/month for noncommuting trips in the vehicle left home per survey respondent (180 miles/month per automobile x 13 percent of survey respondents who reported automobile left home is used for noncommuting trips).

This totals to an average of 239 miles/month per survey respondent. Hence, the shift to vanpooling resulted in a reduction of 339 miles/month per vanpooler. This is an average saving. Vanpoolers who drove alone would save much more. Vanpoolers who previously used transit would save nothing.

SUMMARY AND CONCLUSIONS

In April 1980, SEMCOG conducted a comprehensive survey of all employer-sponsored vanpools in the southeast Michigan region. An excellent response rate was achieved; therefore, I believe that the survey results provide an accurate picture of the vanpoolers and their travel habits in the Detroit area. There is one important exception, however. The survey undersampled long-term vanpoolers in the region because

1. Only a small sample (5 percent) of vanpoolers was surveyed from the oldest and largest vanpool program in the region (i.e., Chrysler Corporation, which has 112 vans in operation for five years) and
2. No other vanpool programs in the region were more than 18 months old at the time of the survey.

As a result, the impact of vanpooling on the automobile ownership decision cannot be completely identified from the survey results because this decision is highly correlated with length of time in a vanpool.

A review of survey results indicated several areas where the survey could be improved. More details about travel habits of former ridesharers are desirable, particularly the fate of the carpool after the ridesharer left it for the vanpool. Responses to questions on travel time and distance before vanpooling were not always consistent (e.g., some respondents indicated their travel distance to work was 5 or more miles less after vanpooling), which indicates a need to revise these questions. The question about the vehicle ownership decision is potentially ambiguous in regard to the purchase-postponed decision--it could be interpreted to relate to the decision of whether or not to replace an existing vehicle or to the decision of whether or not to increase the total number of vehicles owned. Both decisions are of interest. Finally, an independent means of checking the respondent's estimate of the use of the vehicle left home needs to be found.

The principal travel results of the survey are as follows. Vanpooling attracts few transit users and draws riders nearly equally from drive alone and ridesharing. Vanpooling does not have a significant impact on automobile ownership. Only 15 percent of respondents reported that either a vehicle was sold or its purchase postponed as a result of vanpooling. (As discussed above, the estimate is probably low.) However, only 20 percent of respondents reported that the vehicle left home was used by other household members and their use was substantially less in terms of mileage than the former commuting use. Finally, the total travel impact of vanpooling was a reduction of 339 miles/month for the average vanpooler.

Abridgment

Commuter Demand for Ridesharing Services

PETER J. VALK

Ridesharing has recently become one of the most discussed topics in the fields of transportation system management and energy conservation. It is increasingly being looked on by both public and private sectors as a short-term answer to a variety of economic and environmental ills. Ridesharing behavior is manifested in two distinct ways: Regular ridesharing refers to the adoption of shared commuting on an ongoing basis; emergency ridesharing is characterized by swift, but short-term, shifts from driving alone to pooling for the home-to-work trip. This paper characterizes both types of behavior and addresses the implications for providing assistance to commuters in both settings.

Table 1. Rideshare adoption process by type of ridesharers.

Rideshare Adoption Process	Ridesharers			
	Regular Period		Emergency Period	
	Normal–1	Normal–2	Long Term	Short Term
Motivational factors	High price of gasoline, too much travel time, costly wear and tear on vehicle	Change jobs, residential relocation, greater family mobility needs	Prevent anticipated loss of mobility due to emergency, e.g., no gasoline	Get to work
Behavioral predisposition	Socioeconomic profile, current mode, prior experience with other modes, new information on other modes	Socioeconomic profile, current mode, prior experience with other modes, new information on other modes	Socioeconomic profile, current mode, prior experience with other modes, new information on other modes	Current mode, prior experience with other modes
Consideration factors	Cost, convenience[a], scheduling, comfort[b]	Convenience, scheduling, cost, comfort[b]	Convenience[c], reliability, cost, scheduling	Reliability, scheduling
Mode switch	Carpool, vanpool, buspool, bicycle, other	Carpool, vanpool, buspool, bicycle, other	Carpool, bus	Carpool, bus
Evaluation				
Trial period	Perception of positive performance on consideration factors, compatibility with others, comfort[d]	Compatibility with others, comfort[d], perception of positive performance on consideration factors	Actual positive performance on consideration factors	Satisfactory status quo performance
Continued use	Receipt of economic benefits, e.g., time or money	Receipt of economic benefits, e.g., time or money	Receipt of economic benefits, e.g., time or money, comfort[d], compatibility with others	

[a]Ease of access. [b]Physical. [c]Ease of use. [d]Psychological.

