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ABSTRACT

A survey was conducted to evaluate tracking procedures used in longitudinal studies. The study grew out of an effort to locate part of a group used in a 1947-57 longitudinal study. A subsample of 320 was chosen from the 2,344 respondents already located. The tracking methods studied were mail, long-distance telephone calls, community visits and public records. First-class letters resulted in the receipt of return postcards from slightly less than half the subjects. Long-distance telephone calls were successful for about 80 percent of the sample in each community. Community visit tracks were carried out only for those persons not located by telephone. These were initiated at post offices, residence neighborhoods, schools, and the last known employers. This method was more costly than others but led to the location of almost all the rest of the subjects. The use of public records was successful for just 19 percent of the marriage license tracks, 8 percent of the real estate transfers, and 4 percent of the will registrations. All persons located through public records were also located with other tracks. The various techniques led to current addresses for all but two of the persons tracked. (Author/KM)

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Locating People in Longitudinal Studies

A Research Report and Suggested Guidelines

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THE PROBLEM

Longitudinal data are needed in the social sciences. Whether the emphasis of the investigation is practical or theoretical, applied or basic, information on the same people across time is important for understanding the causes or conditions out of which present situations arose and the effects of these situations on future events. Thus, for example, when Cooperative Extension Service conducts a program to upgrade nutritional levels among homemakers in a community, or the public schools want to know the effects of their curricula on the adjustments of rural migrants to the city, the researcher needs to be able to get information on the same people at different points in time.[1]

Despite the need for longitudinal data, a relatively small number of reported studies have utilized true time-series information (17). Instead investigators usually infer the effects of changes over time from data which are not strictly longitudinal. Several methods are commonly used including comparison of cross-sectional information, aggregate analysis of census cohorts, and reconstruction by means of respondent-recall data. Each of these methods is intrinsically weak. The first two do not follow the same subjects across time or else have no way of identifying individual sample members and their specific changes over time. The third may be deliberately or inadvertently biased by the subject's selective recollection of past events.

If techniques for approximating longitudinal data are unsatisfactory, why has true time-series information been used so seldom in social science research? Among other things, maintaining contact with respondents over a period of years is difficult, costly, and time-consuming. Moreover, there has been little opportunity for investigators to profit from the tracking experiences of others. Almost noth-

1. This need will probably become more critical in the future if "people" problems in agriculture are increasingly addressed, as has been recommended, for example, by the President's National Advisory Commission on Rural Poverty (9).

ing has been offered in social science literature concerning the relative effectiveness and efficiency of different techniques for retrieving respondents. To facilitate longitudinal data-gathering, methodological guidelines for locating or maintaining contact with respondents across time are needed. The purposes of this bulletin are to report the results of a study of various tracking procedures and, based on this experience, to offer some guidelines to aid other researchers involved in long-term study of the same subjects.[2]

THE SAMPLE

The decision to develop a study evaluating various tracking procedures grew out of inexperienced and unsystematic attempts to locate a cohort of persons from rural areas in Pennsylvania. To assess the utility of a variety of tracking procedures empirically, a number of potentially useful techniques was delineated and data on the effectiveness and efficiency of each of these methods were collected and analyzed for a single sample of subjects.

Initial contact with these individuals occurred in 1947 when the attitudes and aspirations of 2,810 sophomores in 74 fourth-class (rural) high schools, scattered throughout 47 of Pennsylvania's 67 counties, were studied. Intermittent contact was maintained with these persons through the next 10 years. Prior to the present study, the last contact was in 1957 when 2,344 respondents (83 percent of the original cohort) were located and interviewed.

In 1966 the project was reactivated. Mail contacts and visits to the high school communities were used to obtain current addresses for all but 108 of the respondents included in the 1957 survey. At that point, concern for maintaining the total sample prompted investigation of the tracking techniques used by other researchers. A search of the literature failed to provide detailed information on ways of retrieving respondents in longitudinal studies. Accordingly, it was decided to select a subsample from the 2,344 respondents specifically for the purpose of obtaining more detailed and systematic data on the effectiveness of various tracking procedures.

Since the projected study design was to include visits to the respondent's last known address, cost considerations forced the elimination of all who were not living in the Middle Atlantic States[3] in 1957. At the outset, 185 individuals were thus deleted. The remaining

2. The research was supported by the U. S. Public Health Service, contract number PH-43-68-76, in cooperation with the Pennsylvania Agricultural Experiment Station, Project No. 1626.

