

METHODOLOGY

OVERVIEW

The Puget Sound Regional Council's Travel Behavior Survey Wave 3 consisted of two basic parts: 1) recontacting wave 1 participants and 2) recruiting new participants to replace wave 2 participants who fell out for various reasons. The basic steps used for each part were:

Contact Wave 2 panel members for Wave 3

1. Add 15 and 16 year olds to Wave 2 database
2. Split Wave 1 into 8 groups.
3. Mail diary packets.
4. Telephone contact after packet is received, but before diary dates.
5. Mail new diaries to additions to panel and to "splits"
6. Reminder postcards one week after diary dates.
7. Second telephone contact if necessary

Recruitment of new Wave 3 participants

1. Telephone survey and recruitment from sample of randomly generated numbers.
2. Recruitment of individuals to fit characteristics of dropouts from Wave 1.
3. Newcomers to the 4 county area recruited from randomly generated sample, from newcomers list purchased from US West, and from volunteers gathered with Puget Power's help, and from the Cole Directory listing.
4. Mail diary packets.
5. Reminder postcards one week after diary dates.
6. Follow-up telephone contact if necessary.

CONTACT OF WAVE 2 PANEL MEMBERS FOR WAVE 3

Database of names and addresses

Since the previous diary data was collected 2 years earlier, the master name and address list had been updated from returned questionnaires sent out in the fall of 1991, and from Christmas postcards sent out by PSRC that were returned by the post office with address corrections.

In order to cut down on the number of additional mailings to households because of added members to the panel, an attempt was made to add all children in the household who turned 15 or 16 years old in 1992. Along with the 1991 questionnaire the panel contact person was asked to return a household information sheet that asked for the names and birthrates of all household members. Each of those sheets was scanned for possible children who would currently be 15 or older and were not on the panel 2 years ago. These

15-16 year olds were added to the master file. Diaries were included for them in the packets to the households.

Organization

In 1990 the Wave 2 mailout was conducted over 4 weeks with the households divided into 13 groups. Due to the shortened time allowed for wave 3, the mailout in 1992 was conducted in two weeks with the households divided into 8 groups.

Design of Mailout Packets

In order to maintain continuity from wave to wave, the diary forms and auxiliary pieces were designed in the same general format. Changes to the mailout packet included changes to the diary itself, a revised instruction sheet and the addition of a "right/wrong" example for filling out addresses. The changes to the diary included:

- 1) adding "address" , "or cross streets" and "city" prompts to the address box on the diary
- 2) moving the start and end trip columns to precede and follow the address column, respectively, and labeling them "I left at:" and "I got there at:".
- 3) renumbering locations so that the "starting place" is numbered and is designated by the number "1".
- 4) deleting the column for number of family members under 15.

The revised instruction sheet was reorganized and simplified over the previous wave's (some respondents even wrote complimentary notes about this). Graphic items were also added. These included a man and a woman walking. Nevertheless, we still received blank diaries from individuals who "only walked," and we had to ask them to do the diaries again. The instructions also specifically asked persons on vacation or out of the four county area on their assigned days to select the same days of the week at a different date. We still got blank diaries returned and had to ask for them to be redone.

The "right/wrong" sheet was added as emphasis on the correct way to enter trip information. There were still a very large number of mistakes in the trip information as discussed below.

Mailout of packets

The mailout packet to each panel household consisted of the following items:

1. cover letter
2. example diary for specific county
3. instruction sheet
4. half page with "right" and "wrong" examples
5. postage paid return envelope
6. a crisp new two dollar bill
7. two travel diaries for each household member

All correspondences, including envelopes, were specifically printed for this survey and were labeled in blue letters "Puget Sound Transportation Panel." The packet was mailed in an oversized envelope addressed to the household contact. For postage first class colorful, large stamps were used.

The cover letter was on PSRC letterhead and personalized with the household contact's name in the salutation and with the current date.

The sample diary was printed on pale colored paper with "SAMPLE" screened across it. For each of the four counties a separate diary was printed with examples specific to that county and each county was color coded for easier assembly of the mailout packet.

The instruction sheet was printed double sided with instructions broken out in categories corresponding to the sections of the diaries. Boxes were used to enclose the major sections just as in the diaries and graphical elements were used to add interest to the instructions. The instructions were edited and simplified over the Wave 2 version.

