

Home Interview Survey and Data Collection Procedures

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•SUCCESS in travel survey design and implementation rests upon the accurate measurement of the total universe of person and vehicular trips. In the urban area this is more or less accomplished by means of the home interview, truck and taxi, and external or cordon line surveys. Each of the above surveys measures different parts of the internal, internal-external, or the external-external universe of travel. This paper describes quality control procedures related to the measurement of internal-internal or internal-external travel accomplished by means of the home interview survey.

What procedures are used to check that the number of trips reported is indeed a representative sample of all internal travel? The conventional approach is that of the screenline survey which measures the gross travel occurring between two or more portions of the cordon area. The results obtained are usually 5 to 15 percent greater (in terms of gross travel) than that reported by the home interview survey. Various hypotheses have been offered as an explanation of this difference, such as the "under reporting" of non-peak hour trips, the internal travel by persons living outside of the cordon area, and double crossings of the screenline.

Evidence obtained from different travel studies indicates that the home interview survey under reports trips by an average of about 10 percent. This necessitates the factoring of home interview reported travel to that indicated by screenline counts to measure the total universe of travel. Is this factoring necessary or desirable? Could home interview survey procedures be refined so that survey results are within 1 or 2 percent of that reported by the screenline survey?

QUALITY CONTROL

Improvement of home interview survey techniques is best obtained by refinements of existing procedures. This includes improvements of the sample selection process and in obtaining travel data from respondents.

Sample Selection

The first requirement of the sample selection process is that it be drawn from the complete urban universe of dwelling unit and non-dwelling unit quarters. This refers to the selecting of samples from current listings of dwelling places obtained from city directories, utility company meter records, assessor's tax account records, or field listings of dwelling places designed for sample selection or sample selection and land-use classification purposes. Great emphasis is placed on the word "current." Any listing of this type is subject to constant change brought about by new residential construction and urban renewal and slum clearance projects, and must be kept current if it is to be of value. Equally important is the completeness and accuracy of the listing. If dwelling places are omitted or duplicated on documents used as the sample source, the sampling rate will be correspondingly affected.

No matter how good the dwelling place list may appear to be, dwelling places are occasionally omitted. An interval check procedure detects errors of this type by verifying the correctness and accuracy of the dwelling place list. It provides a systematic method of adding newly discovered dwelling places to correct the dwelling place listing.

Likewise, it permits the removal of erroneously listed buildings or addresses. It permits the proportion of sample to total dwelling units to be systematically adjusted.

Survey Techniques

Assuming that the list of dwelling places selected as a sample is representative of all dwelling places in the urban area, how good is the interview process in obtaining complete household trip information? What improvements can be made to insure the complete reporting of all travel taking the traveler outside of the block origin?

The standard interview procedure involves the following: (1) the mailing of a "Dear Householder" letter to the sample address in advance of the travel day, and (2) a personal interview with at least one responsible adult living at the sample address within three days after the travel day. This procedure has been extensively used in the past. It consistently under reports travel.

To overcome this systematically occurring discrepancy, three modifications to the basic interviewing procedure have been devised. The first of these modifications is simply requiring the interviewer to interview all persons 16 years of age and older at the assigned sample address. This is accomplished by making at least one personal visit to the sample household to obtain detailed information on the travel made by all members of the household. Additional callbacks, either in person or by telephone, are made to those members of the household not originally interviewed in person to verify the completeness and correctness of the information already obtained.

The second modification, not used in the Niagara Frontier home interview survey, is to encourage the voluntary reporting of trips made by the respondents but not remembered until after the completion of the personal interview. This is done by leaving a small card with the respondent at the close of the interview. On the card is a request for any additional travel information and instructions for reporting such travel by telephone.

The third modification is that exemplified by the "pre-interview" technique. Pre-interview identifies an interviewing procedure which features before and after travel date visits to the household by the interviewer. Trip cards on which travel data can be recorded are left for each member of the family on the interviewer's first visit, who at the same time explains their use and arranges for a return visit to the household as soon after the travel date as is mutually convenient. On the second visit, the interviewer reviews the trip cards completed by members of the household and transfers this information plus additional household and person data to the standard interview form or document.