2,159 persons represented those from whom the sample was to be drawn for study. This grouping, however, contained more females than males, consisted overwhelmingly of married rather than single persons, and included many more nonmigrants (persons who had not moved across a county line between 1947 and 1957) than migrants. To ensure acquisition of information on tracking different types of people, the sample was stratified by sex (male-female), marital status (married-unmarried), and 1957 migrant status (migrant-nonmigrant). For each of the eight categories so delineated, 40 people were randomly chosen to give an initial sample of 320. To facilitate some of the analysis, additional subjects were later added, as will be described.

PROCEDURES

The specific tracking methods selected for study consisted of the following: (1) mail, (2) long-distance telephone calls, (3) community visits, and (4) public records. The mail contact used only the last known (1957) address of the respondent; all of the other procedures were devised in terms of two communities of contact—the parental community or 1947 residence, and the last known or 1957 address. In 100 of the 320 cases, the 1947 and 1957 residence communities were the same, and in an additional 60 instances the respondent, while living in a different town in 1957, was still in the same county as his 1947 residence. Thus, tracks through the parental community and the 1957 address sometimes overlapped.

The original intent of the study was to track each of the 320 sample members with all four methods. This procedure was followed for the mail and telephone tracks. Pretesting indicated, however, that informants in the community visits often searched the telephone book for the respondent's name. Frequently they found it, sometimes at the same address that was already in the files. Thus, to prevent the field tracks from simply duplicating the long-distance phone calls, it was decided that only those persons who were *not* located by the telephone tracking in a community and who had moved from their previous residences were to be tracked through community visits there.

To identify the respondents, the following information was used:

1. Respondent's name as specified in the 1957 interview (including the maiden name of any married woman);

3. Middle Atlantic States are herein taken to include: New York, New Jersey, Delaware, Pennsylvania, Maryland, Ohio, Virginia, West Virginia, and the District of Columbia.

2. Name of respondent's parent or guardian as indicated on the 1947 questionnaire;
3. The last known address of the respondent (defined as the "permanent address" listed in the 1957 interview);
4. The name of the parental community or post office for the respondent in 1947;
5. The name and location of the high school which the respondent attended as a sophomore when the 1947 data were collected; and
6. The approximate age of the subject (between 36 and 38 years).

Information about the respondent's occupation was used on the track through the employer in the 1957 community, but was otherwise excluded from use unless it was obtained within a particular track itself.

For each of the procedures, data concerning the effectiveness and the complexity of the system were compiled. Effectiveness was assessed simply by whether the person was located as a result of that tracking technique. Complexity was measured by the number of contacts or steps in the total procedure from beginning to end. Complexity can, at least in some measure, be taken as an indicator of time and/or cost involved in the task and hence represents a kind of efficiency indicator.

The nature of the research task was such that it was impossible to obtain detailed time-cost data for each procedure. The tracking of each respondent by a number of different procedures often resulted in repeated convergence on the same informant. It was unnecessary, impractical, and embarrassing to return repeatedly to such an individual. Therefore, when a particular method merged with one previously carried out, the information from the relevant section of the earlier track was inserted. This meant that a given track was frequently not followed from start to finish, but rather was "pieced together" using information obtained in other procedures. In such cases it was impossible to obtain the major component in a time-cost analysis—the time between contacts.

ANALYSIS

First-Class Mail

Many longitudinal studies have used some form of mail for respondent retrieval. Variations in both the class of mail used and the rate of success realized have been reported (1, 2, 3, 7, 10, 14). Periodic alterations in the specifics of government postal services contributed, no doubt, to some of these variations.

Automatic forwarding is available for the regular fee (6 cents) for

first-class mail.[4] Forwarding-address records, however, are maintained for only two years. Thus, if the addressee has not moved, or if mail can be forwarded through his old address, contact can be made with him for the cost of letter preparation and a postage stamp. If the addressee cannot be reached either directly or with postal forwarding, a first-class letter is returned to the sender.

Even if a mailed communication reaches the desired addressee the track is not complete. Information on the point of delivery needs to be returned to the sender. The simplest way to do this is for the subject to return a postcard confirming his current address. However, when the card is not returned the investigator has no way of knowing whether the addressee received the letter and has simply failed to comply with the request, or whether it was not delivered to the intended party at all. Such a misdelivered letter is required by law to be returned to the post office for redelivery or return to the sender, but the regulation is not always observed. Follow-up letters can be used to decrease the number of such ambiguous cases.

On January 24, 1967, a first-class letter was mailed to the last known (1957) address of each of the more than 2,000 respondents in the study group. These letters contained a brief discussion of goals of the study and indicated that the purpose of the current contact was to update the address files preparatory to proposed interviewing. Each person was asked to return a stamped postcard (supplied by the investigators) indicating his current name and address. On February 17, a second mailing was sent to those persons from whom no response had been received. This contact brought in additional address cards and post office returns (Figure 1).