The postage paid return envelope was printed in blue and the return address said "Puget Sound Transportation Panel."

Each household member received 2 diaries and a crisp \$2 bill. A colored paperclip fastened the 3 item together. Each diary was personalized with the member's name, the date the diary was to be filled out and their identification number.

Telephone contact

The mailings were orchestrated such that the assigned diary dates were within 3-5 days after the household's receipt of the diaries. During those 3-5 days telephone calls were made to each household. (See next page for schedule used.) The objective of this telephone contact was to:

1. update the household information
2. determine if packet was received
3. determine if replacement or additional diaries were required
4. obtain address and telephone number of panel members who had "split" from the primary household, so that diaries could be sent immediately
5. personalize the study by adding warmth and intensity
6. convey the importance of participation
7. convey the importance of all household members participating and collecting information on the same dates
8. create a sense of urgency for the target days
9. provide clarification of procedures / explanations and answers questions
10. verify the validity of the telephone numbers from Wave 2

Since not all households could be contacted in those 3-5 days, telephone calls were made after the diary dates and even after diaries were received, in order to update the household information.

These contacts were fruitful in determining who had not received packets due to address changes, who had not even opened their mail yet, who had already lost the packets, who needed extra diaries and \$2 bills for new additional prospective panel members in the household. Overall in this study, new packets had to be sent out to 392 individuals. The majority of these mailings were as a result of these phone contacts. (The rest were because panel members called in and asked for new sets or they were asked to re-do their diaries because they returned them blank because they had been on vacation, out of the 4 county area, or said that they "don't drive anywhere.")

Reminder postcards

Reminder postcards were sent out one week after the diary date. Again these were personalized with the household contact's name.

Additional telephone contact

Follow-up telephone contact was made if

- 1) diaries had not been received by 2 weeks after the diary date,
- 2) if diary data needed clarification or
- 3) if it was necessary to request an individual or household to redo their diaries (e.g. if all trips were outside of the 4 county area).

If the diaries had not been received, the interviewer called to determine the reason. Often it was because the diaries had been lost or misplaced, so the household was sent a new package. Sometimes the diaries had been completed and just not mailed, so the respondent simply needed to be reminded to put them in the mail. Other households had forgotten to complete them or had procrastinated and needed to be urged to complete them on a different date. In some households where this had happened, the respondent thought that it was too late (because of the printed date on the diaries). Thus, the call back procedure is really needed if a date is to be printed on the diary form.

Schedule for mailout

The following table shows the schedule for all of the above activities.

SCHEDULE FOR CONTINUING HOUSEHOLDS

Group Number	1	2	3	4	5	6	7	8
Mailout Date	9/28	9/29	9/30	10/1	10/6	10/7	10/8	10/12
Diary Date 1	10/5	10/6	10/7	10/8	10/13	10/14	10/15	10/19
Diary Date 2	10/6	10/7	10/8	10/9	10/14	10/15	10/16	10/20
Diary Weekday 1	Mon	Tues	Wed	Thurs	Tues	Wed	Thurs	Mon
Diary Weekday 2	Tues	Wed	Thurs	Fri	Wed	Thurs	Fri	Tues
Telephone Update	10/1	10/2	10/5	10/6	10/9	10/12	10/13	10/15
Postcard Mailed	10/6	10/7	10/8	10/9	10/14	10/15	10/16	10/20
Telephone Follow-up	10/14	10/15	10/16	10/19	10/23	10/26	10/27	10/29

RECRUITMENT OF REPLACEMENT PANEL MEMBERS FOR WAVE 3

Recruitment of new panel members included the following steps:

1. The recruitment was based upon randomly generated telephone numbers for prefixes within the four counties.
2. A telephone interview was conducted to obtain the household and person information as well as to ask respondents to participate.
3. Additional effort was made to get the appropriate number of newcomers.
 - a) Newcomers list was purchased from U.S. West for U.S. West territory.
 - b) For zip codes not in U.S. West territory, Puget Power sent letters asking for participation on transportation panel.
 - c) Newcomers were selected from the Cole Directory.
4. Packets were mailed one day following the telephone interview.
5. Reminder postcards were sent a week after diary dates.
6. Follow-up telephone calls were made as necessary.