In comparison, the "standard" technique involves one visit to the household by the interviewer, conducted as soon after the travel date as is possible. In this case, the interviewer obtains the data by question and answer either directly from the respondent or from members of the household present and familiar with the travel of those members not present at the time of the interview. No trip cards or other respondent travel logs or diaries are used.

BACKGROUND OF PRE-INTERVIEW TECHNIQUE

How did the pre-interview technique come about? Unfortunately, no complete history is available. It has long been believed that if person contact could be established with the household prior to the travel date, then more complete and accurate travel data could be obtained from that household. The question then was as it is now: Would the improvement in trip reporting more than compensate for the additional interviewer time and cost involved in using this procedure?

The first attempt to determine this came about with an origin and destination survey conducted in New Orleans several years ago. No conclusive results were obtained at that time. Since then this technique has been experimentally utilized in the Pittsburgh and Penn-Jersey Transportation Studies. In the former application, the results were promising, although not conclusive enough to warrant a full-scale adoption of technique for the home interview survey in Buffalo. The results obtained in the latter application indicated no basic improvement over the standard interviewing technique developed during the past several decades.

THE NIAGARA FRONTIER HOME INTERVIEW SURVEY

The Niagara Frontier Transportation Study cordon area encompasses an area of approximately 800 square miles, containing over 400,000 dwelling places. It includes the cities of Buffalo, Niagara Falls, and Lockport and the suburban towns and villages adjacent to these cities.

In this area, 4 percent of the field-listed dwelling places were selected as sample units. This produced a total of over 16,000 scheduled interviews, of which 13,000 interviews were completed. The selected samples were divided into three groups: 80 percent to be interviewed by the study's consultant, 10 percent to be interviewed by NFTS personnel using "regular" interview techniques, and 10 percent to be interviewed by NFTS personnel using pre-interview technique. Personnel employed by the study's consultant were under instructions requiring that the interviewer or the editing staff personally contact each respondent sixteen years of age and older by means of personal visit or a telephone call after the initial interview. The same instructions were in effect for NFTS personnel only during the last five weeks of the interviewing period. Otherwise interviewing instructions, data requirements, personnel supervision and administration were essentially identical between the two organizations.

In brief, interviews have been classified into groups, depending on the organization to which the sample was assigned and the degree of personal contact obtained with the residents of the household. Emphasis is placed on the effectiveness of intensive interviewing and the pre-interview technique, taken singly and in combination with each other, in improving trip reporting in comparison with conventional techniques.

RESULTS

Figure 1 gives the basic Niagara Frontier home interview survey results as a function of the organizations and techniques involved. The completed interviews and trips reported for the NFTS regular, NFTS pre-interview, contractor, and total home interview survey are shown. In this paper, trips reported are raw data, since no trip linking or collapsing of passenger ride-to-ride trips has been done. These data have also been calculated and graphed as reported trips per household and reported trips per capita. There is a difference in the household rates (7.5 for NFTS versus 8.0 for the contractor) and a similarity in the per capita rates (each is on or about 2.3 trips per person).

Is there any appreciable difference in the average household characteristics of the interviews completed by each organization? In addition to trip and interview data, Figure 1 also gives average persons per household, average automobile ownership, and average family income. The numeric values shown for each of the listed family characteristics remained practically identical between organization and technique group. This substantiates the contention that each group is a representative sample of the same universe of dwelling places. It also shows that any differences in interview rate or trip reporting cannot be attributed to differences in family characteristics but are a function of organizational efficiency and the interviewing techniques.

Figure 2 shows the number of completed interviews and trips in households where one person 16 years of age and older was interviewed and in households where two or more persons 16 years of age and older or all persons 16 years of age and older were interviewed for the same organization and technique groupings as before. These data have also been calculated and plotted as reported trips per household and reported trips per capita.