Because the mail tracking was carried out on nearly the entire study group, some of the general analysis that follows is based on the larger number of cases. Data for the 320 cases sampled for this study are also reported (Table 1). The two mailings yielded current addresses for 1,137 persons, or approximately 51 percent of the total study group and 48 percent of the subsample. Two-thirds of the current addresses obtained through this tracking procedure differed from the ten-year-old 1957 ones to which the mailings were made. Whether the letters were forwarded through regular postal channels or first delivered to kin in the area is uncertain, but both migrants and nonmigrants were located.

Approximately 30 percent of the contact letters for both the total study group and the sample were returned from the post office as

4. All postal fees and regulations cited in this report were those in effect in July 1969.

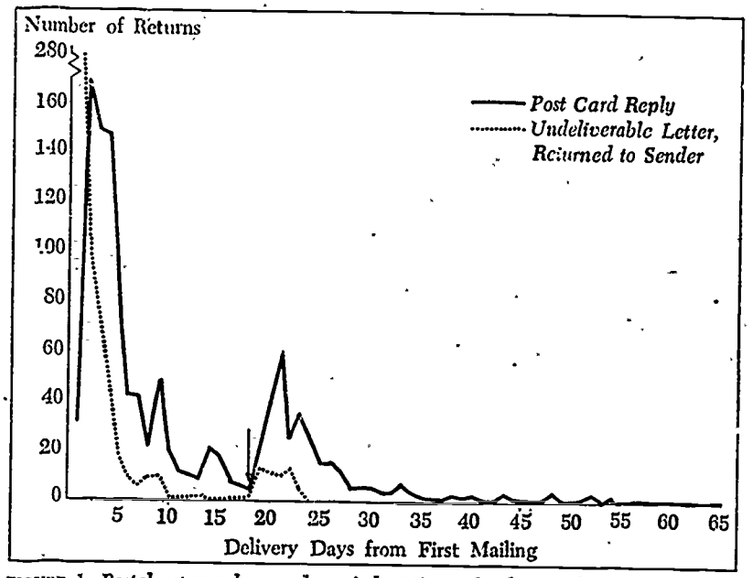

FIGURE 1. *Postal returns by number of days from the first mailing for the 2,344 respondents. Arrow indicates time of second mailing.*

undeliverable. For another 20 percent there were no responses and hence the letters may or may not have been received by the addressees.

First-class mail as a tracking procedure is sufficiently simple and economical that, although it located only about half of the individuals, it must certainly be recommended as an important means of tracking respondents.

Postal regulations change and additional services may become

TABLE 1. *Effectiveness of the Mail Track for 2,216 Respondents in the Total Study Group and for the Sample*

Result	Total study group		Sample	
	Number	Percent	Number	Percent
Located by mail track	1,137	51	153	48
Letter returned as undeliverable	658	30	104	32
No response	421	19	63	20
Total	2,216[a]	100	320	100

[a] A total of 128 persons used in a pretest of the mail track were not included in this table.

available that could aid the researcher in tracking. Such a new service, a revised Form 3547, was instituted after the present study was undertaken. This provides for a receipt to be returned to the sender showing the address to which first-class mail has been forwarded.[5] Such an address correction, requested at the time of mailing, costs the sender 10 cents in addition to regular first-class postage and is payable only in the event that the letter is forwarded. Presumably, mail addressed correctly is simply delivered to the party, no receipt is signed, and no fee is charged. Mail which cannot be forwarded is returned to the sender and no charge is made. For forwardable mail, a receipt showing the corrected address is returned to the sender and the fee is collected (8).

A letter can be forwarded more than one time, and when this occurs, the 10-cent charge is made for each address updating, whether or not the letter finally reaches the intended recipient. The effectiveness of this "Address Correction Requested" procedure was not assessed in the present study, but it would appear to be a fairly inexpensive technique for improving the mail track.

An additional safeguard to prevent delivery of the letter to someone other than the addressee is the use of certified mail. This service is available on mailings for which postage is paid at the first-class rate. A receipt must be prepared at the delivery point and signed by the addressee or his agent, showing to whom, when, and where delivery was made.[6] A copy of this receipt is then returned to the sender. The fee for certified mail, payable at the time of mailing, is 30 cents plus first-class postage, with an additional charge of 35 cents for the return receipt. No refund is made even if the letter is undeliverable.