Ridesharing has recently become one of the most discussed topics in the fields of transportation system management (TSM) and energy conservation. It is increasingly being looked on by both public and private sectors as a short-term answer to a variety of economic and environmental ills.

Ridesharing behavior is manifested in two distinct ways: Regular ridesharing refers to the adoption of shared commuting on an ongoing basis; emergency ridesharing is characterized by swift, short-term shifts from driving alone to pooling for the home-to-work trip. This paper characterizes both types of behavior and addresses the implications for providing assistance to commuters in both settings.

RIDESHARING AS A TSM STRATEGY

The attractiveness of ridesharing as an integral part of a TSM effort stems largely from its ability to help achieve transportation program objectives (e.g., decreased congestion or reduced energy consumption) without the expenditure of large sums of new capital. Ridesharing programs attempt to use private vehicles more efficiently as the basis for moving a given commuter population in as few vehicles as possible. By not having to invest large amounts of public capital in new transportation facilities, communities can get more use out of already dwindling public resources. Ridesharing's lure is also due to the short lead time necessary to provide accessible transportation options to the commuter population. In both instances, investments in ridesharing programs have the effect of leveraging additional investments from individuals, corporations, and the community and thus increase the effectiveness of each dollar spent. For example, public dollars used to support local ridesharing organizations' employer outreach programs are supplemented with an employer's dedication of resources (cash or in-kind) to making the program operational at the work site. The most common payoff to both the individual and the community is realized as a result of long-term shifts in both vehicular use and attitudes toward commuter travel.

RIDESHARING AS A CONSERVATION STRATEGY

Historically, ridesharing has been viewed as a conservation strategy aimed at reducing energy consumption, reducing air pollution, and increasing disposable income. The development of ridesharing organizations (RSOs) after the 1973-1974 Arab oil embargo is testimony to the recognition of pooling as a means to reduce the nation's consumption of gasoline. However, as is the case with all conservation strategies, benefits accrue over time as the result of a continual and long-term change in behavior (e.g., residential energy conservation).

Given the emphasis on conservation, RSOs and corporate ridesharing programs have concentrated their efforts on convincing commuters to share the ride on a regular basis. Measurable efforts have been marginally successful to date, given that many ridesharing efforts only go as far as providing information to commuters and then asking them to form the pool themselves.

The consideration of ridesharing as an alternative to driving alone is often brought about either by a change in a commuter's perception of the economic burdens he or she is enduring or is associated with other changes in individual routines. In the first circumstance (as indicated in Table 1), successive increases in the price of gasoline have generated heightened interest for ridesharing information throughout the nation. As a gallon of gasoline has become more expensive, ridesharing programs have seen an increase in the number of commuters who seek information on travel options. At lower fuel prices, these individuals did not perceive their economic (money and time) burden as being burdensome.

In the second scenario, individuals may consider ridesharing when they are also anticipating a change in their normal routine, such as a residential relocation, job change, or the need to purchase a new vehicle. A ridesharing arrangement in this situation can be considered a personal plan to the potential negative side effects of the change in routine.

In either instance, an individual's interest may be motivated by economic considerations. However, the decision process of whether to adopt ridesharing encompasses not only monetary considerations but, more importantly, social and psychological factors. This process is indicative of a decision made out of choice not necessity.

Several research studies (1-3) on ridesharing behavior agree that ridesharing is more a social than an economic phenomenon. Regular pooling, it seems, is initially chosen more for its compatibility with an individual's personality than for its monetary rewards. These same studies assert, and actual experiences confirm, that use of economic

pressures are less likely to induce a higher incidence of ridesharing than would be found by employing a more personalized means of bringing commuters together. In almost every evaluation or research study done on ridesharing programs, personal sources, word of mouth, or friends are cited as sources of referral by commuters who eventually carpool. Moreover, most people who end up carpooling do so with either a friend or coworker. Each of these responses indicates a careful and deliberate review of choice to change commuting routine.

Having once made the decision to switch travel modes, most ridesharers will continue their new routines for some time, although the majority of those who discontinue ridesharing do so within the first month. This decision process is not unlike that used in the purchase of comparison goods. As opposed to convenience goods, where price plays an important role in consideration and adoption, most comparison goods are reviewed on a wide set of criteria, including performance, durability, and reliability.