The results are somewhat contradictory. NFTS interviewers show a higher household trip reporting rate in families where only one person 16 years of age or older was interviewed. The opposite of this is indicated by the trip reporting rates of interviews conducted by the contractor. Here the higher trip reporting rate occurs in families where two or more persons or all persons 16 years of age and older were interviewed. The major difference between NFTS and contractor interviews lies in the percent of households where two or more or all persons 16 years of age and older were interviewed. The values are 52, 57, and 87 percent for the NFTS regular, NFTS pre-

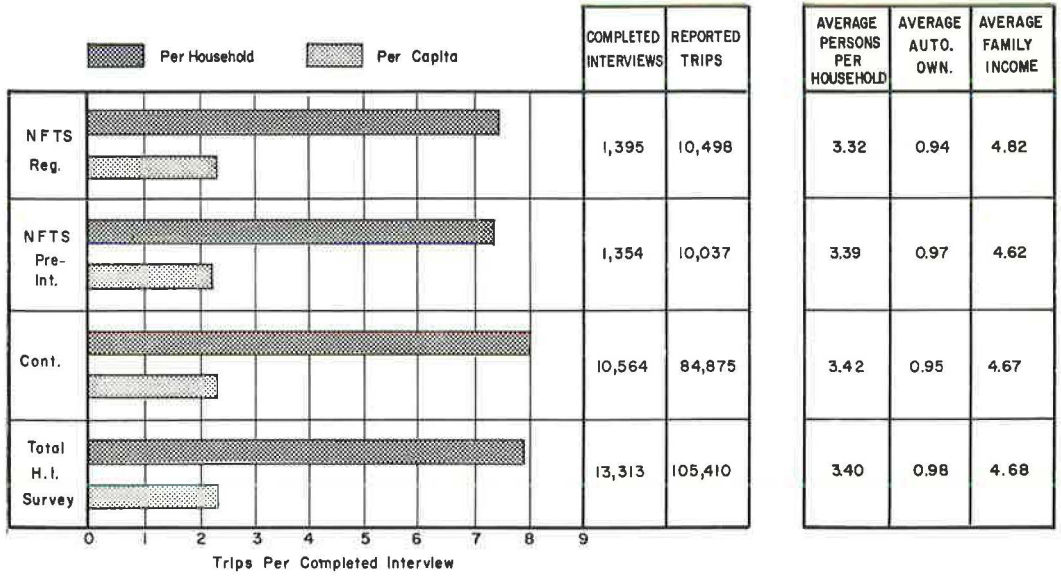


Figure 1. Niagara Frontier home interview survey results.