5. This form should not be confused with one of the same number in effect prior to 1964. Up to that time Form 3547 was used primarily by businesses for bulk mailings by permit. The words "Business Reply: Form 3547 Requested" on third-class mail prompted the return of information—either a forwarding address or the reason for nondelivery. In 1963-64 that form was discontinued. In 1969, however, Form 3547 reappeared with a modified format and an altered function. Its current use is for regular first-class mail in response to the instruction on the envelope, "Address Correction Requested." The earlier use of Form 3547 under third-class mail privileges has been reported by some studies (7, 15). In one, while a high yield of current addresses was obtained (93%), later circumstances showed over half to be in error (15).

6. In the event that the residents are not at home, the addressee must call at the post office to receive the materials, and the return receipt requires only the post office name rather than the exact address. In this case, the investigator does not receive the desired information and the respondent may be unduly inconvenienced.

Since certified mail costs considerably more than first-class, it cannot be recommended for the initial mailings, although it may be useful in follow-up work.

Long-Distance Telephone

The limited literature regarding respondent retrieval recommends both implicitly and explicitly that: "Among the most fruitful devices for locating mobile cases are the services provided by independent and national telephone companies" (4, p. 45). However, local telephone directories are frequently not readily available to the researcher involved in tracking respondents. Directory assistance operators offer an alternative source of phone information. These operators can be reached at no charge by dialing the appropriate telephone area code plus 555-1212. Since they have access to daily updated listings, they can, in a matter of a minute or two, provide the caller with the telephone number for a given name in a specific town anywhere in their area.[7]

The number obtained can be called and the person contacted asked either for the subject's current address or a referral to someone who might be able to help.

An effort was made to locate each respondent in the subsample of 320 by long-distance telephone procedures through each of the two contact communities previously delimited—the 1947 and the 1957 addresses. For the track through the parental community the information operator was given that town's name and the respondent's parent's name as indicated on the 1947 questionnaire. If there was no phone listing in the parent's name, the respondent's name was offered. When that failed, the operator was asked for phone numbers of others with the same surname in the town or general area. The same procedure was used in the 1957 community except that the respondent's name was the first one given to the operator, followed by parent's name, and finally the request for others having the same surname.

In some cases the post office area (as specified in the mailing address) and the telephone exchange area did not coincide. This was particularly true for rural delivery addresses. Had the investigators themselves been searching the local phone directories of areas with which they were unfamiliar, this would have been a serious problem. However, the operator could usually determine the proper telephone

7. If a number of listings are desired for a single telephone area, it may be more efficient to send a list of names and addresses to the relevant directory assistance office. These can be checked at the operators' convenience.

exchange for a given address.

Occasionally, the respondent or his parents apparently lived in the area and had a telephone, but at the subscriber's request the number could not be obtained through the phone book or the information operator. Moreover, if the operator reported that the requested party had an unlisted phone, she generally was unwilling to provide listings for others with the same surname.

A call was placed to the first number obtained from the operator. Frequently the person contacted was able to provide the desired information or a referral to someone who could help. All referrals were followed until the address was obtained or the leads exhausted. If necessary, additional calls were placed to the operator to obtain further listings.

Long-distance telephone calls were highly effective in locating respondents. Interestingly, the track associated with the 1947 community was more effective than that of the more recent address. Of the 320 people, 85 percent were located through the parental (1947) area, while 80 percent were found when calls were placed to the 1957 residence area (Table 2).

Not only was the telephone tracking a highly effective means of locating respondents,[8] it was also a remarkably efficient system. The empirical measure of efficiency for all of the tracking techniques discussed in this report has been defined as the complexity of the track or the total number of contacts involved. It should be remembered, however, that the nature and cost of the contacts included in a telephone track differ considerably from those in the procedures which follow. The latter all involve personal visits. Hence, the expenses involved must include not only the costs of the time for the contact itself, but also the researcher's travel time and accompanying expenditures. In no case did the cost of a telephone call to an area even approximate the expense of going there.

Two measures of complexity for the telephone track were derived. One counted the total number of calls placed—both to information telephone operators and to contact persons, whether the latter answered or not (Table 2). Since both answered and unanswered calls usually took approximately two to three minutes each to complete, this measure indirectly indicated the amount of time needed to carry out the track. The second measure of complexity counted the number of complete nonoperator contacts and hence measured the num-

8. When the joint effectiveness of the two tracks was considered, the success rate was even higher. More than 90 percent of the sample was located by phone through either the 1947 or 1957 residence areas.