Randomly generated sample

Recruits were selected from the 4 county area using computer generated random telephone numbers. Thirty two percent of the randomly generated numbers were invalid. Of those individuals actually contacted, 61% agreed to be interviewed. Of those who were asked to participate in the panel, 68% agreed to participate. Of these, 66% returned diaries.

Newcomers

Newcomers were recruited from three sources: 1) a U.S. West list of newcomers, 2) Puget Power solicited volunteers, and 2) the Cole Directory list.

Twenty nine percent (29%) of respondents from the U.S. West list were valid "newcomers" for the purposes of this study. That is, this was the percentage of respondents who were residents for less than one year in the four county area. Of those US West individuals who did qualify as newcomers, 59% agreed to participate on the panel and 62% returned diaries.

Eighty (80) Puget power volunteer cards were returned. These were not very useful as 33% were from Vashon Island residents and 40 had lived elsewhere in the four county area. From the remaining cards, calls were made to those who lived in zip codes that were still required.

The Cole Directory was the only source used for Snohomish County and was also used for the other counties to generate data to compare with the US West list. Only 1 in 10 of the Cole households marked as newcomers were eligible newcomers for this study. Thus, the U.S. West list was considerably better in this regard. Recruitment percentages were not significantly different (63% agreeing to participate and 65% returning diaries) from the U.S. West list.

DATA ENTRY

Typically, survey data collection and data entry are sequential rather than simultaneous tasks. Following data collection, it is usual to have a trained employee review the completed interview data for completeness and clarity and correct the data as required. The verified surveys are then submitted for data entry when fielding is complete. This procedure was found not to work for these travel diaries.

The travel diary data seems to be error prone in part because addresses themselves are complex (i.e., they have many components which respondents do not conscientiously record). Also, the list of trip record can be long. Respondents seem to forget to record a trip or can't remember the details at the end of the day and may drop it or record partial data. This type of missing data and incompletely recorded data comprised the most common mistakes. But in many other cases, the error was more complex and was detected because something was illogical. This was usually that the sequence of trips did not make sense, or the trips of different family members were not consistent.

There was a very high rate of error provided in the diaries received back from the panel members. Approximately 1/2 of the diaries had errors of one sort or another. Of these, approximately 1/3, or 1/6 of the total of all diaries, required that the respondents be called back to provide, correct or clarify information. The remaining diaries were corrected in-house (addresses looked up, time of a trip added based upon record in another diary, trip added that was on spouse's diary, etc.).

The need to correct so much of the diary data forces the data entry process to be an interactive one. Our procedure was as follows.

- 1) As the diaries were received, they were sorted and logged in. They were then examined and checked for completeness of all answers, especially addresses, by one of 3 supervisors (these were individuals who had worked on the Wave 2 diaries in 1990). There was also some attempt to see if the overall diary "made sense" and if the household's diaries were consistent. Diaries were then separated into four batches: 1) those which looked valid, 2) those with problems which could be solved in-house (a diary with a missing location which might be found in the telephone book, e.g. McDonald's in Monroe), 3) those which required a call back, and 4) those requiring a new set of diaries.
- 2) Corrections were attempted with those diaries from the second batch. Those which could not be corrected were put into batch 3 while those which were corrected were added to batch 1.
- 3) The apparently valid diaries (batch 3) were immediately given to other personnel for immediate data entry. The reason for this is that significant numbers of "logic" errors were discovered during the data entry process. Therefore, this step must be done immediately if problems are to be found and corrected (by call backs to the respondent).

Catching inconsistencies between trips or diaries requires that the researcher read and understand the whole day's diary and the whole household's set of diaries. This is necessarily done as a part of the data entry. It would not be cost effective to duplicate this effort at the check-in stage, even though check in was done by experienced individuals. Because the "data entry" step is really a combination of verification and data entry, it must be done immediately so that panel members can be recontacted to clarify and/or provide missing data before too much time passes since the event.

Diary data were entered directly from the diary forms rather than from a "coding sheet." Not only would transcription be extremely inefficient, but one would lose the context which was very important in finding errors.

