Profile of Monthly Pass Users in the San Francisco Bay Area

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As part of a Service and Methods Demonstration project on transit fare prepayment, a survey was conducted of monthly pass users on the San Francisco Municipal Railway and the Alameda-Contra Costa County Transit District in October 1980. The survey was intended to fulfill three information needs: (a) provide baseline data on pass users and their travel patterns, (b) assist transit marketing efforts by providing information about sales and distribution of passes, and (c) help to gauge the market for proposed intersystem transit passes in the San Francisco Bay Area. The survey instrument design was innovative, embodying a number of incentives designed to boost the response rate on the self-completion survey. The use of these incentives as well as the design of the trip-making questions on the survey are of potential interest to travel behavior researchers. The survey results focus on a number of issues: a profile of the transit pass user, pricing implications derived from trip patterns of pass users, the market of intersystem passes, and consumer preferences for marketing and distribution of fare prepayment modes. The survey found that the market can really be subdivided into the long-haul, higher-income, commute-only user and the local, lower-income, transit-dependent user. Different methods of distribution, pricing, and promotion must be directed at these distinct submarkets. The survey also found that a significant number of current pass users now buy passes for more than one system and would be interested in buying a joint pass. The first joint pass to be developed was one that met these needs—a simple combination of two existing passes.

An increasing number of individuals are choosing to buy monthly transit passes instead of paying the regular cash fare. As of November 1981, pass sales on the San Francisco Municipal Railway (Muni), for example, begun in 1974, had nearly doubled in a year and a half to more than 100 000/month, and the Alameda-Contra Costa County (AC) Transit District in the same region was selling more than 11 000 passes monthly, though its program was just over a year old. This ranks the Bay Area as one of the highest-volume sellers of transit passes in the nation.

In reviewing the available literature, however, it was found that there had never been a survey of the travel patterns or attitudes of AC Transit or Muni pass users. If anybody could help in the design, sale, and distribution of passes, clearly it was the group of transit riders most familiar with monthly passes. In addition, current monthly pass users represented the most easily accessible market for multisystem joint passes.

This paper presents the findings of the October 1980 survey of AC Transit and Muni monthly pass users. The survey was conducted as part of an Urban Mass Transportation Administration (UMTA) Service and Methods Demonstration project in the San Francisco Bay Area. The overall project examined the potential for fare prepayment programs that involve more than one transit operator. Because the Bay Area contains six major transit operators, the potential for intersystem fare coordination was high.

The survey was intended to fulfill three informational needs: (a) provide baseline data on pass users and their travel patterns, (b) help to gauge the market for interoperator monthly passes within the largest existing market, and (c) assist marketing and planning efforts by providing information about monthly pass users. The principal orientation of the analysis is descriptive.

Detailed information on the survey methodology, including sample design, questionnaire design, and computer analysis, is presented later in this paper. The self-completion survey was distributed at the point of purchase of the October pass to 6700 purchasers of the Muni "Fast Pass" and 5700 purchasers of AC Transit monthly passes.

QUESTIONNAIRE DESIGN AND DEVELOPMENT

Sample questions were formulated that dealt with the characteristics of pass use at the present time, the user's desire for joint passes, and basic demographic information. Staff at AC Transit and San Francisco Muni were involved at this point, both to review suggested questions and to include other questions of particular interest to the two transit properties.

It was recognized early in the project that typical rates of response to self-completion questionnaires (10-30 percent) were not acceptable. Moreover, the project requirement for detailed information on pass use resulted in a somewhat complex set of questions that could further discourage response. For these reasons, an innovative aspect of the questionnaire design for this survey was the inclusion of an incentive designed to increase the response rate.

Two distinct questionnaires were developed: a short, fairly simple form and a longer, more detailed form. To encourage those persons receiving the longer form to complete the survey and return it by mail, a special coupon was included on the front of the survey that entitled the respondent to a $1 discount on the next month's pass purchase if the form was completed and returned. The shorter form included a space for comments in hopes that respondents would be encouraged to express their opinions. The short form allowed two tests: whether the incentive produced a higher response rate and whether it resulted in any bias in the type of traveler responding.