TABLE 2. *Effectiveness of the Long-Distance Telephone Track, and Efficiency Measured by Total Number of Telephone Contacts Attempted.*

Criteria	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=273)	Respondent not located (N=47)	Respondent located (N=256)	Respondent not located (N=64)	Respondent located (N=422)	Respondent not located (N=96)
EFFECTIVENESS						
Percent	85	15	80	20	81	19
EFFICIENCY						
Total number of contacts	Number of subjects					
1	0	26[b]	0	31[b]	0	48[b]
2	137	4	169	4	238	6
3	41	4	27	7	55	10
4	35	2	24	1	47	2
5	21	2	11	3	28	5
6	12	2	4	5	15	6
7	8	2	7	4	12	6
8	6	1	2	1	7	2
9	2	1	4	2	5	3
10 or more	11	3	8	6	15	8
Mean number of contacts	3.6	3.6	3.1	4.0	3.4	3.9

[a] The total number of separate tracks—i.e., the total number of tracks through the 1947 and 1957 communities minus the number of tracks where the 1947 and 1957 residences defined exactly the same track.

[b] These were all operator contacts where no usable phone numbers were obtained.

ber of telephone calls paid for (Table 3).

Regardless of which of these measures was examined, the number of contacts was not great, nor were there appreciable differences between the number of contacts used in the 1947 residence track and the 1957 one. In about 10 percent of the telephone tracks the operator could not or would not provide the requested telephone numbers. This, of course, terminated the track unsuccessfully with one operator call. If a number were obtained from the information operator, the likelihood of obtaining the desired address through the track was very high. About 9 out of every 10 such cases were successful, and more than two-thirds resulted in acquisition of the desired address through the first answered call beyond the initial operator contact. While the total number of calls attempted was sometimes high (ranging from 1 to 27), comparatively few of these were completed and charged. The remainder were operator contacts, busy signals or no-answers. In only one instance did the number of persons actually contacted exceed six. Thus, although considerable time was involved in attempting contacts, the actual number of completed, charged calls was not high.

When labor costs and long-distance charges were considered, telephone tracking was much more expensive than mail. However, it was also more effective in that it allowed the investigators to make direct local contact with persons in the area and resulted in immediate acquisition of the desired address. The primary cost was labor. Toll charges themselves were not great. A single call seldom exceeded the three-minute basic limit and usually cost less than one dollar at standard long-distance rates.

The expense of extensive long-distance calls can sometimes be reduced by the use of specialized telephone lines (e.g., WATS) which permit the user to place toll-free calls within specified limits of time and area coverage. Costs of this service, however, may easily exceed the standard toll charges, depending on the number of wide-area calls made.

Community Visits

Some writers have suggested that personal visits may be a useful device for locating subjects (6, 11, 13). Unfortunately, the extant literature provides few guidelines for such tracking. It would seem reasonable, however, that the researcher's approach should depend somewhat upon the nature of the sample he is trying to track.

If the grouping consists of individuals who might be expected to know one another (such as members of the same high school class,

TABLE 3. *Efficiency of the Long Distance Telephone Track, Measured by Total Number of Nonoperator Contacts Realized.*

Number of nonoperator contacts	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=273)	Respondent not located (N=47)	Respondent located (N=256)	Respondent not located (N=64)	Respondent located (N=422)	Respondent not located (N=96)
	Number of subjects					
0	0	27[b]	0	31	0	49
1	197	10	211	15	318	22
2	44	5	26	4	59	8
3	20	2	13	5	28	6
4	7	1	5	4	12	5
5	5	0	1	2	5	2
6	0	1	0	2	0	3
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10 or more	0	1	0	1	0	1
Mean number of contacts	1.5	1.1	1.3	1.4	1.4	1.3

[a] The total number of separate tracks—i.e., the total number of tracks through the 1947 and 1957 communities minus the number of tracks where the 1947 and 1957 residences defined exactly the same track.

[b] All but one of these 27 cases were operator contacts where no usable phone numbers were obtained. The single exception was an instance in which only one appropriate number was obtained from the operator and, despite repeated attempts, there was no answer.

church, or voluntary organization), the investigator can use this characteristic to seek cumulative information on the unlocated subjects from already located sample members. The sample used in the present study, when viewed from the perspective of the 1947 residence area, could be tracked by this "snowballing" procedure. Since the respondents were sophomores in 74 high schools in 1947, they might be expected to know one another within the communities represented.

There are times, however, when the individuals being tracked could not be expected to know one another. In such cases, the initial objective is to enlist the aid of a knowledgeable citizen in the area of the former residence, seeking to capitalize on the acquaintances of this person in the search for an informant with the current address. The 1957 community tracks, when they differed from the 1947 area, generally required this kind of approach.

Visits to both the 1947 and 1957 communities were initiated at specified points of contact: the post offices and residential neighborhoods for both communities, the employer associated with the 1957 address, and the school for the 1947 parental community. These different places were chosen to provide a variety of starting points. At each location information was sought that might provide direct access to the respondent's current address, or suggestive leads through which one might reach the person sought.