Problems Encountered with Diary Data

Problems that the panel members had in filling out the diaries could be classified into four categories:

1. trips do not make sense
2. incomplete location information
3. inclusion of inappropriate trips
4. inclusion of out of area trips

Trips do not make sense

Quite a variety of errors were detected simply because they were internally inconsistent or illogical. These ranged from simple to complex. Some simple problems included circling both "driver" and "rider", forgetting to include a starting location or putting the starting location on line 2, and forgetting to add the final return home. The more complex problems involved the relationships between distance and time, relationships between trips and so on. For example, sometimes the respondent would enter the time spent at a location (i.e., the arrival and departure time at the destination). This could be detected if the time was significantly too long for the trip. Another common problem was circling the wrong time of day (am/pm). This could generally be figured out from the times of other trips. Occasionally, respondents would list trips in the wrong order (many of these diaries are apparently filled out at the end of the day rather than when the trips are actually made) so that the sequence of trips did not make sense. In many instances missing trips or trips out of order were detected because of the inconsistency in the number of passengers or the relationships of passengers from trip to trip or the mode of transportation used on successive trips. For example, diaries implying that a car was abandoned, that an individual walked home from a very long distance, or that an child reappeared at an inappropriate time or place, all gave rise to suspect trip sequences. Other problems were detected by comparison of the diaries of different persons within the household. This usually involved trips recorded by one individual and not by another although sometimes it was more complicated than this.

Respondents were called in order to make corrections to the diaries if necessary although in many cases (about 2/3 of the diaries with problems) the diaries could be corrected without calling the respondents.

PROBLEM	SOLUTION
Forgot trip home at the end of the day.	Added with as much information as possible only if it was obviously correct.
One member neglects to enter trip that other members included.	Used information from other members. Called if necessary.
Entered time spent at place rather than time in transit.	Attempted to figure out times. Called if necessary.
Sequence of trips doesn't make sense.	Called person to straighten out.
Number of individuals on trip doesn't make sense.	Tried to figure out from other information. Called if necessary.
Circled both D and R (driver and rider).	Tried to figure out from other information. Called if necessary.
Neglected to enter "Why?"	Tried to figure out from other information. Called if necessary.

Incomplete location information

Many problems were found in the diaries when the trip information was being entered, and these problems were usually solved. If there was a non-distinctive place listed, such as "Mercer Island" or "friend's house," the panel member who filled out the diary was called to obtain a more complete location. In the case of a non-distinctive place and one street name ("McDonald's on Bellevue Way"), the address was looked up in the computer list or telephone book. If a place name and city, such as "Azteca Restaurant, Kirkland" were given, the address was also looked up in the phone book. When the "Address where started" box was left blank, other trips were checked to see if the person started at home and if there was a home address on the diary. Occasionally, times started and/or arrived were missing from some trips data and were reconstructed if possible. Otherwise, the person was called to get the missing times which were then entered if they were remembered or left blank if the person could not remember.

The computer list alluded to was a reference consisting of 9343 places. This list was available on two computer terminals for lookup of places with insufficient addresses. The list was also available on some terminals in a "pick window" of the data entry program so that the correct address could be chosen and inserted directly. Although the list had over 9,000 places, it was lacking some of the fast food chains which were a common destination. Nevertheless, it was quite helpful in many instances to have a single source to look up addresses rather than having to look through several separate telephone directories.

Locations were considered acceptable if they were unique. For example, we accepted place names of schools, colleges, shopping centers or malls, post offices in a small towns, and names of a large buildings. If the trip was to a location outside of the 4 county area, the name of the city, without an address, was accepted.

PROBLEM	SOLUTION
Non-distinctive place and incomplete address or absence of address.	Called person to get address or intersection.
Place name and incomplete address or absence of address.	Looked up in computer list or in the phone book.
"I Started the Day At" left blank.	Checked other trips to see if they started at home.
Neglected to enter times.	Reconstructed if possible. Otherwise, called person to get times. If they could not remember, times were left blank.

Inclusion of inappropriate trips

In some cases trips listed on the diaries were deleted. Trips for walking for exercise or walking the dog were excluded. A walk to the nearest bus stop that was 5 minutes or less was also excluded. Where bus transfers were listed as separate trips, those trips were condensed into one trip with the appropriate total time spent in transit. Individual trips to different stores within one mall were entered as one trip. If the home address was entered as the first trip, the diary was straightened out so that all information for one trip was on the same line.