The selection and trial of a comparison good often involves careful evaluation of the product's performance during the initial purchase period. If the product satisfies or exceeds the purchaser's expectations, then it is not unusual for the purchaser to continue using the good. In ridesharing, if the shift from driving alone to some form of pooling (usually carpooling) integrates well with an individual's routine, then some form of ridesharing can be expected to continue.

Moreover, experiences in Los Angeles (4) have shown that the selection of ridesharing modes follows a maturation process. Observations over the last several years have found that carpoolers are predominantly composed of former solo drivers who seek alternatives to driving alone, whereas vanpoolers are largely former carpoolers (especially vanpool drivers) who see vanpooling as a way to continue ridesharing and at the same time eliminate the use of their personal vehicle. Moreover, many buspoolers are former vanpoolers who see economic gains to commuting in an even larger vehicle, without severely compromising comfort found in vans.

MARKET POTENTIAL

The greatest potential for widespread adoption of ridesharing can be realized through carpooling. As opposed to most vanpooling and buspooling programs, the rolling stock for carpooling has been acquired, routes already exist, and the market area has the broadest definition (physical and psychological) of all potential ridesharing modes. Vanpooling achieves the most efficient vehicular use (when fully occupied) and represents a potential step-up for carpoolers. Buspooling's share of the ridesharing market often coincides with that of vanpooling and can more efficiently serve areas where three or more vanpools originate. In each instance little, if any, new investment must be made in order to begin (or continue) travel in a shared-ride mode.

Armed with the knowledge of this mode-shift process, many programs (either company-based or areawide) have been established in order to assist an even greater number of individuals in ridesharing. Both government, through the establishment of RSOs, and businesses, through the initiation of their own programs, have recently invested resources in a multitude of efforts aimed at generating an increasing number of routine ridesharers to thereby conserve energy resources.

RIDESHARING AS AN EMERGENCY STRATEGY

Interest in ridesharing programs has increased dramatically as planners have concerned themselves with emergency energy programs and activities. Ridesharing is being considered the answer for satisfying the demand for fuel-saving alternatives. A variety of governmental efforts, including the Energy Emergency Conservation Act of 1979 guidelines, state energy office programs, and local energy management studies call for ridesharing programs to play a major role in responding to extraordinary levels of demand for assistance during crisis periods. Although the RSO or company ridesharing program may be the logical entity to provide such a response, it is not clear that these units are capable of an adequate response to crisis-proportion demands.

The ability to perform efficiently and effectively in an emergency period is the result of first, understanding the nature of demand for ridesharing and second, taking the necessary preparatory steps in advance of the actual crisis period.

A review of experiences from the 1979 gasoline shortage is helpful in differentiating between the nature and level of demand for regular and emergency ridesharing. The April-July period of 1979 saw the demand for ridesharing information rise as commuters faced a sudden and severe shortage of normal transportation services and sought an immediate resolution to their dilemma. Moreover, individual actions, such as bus riding, curtailment of discretionary trips, carpooling with a spouse, or requests for assistance from a ridesharing program, were taken out of necessity rather than choice. The process of selecting an alternative, as compared with a normal mode-choice decision, was abbreviated and may have followed a different path altogether (see Table 2).

In late 1979 the Los Angeles area ridesharing program, Commuter Transportation Services (CTS), Inc., conducted a series of surveys in order to determine the impacts of the 1979 gasoline crisis on travel behavior and CTS, Inc.'s services (5). Responses from the surveys reveal the process by which commuters in southern California sought alternatives to long gasoline lines and rapidly escalating fuel prices. For the most part, those who eventually requested help from CTS were those who did not have a readily apparent alternative and thus were forced to rely on an outside source for help. Most of this group had known about CTS prior to the crisis; however, they had not considered a switch to ridesharing during normal times. These crisis-compelled individuals eventually registered with CTS, Inc., because they could not get to work or because gasoline prices were too high, as opposed to the normal-period registrant who wanted to consider carpooling as an alternative to driving alone.

The timely receipt of information on personal travel options was of utmost importance during the crisis periods. Survey respondents reported that it took 4-5 weeks to receive information (carpool matchlists) from CTS, Inc. Although this time period may initially appear to be too lengthy, only 12 percent of the emergency period respondents considered it too long. This finding, however strange, is also found among normal period commuters. Responses from case crisis registrants indicate that personal urgency (and expectations) may have been diminished due to the formation of informal carpools among acquaintances, while at the same time CTS, Inc.'s (or other rideshare program) information was used as a contingency measure.