If the subject had been located by long-distance phoning into a contact community he was not tracked by means of the various field visits in that town or area. He would, however, be field-tracked through the other community if phoning into that area had been unsuccessful. The telephone procedures were so effective, however, that the number of people left to be tracked through community visits was deemed too small to allow meaningful analysis.

Additional cases therefore were selected from the larger cohort of subjects out of which the original sample had been drawn.[9] These were also subjected to screening by long-distance telephone calls. A total of 79 individuals then remained to be tracked through visits to the 1947 community and 91 through the 1957 address, of whom 34 and 29, respectively, came from the added grouping.

For each of the tracks, data on effectiveness and efficiency were

9. These cases were not selected randomly from the larger study group. Since one aim of the project was to locate as many members of the total cohort as possible, the 108 persons not found by the unsystematic tracking attempts carried out prior to the initiation of this study were used. Fourteen of these had already been included in the original group of 320. The other 94 were added here. These people may have been disproportionately "hard to locate." At least, they had not been found by mail or the earlier unsystematic community contact.

compiled. Effectiveness was again measured in terms of a simple dichotomy: located versus not located. Efficiency was defined as the total number of persons actually contacted in carrying out the track. Measured in this way, efficiency approximated the second indicator used in the telephone track—the number of answered, nonoperator calls.

The Post Office as a Point of Contact. Until quite recently, post offices were prohibited from divulging forwarding addresses to the general public. Just prior to the community visits undertaken in this project a regulation had been adopted permitting interested parties to obtain such information.

> The fee for searching or furnishing the last recorded change of address is $1 per change of address. . . . The $1 charge is not refundable if the change of address information is not found. In such cases the $1 charge is for the search for the address change information (8, section 113.53).

This procedure could be implemented either by writing to the postmaster at the relevant office or by visiting the post office itself. The latter procedure was followed in this study.

The post offices visited varied considerably in size and number of personnel employed. Response in rural areas was most often immediate and by recall. In such a situation, the contact people acted less in their capacities as postal employees than as knowledgeable local citizens. Frequently they did not require the payment of the specified fee. Referrals to friends and relatives of the respondent were more frequent than specifications of forwarding addresses. (The former occurred 48 times, while there were only 14 instances of the latter.) Records were not often consulted in these smaller post offices.

In the very large, urban post offices the service was highly impersonal. Staff changes were frequent so that even long-term employees rarely had sufficient familiarity with any single delivery route to be able to recall useful information. Records seldom covered more than two years. The formalities of the search for forwarding addresses therefore were politely followed: acceptance of the request in written form, issuance of receipt for payment of one dollar per person sought, and official notification of results. The effort was seldom successful at a post office in a city location.

Of the 157 post office tracks followed, only 59 (38 percent) led to the acquisition of a correct current address (Table 4). For the remainder, the post offices contacted were either unable to provide any information at all (74 cases or 47 percent of the total), or gave referrals that did not lead to the desired address (24 cases or 15 percent).

Visits to the post offices in the 1947 residence communities were considerably more successful (58 percent) than were those to the 1957 areas (24 percent). This probably reflects differences in post office size, with the earlier addresses being predominantly in small towns.

Overall, the post office visit was an efficient means of tracking. If a lead were obtained, it usually led to acquisition of the desired address. For fully three-fourths of the 98 unsuccessful tracks carried out, no information was obtained and they were terminated with just the post office visit. Referrals were also generally direct, so that few contacts were wasted. In 30 of the 59 successful tracks, the address was received directly from those on duty or from the first contact beyond the post office. In short, while the success rate of the post office (particularly in the 1957 address communities), was not high, little time or effort was consumed in checking out this source of information. It should be noted, however, that receipt of the post office data sometimes required the payment of a fee, especially the larger post offices, which were also the least likely to provide useful leads. Therefore, it would seem reasonable to suggest that if the town is small, the post office personnel might be able to aid the researcher in tracking, either through the use of records or by recollection. If the town is large, this is not likely to be true.

The School as a Point of Contact. The high school was chosen as an initial point of contact for one of the tracks carried out within the 1947 community. The original respondents had been sophomores in the 74 schools sampled in 1947.

Each of these tracks began with a visit to the office of the high school now serving the district. School records were checked for possible leads. Useful information that was sometimes obtained included: full names of both parents; a later complete mailing address; composition of the family, often with names of siblings; teachers' and administrators' names; occupation(s) of the parent(s); name of the family doctor; and places to which transcripts had been sent, along with dates.

In addition to the records, school personnel were asked for referrals to others who might help. These were followed up until success was achieved or the leads were exhausted. In nine instances, one of those to whom the researchers talked within the school system (a secretary, teacher, or administrator) was able to supply the desired address directly. In other cases, the researchers were referred to friends or relatives.