PROBLEM	SOLUTION
Walk to the nearest bus stop (5 minutes or less).	Did not record as a trip.
Walk for exercise / walk the dog.	Did not record as a trip.
Transfers on bus listed as separate trips.	Recorded all transfers to one destination as one trip.
Entered home as entry of first trip, causing aspects of one trip to be on two lines.	Straightened out trips.
Individual trips to different stores in one mall listed as separate trips.	Entered as only one trip.

Out of area trips

Respondents who were out of the 4 county area for both assigned days were asked to redo both diaries. When trips were listed on a diary that were out of the 4 county area, only the trip that took the person out of the area and the trip that brought the person back into the 4 county area were recorded. The trips that started from and ended within counties other than King, Pierce, Snohomish and Kitsap were excluded.

PROBLEM	SOLUTION
Out of 4 county area on two days.	Asked to redo on two days within the area.
In 4 county area for only one day.	Diary was accepted
Trips outside the 4 county area.	Only recorded the trips that took them out of the area and then back into the area. Only required the name of city or county outside of the 4 county area.

After all diaries had been entered, the diaries were verified for correctness and consistency. Each diary was checked against the information that had previously been entered into the computer. This step was primarily to correct "keying" errors rather than data recording errors made by the respondents. Most of the errors in the original data entry were incorrect spellings due to the poor handwriting on the diaries.

This verification step also ensured that information from the diaries was interpreted consistently into the appropriate codes. For example, a panel member may have put "School" in the "Why?" column, so the information was originally coded as "3 - School." However, by reviewing the diary more closely, it could be seen that this person was not really going to school, but dropping off children at school and the coding should really be "6 - Personal."

Suggestions

Data recording errors

A major cost factor in this project is the need to correct the data recorded by respondents. This cost will increase relative to other costs if the diary is expanded to include more days. Therefore, we believe that it would be cost effective if a research project were conducted to determine the least error prone method of recording the data.

Failure to read the instructions is probably one reason why so many mistakes are made. This failure to read instructions was highlighted when one respondent called in to say that the diary she had received was already filled out! Of course, this was the sample, the sheet with "SAMPLE" screened across it in 1" high letters.

It seems likely that much of the error is due to delayed recording of the data. It seems to us that a booklet format could be advantageous if the respondents would take these along with them.

Instructional Material

More effort should be made to make the instructional material more readable. Any tests of methodology should also consider this as a variable.

New panel members seem to be somewhat less error prone than continuing panel members, probably because they read the instructional material. Thus, it would be advantageous to run a test involving more than one data collection period so that this effect could be measured.

A new diary format would not necessarily prompt the respondents to read instructions more carefully. However, it might be advantageous in improving the quality of responses if it was pocket sized and respondents carried it with them so as to fill out the information "on the spot." It is apparent from some diaries that they were filled out at the end of the day although we have no idea of the extent to which this is true. It would be worthwhile to

assess this in the current panel before conducting a test of another method.

We believe that one basis for the choice of the current diary format was its "readability" and "friendliness" from the user standpoint. It should be pointed out that this form has some advantages from the data entry and validation standpoints as well. To catch many of the mistakes in the diaries, one needs to view the whole day's trips (to see if they make logical sense). This is facilitated by having the trips and times laid out in columnar form on one page (usually). It seems unlikely that a booklet format would be as clear. Furthermore, the organization of the trips in this columnar fashion facilitates the speed of data entry (less paper manipulation).

Telephone Contact

The telephone calls were planned to be made shortly before the diary date of the panelist. The purpose of the timing was to utilize the call to reinforce participation on the assigned date as well as to update the household data. Perhaps because of the two year lapse since the last diary wave, there were a considerable number of persons to add which resulted in a considerable number of secondary mailings. A more economical approach would be to conduct all of the telephone calls first, in order to obtain a complete file of persons. This would eliminate the need to make the secondary mailings and adjustments in diary dates for households with changes.

Instructions

The back side of the instruction page contains some instructions for specific situations. We suggest that these be put onto a separate piece of paper. "Walking" should be added to the items on this list with the explanation that this is a valid mode of transportation.