Short-Term Versus Long-Term Ridesharing

The changes in commuter travel behavior during the 1979 gasoline shortage were short lived. Results

Table 2. Carpooler characteristics by type of carpool.

Data Item	Normal Carpooler (%)	Emergency Period	
		Long-Term Carpooler (%)	Short-Term Carpooler (%)
Prior mode of travel			
Drive alone	72	83	85
Another carpool	13	9	0
Bus	10	3	8
Vanpool	3	2	0
Walk or bicycle	2	3[a]	7
Previous carpooling experience	33	37	98
Current mode after emergency period			
Drive alone			77
Carpool	100	100	0
Bus			0
Walk or bicycle			15
Motorcycle			0
Vanpool			
Other			8
Knowledge of partners prior to carpooling			
Complete		16	17
Partial		24	30
None		60	53
Importance of prior acquaintanceship			
Very		33	43
Somewhat		15	12
None		50	45
		2	
Importance of time spent picking up partners			
Very		45	79
Somewhat		41	
Never		14	
Would quicker matchlist receipt help in forming carpool?			
Yes	18	13	11
Maybe		12	8
No	63	75	81
Do not remember	21		
Continuing interest in ridesharing information			
Yes		86	64
No		14	36
Motivating source of information			
Employer		64	58
Mass media		15	25
Word of mouth		21	17
Age			
Less than 25	5	11	17
26-29	9	9	33
30-39	29	34	9
40-49	31	26	33
50-65	26	20	8
Household income			
Less than $10 000/year	5	6	10
$10 000-$19 999/year	24	34	30
$20 000-$29 999/year	36	22	50
$30 000+/year	24	38	10
No response	12		
Sex			
Male	73	43	65
Female	27	57	35

Note: The average distance traveled to work is 23 miles for normal carpoolers, 18 miles for long-term emergency carpoolers, and 11 miles for short-term emergency carpoolers.

[a]Motorcycle.

from CTS, Inc.'s survey indicate that, although a significant number of commuters chose carpooling during the crisis, much of this change lasted for the duration of the shortage. Furthermore, once the crisis passed, individuals reverted to their solo driving habits. In fact, vehicular use (and energy consumption) was reduced not for commute purposes, but rather for discretionary travel (6). However, a small number of emergency poolers did adopt ridesharing as a long-term change in travel mode.

A contrast of long-term and short-term poolers suggests that the latter group experienced a change in travel behavior, as opposed to changes in attitudes and behavior as related by long-term carpoolers. More importantly, the decision process for long-term carpoolers, as viewed through survey responses, is similar to that of the normal period carpooler.

The demographic characteristics of long-term poolers more closely resemble normal ridesharers than that of short-term poolers (see Table 2). Long-term poolers tend to be in the same age brackets (20 percent ages 50-65 versus 8 percent for short term) and have similar household incomes (38 percent in the $30 000/year bracket) to normal period carpoolers. Interestingly, both long- and short-term poolers have a greater number (57 and 35 percent, respectively) of females than did normal period poolers (27 percent). This may be indicative of household decisions to allocate the family automobile to primary wage earners in times of emergencies and seek alternative travel options for the family member who earns the secondary income.

Long-term emergency poolers also resemble normal period poolers in their motivations and attitudes toward ridesharing. Both of these groups express greater sensitivity to monetary concerns (i.e., price of gasoline) as opposed to the short-term fuel availability concerns of the short-term poolers. Fifty-eight percent of the short-term carpoolers (versus 64 percent of long-term poolers) sought assistance as a result of mass audience messages (e.g., freeway signs or radio) on emergency ridesharing. This medium, as contrasted with CTS, Inc.'s employer program, does not include educational or promotional information aimed at changing long-held attitudes on commuter travel.

Prior experience with ridesharing also has an effect on how long a commuter may carpool. Almost 98 percent of those identified as short-term carpoolers reported they had carpooled at some earlier time, but not quite 40 percent of long-term carpoolers reported similar experiences. This observation might seem contrary to what might be expected; however, short-term poolers also exhibit less flexibility (or possibly desire) in adapting to ridesharing. When asked why they stopped pooling, long-term poolers (and normal poolers) cited circumstances beyond their control (i.e., moved residence or work relocation), although short-term poolers more-often cited personal conflicts and irreconcilable time differences. Consequently, the finding that short-term carpoolers express a greater desire for prior acquaintanceship with potential carpoolers than do long-term carpoolers is not unusual. The foregoing observations suggest that short-term carpoolers, although they had had an unsuccessful experience with carpooling in the past, saw it as a ready alternative to driving alone, but only during crisis periods. Moreover, their prior negative experience with carpooling further suggests that attitude formation (positive or negative) plays a strong role in the trial and, more importantly, in the continued use of ridesharing modes.