The proportion of the sample who had attended college or had

TABLE 4. *Effectiveness and Efficiency of the Post Office Track, by Contact Community.*

Criteria	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=46)	Respondent not located (N=33)	Respondent located (N=22)	Respondent not located (N=69)	Respondent located (N=59)	Respondent not located (N=98)
EFFECTIVENESS						
Percent	58	42	24	76	38	62
EFFICIENCY						
Total number of contacts	— — — — — — — — — — — — — — Number of subjects — — — — — — — — — — — — — —					
1	1	19	3	57	4	75
2	20	8	12	5	26	11
3	11	3	2	3	12	5
4	9	1	3	1	11	2
5	3	1	1	3	4	4
6	1	0	0	0	1	0
7	0	1	0	0	0	0
8	1	0	1	0	1	1
9	0	0	0	0	0	0
10 or more	0	0	0	0	0	0
Mean number of contacts	3.0	1.8	2.6	1.4	2.9	1.5

[a] The total number of separate tracks—i.e., total number of tracks through the 1947 and 1957 communities minus the number of tracks where the 1947 and 1957 residences defined exactly the same track.

other post-high school training was small. Nevertheless, for such subjects the school records usually indicated sending of transcripts, and calls to college alumni offices were highly successful in obtaining updated addresses. Information received was always checked by telephone, letter, or visit, and either confirmed, corrected, or followed-up as a lead.

Almost three-fourths of the 79 subjects tracked through the 1947 high school were located (Table 5). While quite effective, the track was not particularly efficient or direct. In 16 instances, leads were obtained from the high schools which, when followed, did not produce the desired address. Successful tracks tended to be fairly long, with nearly 70 percent of them requiring three or more contacts.

The Employer as a Point of Contact. The 1957 interview was conducted approximately eight years after the respondents would have graduated from high school. By that time most persons would be expected to have settled into fairly stable occupational patterns. Therefore, employer designation and job description for each respondent were secured from the files. For married women the occupation of the husband was used.

A total of 91 separate tracks was initiated through visits to the subjects' last known employers. The types and sizes of operations

TABLE 5. *Effectiveness and Efficiency of the School Track.*

Criteria	Respondent located (N=58)	Respondent not located (N=21)
EFFECTIVENESS		
Percent	73	27
EFFICIENCY		
Total number of contacts	— — — Number of subjects — — —	
1	9	5
2	9	6
3	19	5
4	10	2
5	2	1
6	2	1
7	2	0
8	3	1
9	1	0
10 or more	1	0
Mean number of contacts	3.5	2.8

varied widely and the information available was largely a function of those circumstances. A small businessman tended to know his current and past employees personally, and could often recall useful data. As the operations increased in size, records as a source of leads took a more prominent place.

In order to be successful, the employer track required: that the subject be employed in 1957, that the employer be located by the researchers, and that through records or recollection, some information about the respondent be forthcoming. For three respondents, there was no employer listed in 1957. Seven employers were not located. Whether these firms had gone out of business, moved, or changed their names could not be determined.

Of 91 individuals, 55 were located through their 1957 employers—a 60 percent success rate (Table 6). Ten of these persons still worked for their 1957 employers. In nine other instances the address was obtained directly from the company through a former co-worker or supervisor who knew the respondent and was able to provide a current address.

This track rated fairly high in terms of efficiency. When any leads from the initial employer were forthcoming, they tended to be direct. For 58 percent of those located by this procedure the address was

TABLE 6. *Effectiveness and Efficiency of the Employer Track.*

Criteria	Respondent located (N=55)	Respondent not located (N=36)
EFFECTIVENESS		
Percent	60	40
EFFICIENCY		
Total number of contacts	— — — Number of subjects — — —	
0	0	3
1	18	19
2	14	5
3	12	4
4	3	2
5	4	1
6	1	1
7	1	1
8	0	0
9	0	0
10 or more	2	0
Mean number of contacts	2.7	1.9

obtained either directly from the employer or in one contact beyond the initial visit.

The Residential Neighborhood as a Point of Contact. Tracking was carried out through neighborhood contacts in both the 1947 and 1957 residence areas. The earlier address was expected to reflect knowledge of the parental generation and the family of orientation; the later address was expected to indicate recognition of the respondent as an individual or in terms of his family of procreation.

The initial point of contact in each of the 160 discrete neighborhood tracks was the respondent's former residence when it could be specified. Imprecise rural delivery (R.D.) or post office designations were supplemented, whenever possible, by directions to the former residence obtained from the post office.

In 62 cases no specific neighborhood could be defined. In these instances, tracks were initiated at public buildings such as fire companies, libraries, and town halls; or at businesses, such as the corner grocery, drugstores, bars, beauty salons, barbershops, and newsstands.