It was essential to develop a method of ascertaining travel behavior by monthly pass users. Several problems guided the development of an instrument for obtaining these data:

1. It was thought important to obtain actual data on travel behavior rather than predictive data.
2. The trip table had to show linked passenger trips.
3. Some method had to be derived to explain the concept of one-way trips.
4. Data on transit use during peak and off-peak periods were desired.
5. Some indication as to trip purpose was thought advantageous.

The instrument designed was a trip table that asked for a record of transit travel during the past week, divided between peak and off-peak. A separate question was asked as to trip purpose. In addition, a question was included as to whether the data shown were typical.

The trip table eventually designed was fairly complicated both in instructions and layout. The concern that people would simply not respond to such a complicated table was not borne out by the actual response to the survey, however. The response to this complicated question was almost as high as it was to the question on annual household income (89 percent of responses were valid compared with 94 percent on the income question).

Table 1. Grouping of pass sales outlets and data on sales and distribution of survey forms.

Group (no. of passes sold per outlet)	Outlet	Total Passes Sold			No. of Forms Needed	
		Number				
		Group	Outlet	Percentage	Long	Short
<100	Filipino-American Council	1 381	50	1.6	40	10
101-250	University of San Francisco	5 981	246	7.1	178	68
251-500	Bank of Canton	11 403	397	13.6	340	57
501-1000	Walter May Shoes	18 411	605	21.9	548	57
1001-2000	Eureka Supermarket	17 732	1500	21.1	528	972
2001-6000	Olympic Savings and Loan	29 017	3065	34.6	866	2199
Special	Southern Pacific Depot[a]				500	500
Total					3000	3863

[a]Included at request of San Francisco Public Utilities Commission; not part of sample.

Respondents were also asked whether this represented a typical weekly pattern of travel. Overall, 94.7 percent of all respondents indicated that the trip diary represented a typical week of travel.

SAMPLING PROCEDURE

The general method used in distributing the survey imposed a number of constraints on the eventual sampling procedure. The only method available for surveying monthly pass users was to distribute the survey along with the monthly pass at the point of purchase. This entailed a mail-back survey because it was impossible to monitor survey response at the distribution outlets. The different distribution channels used by AC Transit and San Francisco Muni entailed the development of two distinct sample designs to ensure representativeness among the different pass-user populations (described below).

The overall sampling strategy was to select a representative sample of pass sales outlets to obtain a total usable response of approximately 1200 long forms each for AC Transit and Muni pass users. This large a response would allow a high degree of accuracy in the variety of breakdowns by traveler and travel pattern types required by the analysis plan. Long-form questionnaires were distributed to selected outlets in proportion to their sales volumes. To simplify the instructions for those directly responsible for pass sales, short-form questionnaires were distributed to make up the difference between the number of long forms and the total sales estimated for each outlet.

Sampling Design for Muni Fast Pass Purchasers

San Francisco Muni sells Fast Passes through more than 100 private sales outlets as well as at selected city outlets and transit stations throughout the City and County of San Francisco. Sales at the various outlets vary considerably, from 25 or fewer passes to more than 3000 passes/month. The larger outlets tended to be in downtown San Francisco and the smaller outlets in outlying neighborhoods. The sales outlets were grouped by size (number of passes sold), and outlets were randomly selected (by using a random number table) from each group. The strategy was one of stratified sampling in which allowance was made for replacement if an outlet chose not to participate. Table 1 gives the Fast Pass sales outlets selected in relation to other Fast Pass sales outlets in San Francisco. To make the sample outlets representative of the volume of passes sold in each group, long forms were distributed to each outlet in proportion to the sales group's percentage of total pass sales. Table 1 illustrates this process.

The original sample size was 2500 long survey forms. The San Francisco Public Utilities Commission requested that the Southern Pacific depot be included in the sample to test the joint-pass market for commuters using the Southern Pacific railway service. Because the inclusion of this outlet in the original sample would have biased the sample, since long-distance commuters from the rail corridor are quite different from San Francisco residents, this outlet was treated separately from the beginning.