Factors such as personal habits and reliability of potential partners were cited as critical in establishing long-term carpools; short-term carpoolers cited more travel-specific variables, such as living and working within short distances and similarity of work start and stop times.

Implications for Preparation of Emergency Plans

The implication of these user profiles is important in identifying activities during a crisis period.

The mission of any effort aimed at reducing energy consumption during shortages should be to facilitate speedy individual action. The point was made earlier that carpooling holds the most potential for a sustained reduction of energy consumption. The potential for quick initiation of carpooling during an energy crisis is even greater and thus should be the prime strategy of any emergency plan.

The preceding sections on crisis-oriented demand noted that readily accessible alternatives were those most often used (i.e., carpooling with spouse) and required little, if any, educational or promotional information to generate. The ridesharing program is thus relieved of its normal period mission of motivating individual action and thus can concentrate its efforts on providing mode-specific information with the assumption that individuals will act accordingly.

The ridesharing program can act more expediently by providing basic ridesharing information, which consists of instructions on how to arrange a carpool by oneself and a list of potential carpool partners. Although transit and vanpooling are attractive in that more individuals can be carried in one vehicle, the lead time to getting the vehicle on the road often exceeds the time individuals can wait to switch to a fuel-saving mode. In addition, new capital investments must be made to procure the vehicle (if vehicles are even available). Emergency plans often contain strategies aimed at stockpiling buses for use during shortages. This tactic will reduce implementation lead time; however, precious public dollars are being invested in equipment that has little ongoing productivity. Although this tactic is necessary for meeting increased transit ridership, much of that same demand could possibly be shifted to carpooling during the crisis and thus avoid the low-yield investment.

In terms of vanpooling, concern must also be given to lead time. However, in this case the money invested to acquire vehicles are eventually recapped through fares. A potential vanpooling tactic in emergencies would be to use carpools as a seeding mechanism for vanpools until vehicles could be acquired. Once the vehicles are available, several carpools could be questioned for their interest in vanpooling. This should be helpful in ensuring the long-term success of the vanpool because those who do not find ridesharing compatible with their demands will drop out prior to entering the vanpool.

Experiences from the 1979 gasoline crisis can also be helpful in guiding the preparation of future emergency plans. Activity at CTS, Inc., in Los Angeles at one point during the fuel shortage period increased by 1900 percent over the same month in the previous year. Although an emergency plan for increased ridesharing program activities had been prepared to meet the anticipated demand, implementation was not carried out until funding was provided after the start of the crisis. Demand for crisis services continued unabated, due in part to only responding to the crisis and not taking preparatory measures. Although this may seem obvious, only after the 1979 experience can the level and nature of demand be reported. Several findings emerge from these observations:

1. Dissemination of self-help information through mass media sources can be instrumental in modifying demand for a ridesharing program (i.e., most short-term ridesharers cited the media as source of information about CTS, Inc., services).
2. Dissemination of ridesharing information in more permanent packaging will enable users to recall where information is stored. In addition, a more substantial format will connote a greater significance to the information piece. More emergency carpools were formed among those who received a matchlist during the crisis as opposed to those in the program prior to the crisis. In addition, a much smaller percentage of the precrisis group recall having a matchlist on hand to use than do the crisis groups.
3. A data file should be established and updated for use during an emergency period and matchlists (and materials) should be generated at the earliest indication of crisis.
4. Employee-commuter emergency readiness should be maintained through fire-drill type exercises at work sites.

The value in understanding emergency ridesharing (short- and long-term) lies not in research findings but rather in the implications for providing ridesharing services during regular and emergency times. The expression of interest in ridesharing, albeit short lived, is a clear indication of the likelihood of switching modes if concerns can be addressed. Moreover, if the short-term carpool group can be identified, self-help information can be provided prior to the crisis and thus demands on ridesharing programs can be reduced. Last, knowledge of the relation between the demand for ridesharing services and variables that affect vehicular use (e.g., price and availability of fuel) can be developed and reviewed periodically as a mechanism to forecast upcoming demand. These preparedness actions are only a sample of tactics aimed at modifying the extraordinary surge of demand for emergency response services. Although response activities cannot be avoided, only by reducing the potential volume can crisis-compelled commuters receive an adequate response.

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