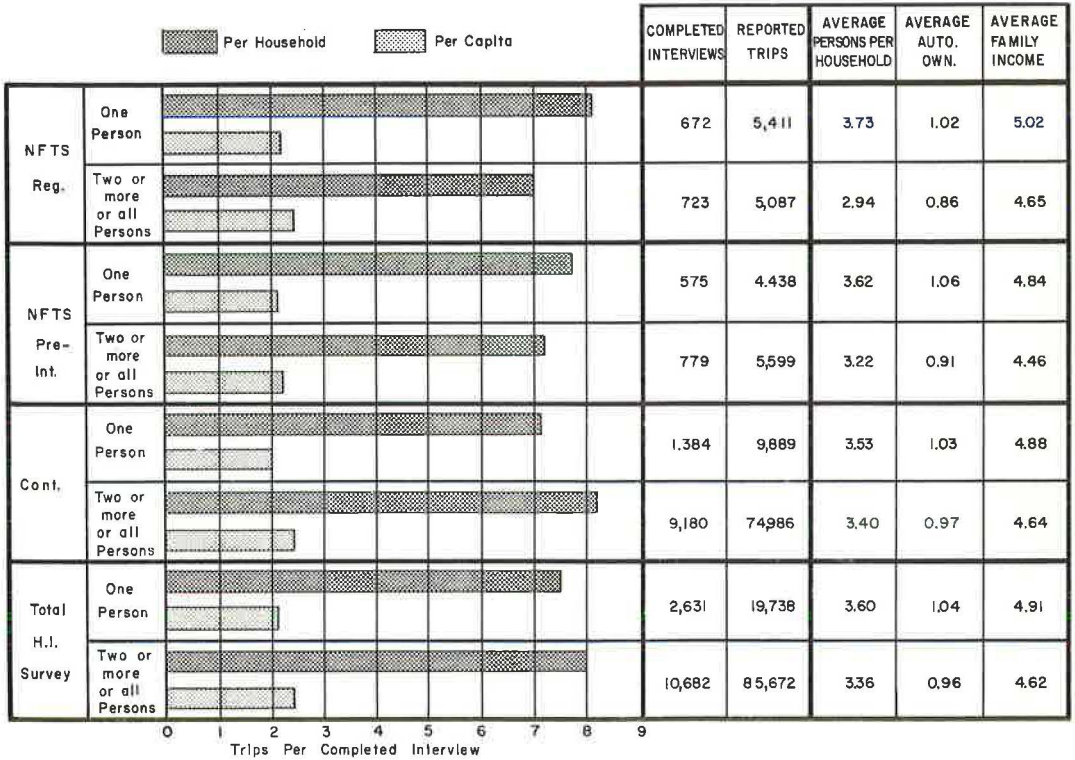


Figure 2. Trip reporting vs number of persons interviewed.

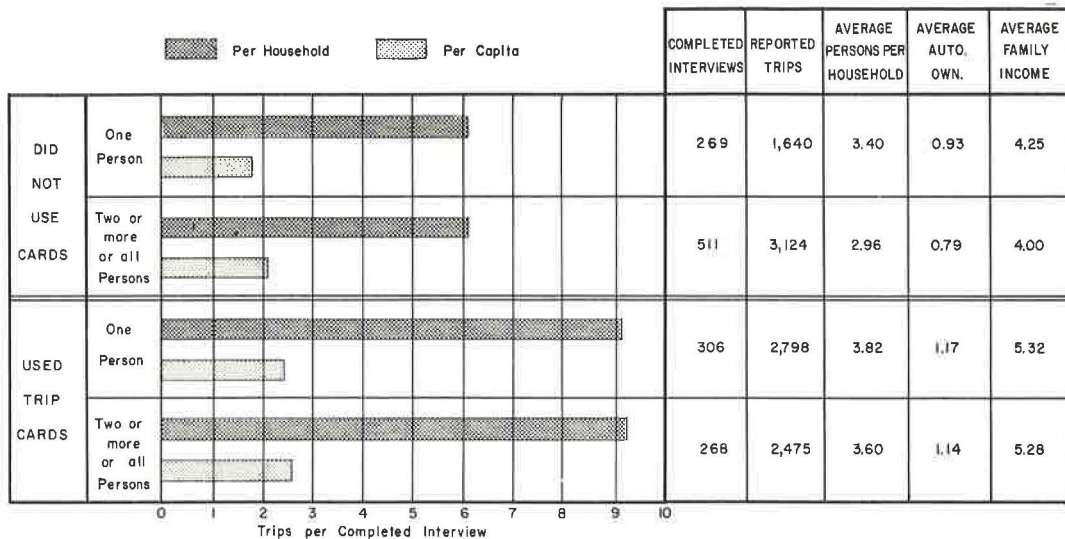


Figure 3. Trip reporting vs use of trip cards.