Sampling Design for AC Transit Pass Purchasers

AC Transit sells two kinds of monthly passes: a local pass for service to its East Bay service area and a Transbay pass for service from the East Bay to the San Francisco Transbay terminal. The local pass is sold at the AC Transit office in downtown Oakland and through participating grocery stores throughout the AC Transit service area. The Transbay pass is sold at the AC Transit office, through the mail, and at the Transbay terminal. Unfortunately, it proved administratively impossible to distribute the survey at the grocery store points.

The pass survey was divided in a manner proportionate to sales at the AC Transit office and the Transbay terminal in San Francisco.

Distribution of Survey Forms

The survey forms were distributed with the October 1980 passes to the outlets that had been selected. Each outlet was visited in person during the month of September to elicit cooperation in distributing the survey. Monthly passes were inserted into the survey form prior to distribution so that the purchaser would receive the survey and the monthly pass as one item.

SURVEY RESPONSE RATE AND RESULT OF INCENTIVE

Sales of monthly passes began in both San Francisco and the East Bay during the last week of September 1980, and survey distribution proceeded concurrently. Completed surveys began to arrive at the Metropolitan Transportation Commission around the first of October. Approximately 90 percent of the forms in the final sample were received within the first 2.5 weeks of the survey.

The coupon that provided a dollar discount for the next month's transit pass appeared to have its intended significant effect on increasing response. Responses to the long form (which contained the coupon) were significantly higher than responses to the shorter forms. Table 2 illustrates these response rates.

These response rates, particularly those for the long form, are significantly higher than the usual response rates for self-administered surveys, which vary from 10 to 30 percent. The cost per completed survey was less than $3.

Table 2. Survey response rate.

System	Long Form			Short Form		
	No. of Questionnaires	Response		No. of Questionnaires	Response	
		No.	Percent		No.	Percent
AC Transit	2000	1344	67	3700	1405	37
Muni	3000	1615	59	3700	1364	36

CODING AND KEYPUNCHING

A 100 percent verification process was used in both keypunching and coding to minimize coding errors and allow consultation on ambiguous responses. Coders also took the survey forms and recorded comments. The number and variety of volunteered comments provided some useful insights into pass use that could not easily be deduced from closed-end questions.

COMPUTER PROCEDURE AND FILE STRUCTURE

All survey responses were placed on a computer tape in BCD (binary coded data) card-image form. The responses were then built into a file for Version 7 of the Statistical Package for the Social Sciences (SPSS). The SPSS file is structured with 10 separate subfiles, corresponding to the long and short survey forms and the different passes.

A variable was included for weighting the subfiles to the total pass sales in each group. A second variable then weighted the file to total pass sales. The weights are based on the ratio of responses by sales outlet to actual sales at each outlet and the ratio of total sales volume at outlets to actual total pass sales.

SURVEY RESULTS

The survey revealed a number of interesting aspects of monthly pass use. These results can be examined in terms of transit use by pass users, reasons for buying passes, distribution and sales methods, and desire for intersystem passes. Another aspect of the survey analysis was to compare the pass user with transit users who paid cash fares and to compare new pass buyers with more established purchasers of transit passes.

Transit Use by Pass Purchasers

Resondents to the long survey form were asked to fill out a trip diary documenting transit use during the past week. Respondents were then asked to indicate the purposes of the trips taken during the week. Several variables were created to aggregate this trip diary into usable totals. Variables were created for total weekly trips, average monthly trips, and percentage of peak-period trips.

Total Weekly Trips

Total weekly trips is simply the total trips indicated in the trip diary for each respondent to the survey. The mean and median numbers of weekly trips for each of the four subfiles are given below:

Pass Group	Weekly Trips per Respondent		
	Mean	Median	N
AC Transbay	11.0	10.2	4 898
Southern Pacific/Muni	10.5	10.1	799
San Francisco Muni	13.5	11.7	92 465
Ac local	13.0	10.4	5 529

Average Monthly Trips

Average monthly trips aggregated the weekly trip totals and multiplied them by 4.33, the average number of weeks in a month. The results are as follows:

Pass Group	Avg Monthly Trips		
	Mean	Median	N
AC Transbay	47.3	43.6	4 898
Southern Pacific/Muni	46.4	43.5	799
San Francisco Muni	58.3	50.8	93 465
AC local	56.0	44.8	5 529

The table indicates a higher amount of transit use by users of the local pass (Muni Fast Pass and AC local pass). This transit use is far greater than could be accounted for by commuting to work only (approximately 40-46 trips/month). This fact suggests a wide range of discretionary use of passes by this group for purposes other than work trips. The prices of these passes at the time of the survey were based on substantially lower numbers of trips. The AC local and Transbay pass prices are based on 36 trips/month and the Muni Fast Pass is based on 32 trips.

Percentage Peak-Period Trips

The trip diary included boxes for number of peak-period trips taken as well as nonpeak trips. The following table represents the aggregate percentage of trips recorded in each subfile that were taken during the peak period:

Pass Group	Mean Percentage of Peak-Period Trips	N
AC Transbay	90	4 707
Southern Pacific/Muni	89.8	83 089
San Francisco Muni	78	773
AC local	74	4 904

Once again, users of the San Francisco Muni and AC local passes tended to take a smaller proportion of trips during peak travel periods. This would indicate a greater proportion of discretionary off-peak trips, whereas the user of the long-haul commuter pass does not appear to take much advantage of the opportunity for off-peak or weekend trips.

Reasons for Buying a Monthly Pass

Respondents were asked to rank the importance of three reasons for the purchase of the monthly pass. Each of these reasons, along with an "other" category, could be ranked from "not important" to "somewhat important" to "very important". Table 3 gives these results.

Most respondents in each pass group indicated that convenience and savings were very important reasons for buying a monthly pass. Although the different pass prices allow different levels of money-saving, there is no corresponding difference in the importance of saving money as a reason for purchasing a monthly pass.

The major difference is in the response, "I can ride as often as I like." The users of the locally oriented passes (AC local and Muni Fast Pass) felt that the option to use the pass for discretionary trips was very important (77.7 and 71.1 percent, respectively), whereas the users of the commuter-oriented passes ranked this reason considerably lower. This correlates strongly both with the greater transit dependency of local pass users and

Table 3. Response to reasons for buying a monthly pass.

Reason	Pass Group	Ranking (%) Not Important	Somewhat Important	Very Important	N
It is more convenient than using cash	AC Transbay	3.2	0.8	75.9	4 898
	Southern Pacific/Muni	4.9	18.7	76.4	768
	San Francisco Muni	2.4	16.3	81.3	92 257
	AC local	1.9	13.7	84.4	6 804
I can ride as often as I like	AC Transbay	22.8	32.0	45.3	3 810
	Southern Pacific/Muni	25.8	28.0	46.0	569
	San Francisco Muni	7.0	21.8	71.1	73 227
	AC local	5.4	16.8	77.7	4 673
It saves me money	AC Transbay	22.5	12.5	85.0	4 323
	Southern Pacific/Muni	4.8	12.6	82.6	661
	San Francisco Muni	2.4	11.6	86.0	79 348
	AC local	3.1	10.6	86.3	5 228

Table 4. Response to question asking which of seven possible methods of pass distribution and sale were most convenient.

Pass Group	Respondents Choosing Method (%) Location Near Work or School	Location Near Home	Through Employer	Mail or Telephone Order	Automatic Deduction from Bank Account	Major Transit Stations and Terminals	Other	N[a]
AC Transbay	17.3[b]	8.7	7.0	9.8	4.0	50.0[b]	2.3	1136/197
Southern Pacific/Muni	24.0[b]	4.6	16.2	19.7	2.6	37.5[b]	1.7	363/70
San Francisco Muni	50.6[b]	19.1[b]	10.5	6.2	4.2	7.0	2.4	1550/232
AC local	34.6[b]	20.1[b]	10.3	6.8	2.5	19.4[b]	5.2	352/65

[a]Number of responses/number of multiple responses. [b]Highest response to question concerning pricing of joint passes.

with the higher number of average trips per week and month taken by local pass users.

Distribution and Sale of Monthly Passes

Survey respondents were asked to indicate which of seven possible distribution and sales methods were most convenient to them. Respondents were allowed to check more than one method, but no ranking was implied. About 25 percent of the respondents indicated that more than one sales method was convenient. Table 4 totals all unweighted responses.