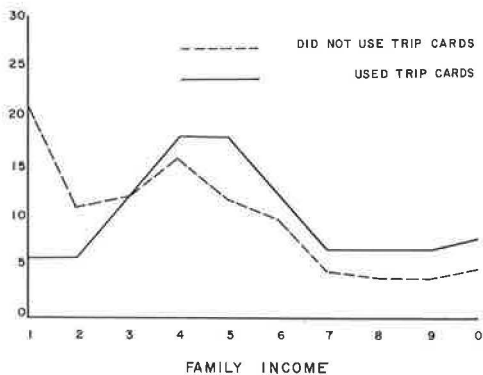
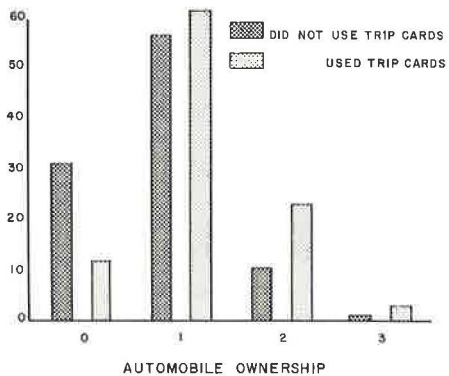
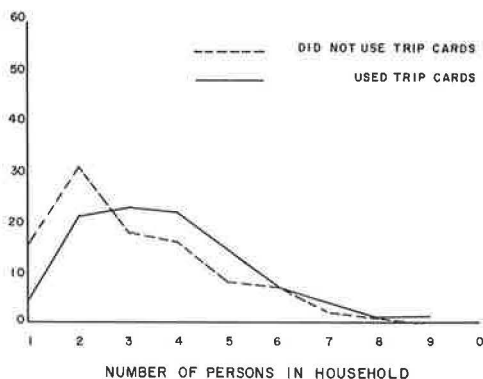
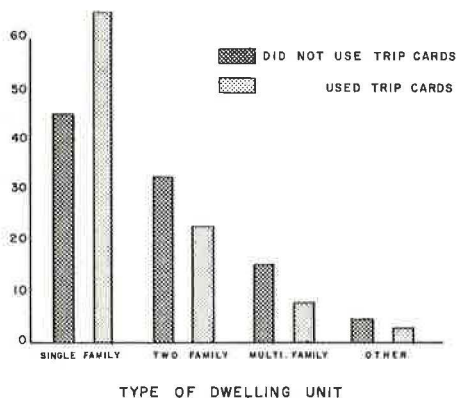


Figure 4. Household characteristics and use of trip cards.

interview, and contractor, respectively. Herein lies one explanation for apparent differences in household trip reporting. In NFTS interviews, households where two or more or all persons 16 years of age or older were interviewed were those which tended to be small in size, own fewer cars, and have a lower family number than the comparable contractor group. In NFTS interviews, the interviewer was usually able to complete interviewing the adult members of this household on a single visit — hence those 16 years of age and older were considerably easier to reach and, as a household, made fewer trips than the comparable contractor group.

Therefore, the 30 to 35 percent difference consists of households having an above average number of trips per household, persons per household, automobile ownership, and family income.

The results for reported trips per capita are as expected. Households where only one person 16 years of age and older was interviewed report approximately 2.1 trips per capita, whereas, households where two or more or all persons 16 years of age or older were interviewed report approximately 2.4 trips per capita. This indicated that interviewing more than one adult member of the household does pay off in terms of increased per capita trip reporting. However, these figures are not inclusive enough to warrant further estimates as to the total effects of intensive interviewing.

Figure 3 analyzes the basic results of the NFTS pre-interviews in terms of those households using or not using trip cards. If in any household one or more members used trip cards, then that household is considered to be one using trip cards.

Households not using trip cards report an average of 6.1 trips per household, while those using trip cards over 9 trips per household. Similar results are indicated for trips per capita. Households not using trip cards report approximately 2.0 trips per capita while those using trip cards report approximately 2.5 trips per capita. This is 3 trips per household and half a trip per person greater per day for those using trip cards. Clearly there must be an explanation for this phenomenon.

Figure 4 shows the differences in household characteristics between those using or not using trip cards. The users as a group are more likely to be residents of single-family dwelling units, to own more automobiles, to have a higher average family income, and to have larger families. The household differences between the two groups are of such a magnitude that they must not be ignored.

CONCLUSIONS

The two basic conclusions obtained are as follows:

1. The pre-interview technique does not increase trip reporting. It facilitates the reporting of trips by those who are willing to complete the trip cards. Those who do use trip cards normally make more trips and have different household characteristics than those who do not use trip cards.

2. Intensive interviewing, where the goal is personally to interview all members of the household 16 years of age and older, does increase trip reporting in proportion to the attainment of this goal.

Both the pre-interview and intensive-interviewing techniques are somewhat more expensive in terms of interviewer man-hours and miles driven than the standard technique. Therefore, increased expenditures on intensive interviewing are justifiable inasmuch as better data can be obtained for the incremental investment. This is not true for the pre-interview technique.

Therefore, use of intensive interviewing procedures is recommended in future home interview surveys.