Joint Passes

Asked whether they would buy a pass that could be used on more than one transit system, respondents replied as follows:

Pass Group	Yes No.	Yes Percent	No No.	No Percent	Maybe (%)
AC Transbay	3 010	57.7	2 170	41.5	0.9
Southern Pacific/Muni	647	79.2	170	20.8	0
San Francisco Muni	35 014	34.9	64 435	64.2	0.9
AC local	2 128	31.2	4 580	67.1	1.7

The greatest desire for combination passes seems to be among those persons currently purchasing the long-haul, commute-oriented passes. Often these long-haul trips require local feeder service from the transit station or terminal to the final destination. Generally speaking, the market for joint passes appears quite high among all monthly pass purchasers. This question was asked, however, irrespective of the price of such a pass.

Pricing

Rather than ask respondents what price they would be willing to pay for a combination pass, the question was posed in this manner: "Would you be willing to buy the combined pass if its price were equal to the sum of the separate passes?" The results were as follows:

Pass Group	Response (%) Yes	No	N
AC Transbay	32.9	67.1	5 062
Southern Pacific/Muni	34.5	65.5	799
San Francisco Muni	28.7	71.2	95 863
AC local	26.1	73.9	6 570

The highest responses to this question tend to be in those categories that embody existing distribution methods (Table 4). Thus, the question does not directly address the issue of potential market capture through a change in methods of pass sales and distribution. Presumably, those individuals who currently purchase passes do so partly because it is convenient for them to do so.

The highest percentage of commute-oriented pass users tended to choose either a location near work or major transit stations and terminals for pass sale and distribution. All AC Transbay pass users pass through the San Francisco Transbay terminal and all Southern Pacific commuters disembark in San Francisco at the San Francisco Southern Pacific depot.

Local pass users (AC local and San Francisco Muni) also felt that it was convenient to purchase passes near work. In addition, however, a significant number of this group found it convenient to purchase passes near their homes. It should be noted that, due to administrative problems with the grocery stores that distribute many of the AC local passes, purchasers of the pass at grocery stores were not included in the sample of AC local pass

users. As a result, the question on distribution could be biased for the AC local subfile.

The purchase of passes through employers and by mail or telephone order was given some consideration by current pass users. Almost 20 percent of those who purchased the Muni Fast Pass at the Southern Pacific depot indicated that mail or telephone orders would be a convenient way for them to purchase the pass.

Desire for Joint Passes

Survey respondents were asked whether they would buy a monthly pass that could be used on more than one transit system. The results are indicated below in percentages and in numbers weighted to total volume of pass sales. Fewer people would buy the joint pass at the combined price than indicated interest when price was not mentioned at all. The implication is that the convenience factor of a single pass that can be used on more than one system, by itself, does not attract a majority of potential users.

What joint passes were respondents interested in purchasing? Of those 3016 AC Transbay pass users who desired a combination pass, preferences were expressed as follows:

	Pass Users Desiring a Joint Pass	
Joint Pass	No.	Percent
AC-Muni	2024	67.1
AC-BART	626	20.7
AC-Muni-BART	349	11.6
Muni-BART	17	0.6
Total	3016	

Of the 1736 users of the AC local pass who desired a combination pass, preferences were expressed as follows:

	Pass Users Desiring a Joint Pass	
Joint Pass	No.	Percent
AC-Muni	486	28.0
AC-BART	972	56.0
AC-Muni-BART	278	16.0
Total	1736	

Of the 647 Muni pass users who purchased their passes at the Southern Pacific depot (hence, also use Southern Pacific service) and desired a combination pass, preferences were expressed as follows:

	Pass Users Desiring a Joint Pass	
Joint Pass	No.	Percent
Muni-BART	26	4.1
AC-Muni-BART	3	0.5
AC-Muni	12	1.9
Southern Pacific/Muni	526	82.6
Other	70	10.9
Total	637	

Of the 35 014 Muni Fast Pass users who desired a combination pass, preferences were expressed as follows:

	Pass Users Desiring a Joint Pass	
Joint Pass	No.	Percent
AC-Muni	3 124	11.0
Muni-BART	16 229	57.0
AC-Muni-BART	1 462	5.1
Southern Pacific/Muni	2 511	8.8
Other	5 148	18.1
Total	28 474	

Others expressed no preference.

These preferences allow the development of estimates of the potential market for joint passes among the most likely market segment, current pass purchasers. This information is currently being used as baseline data for the preparation of a marketing and distribution plan for joint passes.

Demographic Comparison with Other Surveys of Transit Users

Both AC Transit and San Francisco Muni had completed surveys of transit users within the past three years. The AC Transit On-Board Survey of 1978 (1) was a self-completion form handed to a sample of AC Transit riders on board transit vehicles. The AC Transit survey is thus representative of AC Transit users using the service on a given day.

The Muni survey used here for comparative purposes (2) was conducted in 1979 and was a general telephone sample survey of all San Francisco households. The results used here are those for respondents who regularly used Muni. The 1979 survey is representative of travel by Muni users who were part of a random household sample.

AC Transit

The working hypothesis concerning the ways that pass purchasers might be different from other transit users would be that pass users would tend to be either more transit dependent or more frequent riders. For the pass user to achieve a savings over the cash price, the pass user would have to be a daily commuter. It is not possible to test this hypothesis accurately for AC Transit because AC Transit did not offer a monthly pass in 1978. Consequently, the potential pass purchaser was at that time either paying cash or purchasing tickets. Any comparison is between the pass user and the entire population of AC Transit riders (see Table 5). It is possible to determine how closely the AC Transit pass purchaser mirrors the demographic composition of the population using AC Transit.

More females appear to be purchasing passes than would be expected from the general population of AC Transit riders. Asians appear to be overrepresented in the pass-user sample whereas blacks are underrepresented. Income appears higher for pass users than for AC Transit users in general. Comparison on automobile ownership is not possible due to the different wording of that question in the two surveys.

San Francisco Muni

The same hypothesis can be advanced for possible differences between pass users and purchasers of cash fares on San Francisco Muni. The Muni survey allows comparison of Muni Fast Pass purchasers at the current $16 price and at the old $11 price in effect in 1979 (see Table 6).

Pass users do appear to travel more frequently on Muni than persons who pay cash. Pass users have a higher income than individuals who pay cash, which may be due either to the fact that pass users are more likely to be commuters and thus employed full time or to the effects of inflation. Pass users appear to be more transit dependent than the regular Muni user who pays cash in that the number of pass users who do not own an automobile is significantly higher (40 percent versus 29 percent).

Comparison of Long-Form and Short-Form Results

The short survey form was included in the sample partly as a check on the validity of the longer-form

Table 5. Comparison of characteristics of pass users and general population who ride AC Transit.

Characteristic	AC Transbay		AC Local	
	1980 Pass Survey	1978 On-Board Survey	1980 Pass Survey	1978 On-Board Survey
Sex (%)				
Male	41.9	47.8	30.9	43.7
Female	58.1	52.2	69.1	56.3
Age (%)				
<18	0.3	6.0	0.7	24.0
18-34	55.1		47.2	
35-49	25.2	90.0	23.1	51.7
50-64	19.2		28.6	
≥65	0.2	3.6	0.3	5.9
Race/ethnicity (%)				
Asian	24.7	14.3	21.2	7.1
Black	9.3	23.0	31.6	45.4
Hispanic	2.6	3.3	4.7	6.9
Native American	3.0	0.5	3.0	0.9
White	57.7	56.5	35.3	37.0
Other	2.7	2.4	3.7	2.7
Income (%)				
<$15 000	29.2	51.4	60.6	75.1
$15 000-24 999	33.5	26.7	24.1	15.4
$25 000-34 999	20.5	15.3	8.9	5.2
≥$35 000	16.8	6.6	6.4	4.3
Automobiles owned (%)				
0	20.6		47.1	
1	48.0		32.8	
2	22.6		15.7	
≥3	8.9		4.4	
Driver's license (%)				
Yes	82.1		52.5	
No	17.9		47.5	
Automobile available for this trip (%)				
Yes		47.9		20.0
No		52.1		80.0

Note: N = 5000 for AC Transbay pass users (weighted response), 970 for AC Transbay nonusers, 6000 for AC local pass users (weighted response), and 4300 for AC local nonusers.

Table 6. Comparison of characteristics of pass users and cash-fare purchasers.

Characteristic	1980 Pass Survey		1979 Muni Telephone Survey	
	Southern Pacific/ Muni	San Francisco Muni[a]	Pass[b]	Cash
Trips per week (%)				
Mean	10.5	13.5	14.1	8.7
Median	10.1	11.7		
Sex (%)				
Male	55.8	49.5	39.7	39.4
Female	44.2	50.5	60.3	60.6
Age (%)				
<18	0.0	0.3	0.5	1.1
Adult	100.0	99.5	83.2	86.2
Senior	0.0	0.2	16.3	12.7
Income (%)				
<$15 000	12.7	46.3	54.5	56.9
$15 000-24 000	22.9	30.6	32.9	24.3
$25 000-34 999		12.2	12.8	17.8
≥$35 000	70.8	11.0		
Automobiles owned[c] (%)				
None	6.0	40.4	49.2	29.0
One	34.4	42.4	38.1	47.0
Two	38.9	13.4	11.6	18.0
Three or more	20.7	3.7	1.1	6.0
Race-ethnicity[d] (%)				
Asian	14.5	29.2		
Black	1.1	2.7		
Hispanic	1.8	5.7		
Native American	6.4	2.6		
White	73.0	54.3		
Other	3.2	5.9		

[a] Pass price $16.
[b] Pass price $11.
[c] N = 828 (weighted response) and 100 000 for 1980 Southern Pacific-Muni and San Francisco Muni, respectively; N = 167 and 531 for 1979 pass and cash fare modes, respectively.
[d] N = 828 and 100 000 (weighted response) for 1980 Southern Pacific-Muni and San Francisco Muni, respectively; race-ethnicity category not included in 1979 survey.

results. Several questions were directly parallel. Side-by-side comparisons were made on these parallel variables to determine whether any significant differences existed. Responses to these questions were quite similar in all cases.

The inclusion of short and long forms in the sample served three purposes: the methodological check explained above, another methodological check on the value of offering an incentive to boost response rates, and a practical purpose of ensuring that all pass buyers at the sampled outlets would receive some form of survey instrument.

USES OF SURVEY RESULTS

The survey analyses have been put to a number of uses so far. Preliminary survey tabulations were printed and sent to the marketing and planning staff at both AC Transit and San Francisco Muni as soon as they were available.

Survey results on a variety of questions have proved germane to a number of problems encountered in the AC-BART-Muni multioperator pass project. Of particular interest have been questions related to the number of trips taken with the pass, preferred distribution methods, and the potential market for the joint passes. As preparation of marketing and distribution plans for the joint passes continues, the survey will be an invaluable source of background information.

In addition, the pass-user survey represents the first effort at defining the user of the monthly pass as opposed to the regular transit user. Survey results appear to indicate that pass users travel more frequently than other transit users, although a differentiation can be made between the transit-dependent pass user and the pass user who uses monthly passes mainly for commuting to work. It is hoped that the results will prove to be of use to other transit systems in planning and developing fare prepayment schemes.

The survey also found that a significant number of current pass users now buy passes for more than one system and would be interested in buying a joint pass. The first joint pass to be developed was one meeting these needs, a simple combination of two existing passes.

Pass users suggested a variety of potential distribution methods that would make pass buying convenient for them. The nature of intersystem travel would allow concentrating sales at the major intersystem transfer points and by mail or telephone order.

ACKNOWLEDGMENT

I wish to express my appreciation to Joel Markowitz, who both provided the original idea for this project and guided me through the stages from design to analysis and writing. I would also like to thank Shirley Logan, who typed the manuscript.

This paper was sponsored under a grant from the Service and Methods Demonstration program of the Urban Mass Transportation Administration, U.S. Department of Transportation. The views expressed are my own and do not necessarily reflect those of the sponsoring agency.

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Publication of this paper sponsored by Committee on Public Transportation Planning and Development.

1981 San Francisco Bay Area Travel Survey

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Household travel data constitute a major cornerstone of regional transportation planning analysis. But many household travel data sets in use today are more than 10 years old, and cost considerations have deterred many areas from updating these data. The planning, design, and conduct of a household-interview travel survey in the San Francisco Bay Area in the spring of 1981 are described. Household and travel information was collected by telephone from 7200 households in the nine-county jurisdiction of the Metropolitan Transportation Commission. Telephone interviewing proved to be a cost-effective method for conducting household interviews. The sample gave good geographic coverage and provided a good representation of the population groups in the Bay Area.

One of the most difficult and costly factors in transportation decisionmaking is the collection of data on which to base analyses. Because of this cost, it is often tempting to skip a rigorous analysis and to rely on "back-of-the-envelope" calculations. The fact that large-scale decisions often appear to be made on a political rather than an analytical basis contributes to this view.

However, the argument can be made that a solid analysis is necessary no matter what other considerations enter into the decision (1); it is this view that motivates us to undertake data-collection projects.

Many planning agencies are asking whether a complicated household-interview travel survey can be accomplished within today's severe fiscal constraints. Is it possible to obtain a large enough sample to make the survey worthwhile? Can a survey of this type be conducted and processed in a reasonable time? Will the public participate willingly? Can a survey achieve representative sampling of all population groups?

This paper describes the planning, design, and conduct of a household travel survey in the San Francisco Bay Area in the spring of 1981 and discusses how well the survey attained its goals.

BACKGROUND

In the early 1960s in the San Francisco Bay Area, there was a rising interest in transportation matters. The Bay Area Rapid Transit (BART) system was being designed, an additional bridge across the Bay was contemplated, and highway projects of many kinds were in the planning stages.

The Bay Area Transportation Study Commission (BATSC) was formed to create a transportation plan for the region. One of its major projects was a huge travel survey. The BATSC survey gained a certain amount of fame (or notoriety) because of several reasons: its size (home interview of 30 000 households), its cost (more than $1.5 million for data collection), and its failure to achieve a random sample due to lack of coverage of certain minority neighborhoods. Among data processing people, it gained a nightmare reputation because all processing was done on second-generation systems with sequential tape storage only.

In 1970, the California Legislature created a metropolitan planning organization for the San Francisco Bay Region: the Metropolitan Transportation Commission (MTC). Since its creation, MTC has collected and used many types of transportation data. However, the backbone of its transportation data base has been the BATSC survey. The 1970 Census journey-to-work data set proved to be almost unusable because of insufficiently coded work locations. Only after the poorly coded trip ends were assigned, by using the 1965 BATSC data as a template, was this census data set of any value.

It is hoped that the 1980 Census journey-to-work data will be much better. Nevertheless, the world has changed a great deal between 1970 and 1980, and work-trip information alone will not suffice.

Decisions to invest in large capital projects and accompanying long-range planning efforts are conspicuously absent in 1981. Because of fiscal constraints and a change in philosophy, the shift has been to better management and deployment of the existing system. This strategy, sometimes called transportation system management, calls for looking at smaller parts of the system and devising ways to improve them. Accompanying these changes, there has been a strong upward trend in transit use in the San Francisco Bay Area. As always, transit's limited resources must be used to maximize service to the public.

Several other major transportation changes have occurred in the area in the past decade. Some of these were direct: for example, the start-up and operation of the BART system and the emergence of new bus systems in several suburban counties. Others were economic and demographic: the apparent disappearance of the stay-at-home housewife and the massive entry of mothers into the work force, the increase in automobile ownership, the rise in the cost of owning and operating a car, and the greatly expanded number of unrelated-adult households.

What data are needed to do the best job of making the transportation system work for the people of the region in the 1980s and beyond? While other types of data are often useful for analyses, specific household-interview transportation survey data are occasionally necessary (2). For example, in deciding how best to alleviate congestion on a bridge, it is not enough to count the vehicles on the bridge (how many) or even to do a postcard or license-plate survey of such travelers (who, why, where). One must separate the unavoidable single-occupancy trips from the others and analyze strategies to maximize