Contacts in the residential neighborhoods resulted in acquisition of 68 percent of the desired addresses (Table 7). The success rate was higher in the 1947 (82 percent) than in the 1957 community (59 percent). This is particularly interesting since generally only the post office designation was available for the 1947 address.

While the neighborhood tracks were very effective, they were not efficient in terms of total numbers of contacts. There were usually many possible points of contact in a neighborhood. If the track did not meet with immediate success or the acquisition of promising leads, the visits were continued. Thus, an unsuccessful track was generally more drawn out than a successful one.

Public Records

Public records are possible sources of tracking information. State tax rolls, motor vehicle operator license records, police, probation and parole files, and Veterans Administration records are examples of such materials. Unfortunately, the data presented in other research reports are too sketchy to allow for evaluation of the actual effectiveness of these procedures (5, 12, 16). They have usually been employed after other methods (particularly mail and/or telephone) have failed.

The effective use of public records requires that the subject be listed in some centralized file available to the researcher. The records of some agencies that might appear to be potential sources of information are not readily available for use. Thus, for example, the re-

TABLE 7. *Effectiveness and Efficiency of the Neighborhood Track, by Contact Community.*

Criteria	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=65)	Respondent not located (N=14)	Respondent located (N=54)	Respondent not located (N=37)	Respondent located (N=109)	Respondent not located (N=51)
EFFECTIVENESS						
Percent	82	18	59	41	68	32
EFFICIENCY						
Total number of contacts	— — — — — — — — — — — — — — Number of subjects — — — — — — — — — — — — — —					
1	3	1	5	4	8	5
2	16	0	11	2	25	2
3	23	0	13	5	34	5
4	8	0	10	8	16	8
5	8	3	4	3	11	6
6	2	4	5	4	5	8
7	0	0	2	6	2	6
8	2	4	2	4	3	8
9	1	2	0	1	1	3
10 or more	2	0	2	0	4	0
Mean number of contacts	3.6	6.4	3.9	4.8	3.7	5.2

[a] The total number of separate tracks—i.e., the total number of tracks through the 1947 and 1957 communities minus the number of tracks when the 1947 and 1957 residences defined exactly the same track.

searcher cannot generally obtain access to files of the Social Security Administration, Bureau of the Census, Federal Bureau of Investigation, Selective Service, or the Internal Revenue Department.

Even if the files are available to researchers, their utility may be severely limited by the difficulty of finding and identifying the respondent in the listing. Records that cover a small geographical area do not take into account the mobility of the respondent; those covering a wide area increase the probability that the subject will be included, but also increase the likelihood of finding a number of persons with exactly the same name (a not uncommon occurrence). If the number of such entries is large, it may be costly and time-consuming to follow out all leads.

Moreover, the finding of such a listing in the public records does not itself insure acquisition of the desired address. Many types of records provide historical rather than current data on the individual. Thus, marriage records convey information on the parties only as of the time of the ceremony, and while they may suggest leads for locating the respondent, generally cannot provide his current address directly.

From the wide range of public records that might have been used, only marriage licenses, real estate records, and wills were examined in this study. In Pennsylvania, these records are all organized on the county level and are maintained in the courthouse for public use. In most cases, indexes were available. The degree of alphabetical and chronological ordering of indexes varied widely, with some arrangements necessitating time-consuming, line-by-line examination. Records covering the period from 1950 to the present were checked. Leads to addresses were checked either by telephone or personal contacts.

Experiences in the use of public records differed outside of Pennsylvania, although these were limited in both number of contacts and geographical area. In other states, records may be kept at the town or state rather than at the county level, and they may not be accessible for public use at all.

Marriage Licenses as a Source of Information. Marriage licenses were expected to yield information on the names of in-laws, additional address contacts, the name of the officiating clergyman, and the married names of women who had been single at the time of last contact.

A total of 140 spearate tracks were attempted through marriage license records. In only 37 instances was there a record of the respondent's marriage, and 10 of these listings failed to lead to the desired address. Thus less than one-fifth of the subjects tracked were located through these procedures (Table 8).

TABLE 8. *Effectiveness and Efficiency of the Marriage License Track, by Contact Community.*

Criteria	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=15)	Respondent not located (N=64)	Respondent located (N=20)	Respondent not located (N=71)	Respondent located (N=27)	Respondent not located (N=113)
EFFECTIVENESS						
Percent	19	81	22	78	19	81
EFFICIENCY						
Total number of contacts	— — — — — — — — — — — — Number of subjects — — — — — — — — — — — —					
1	0	63	1	69	1	111
2	4	0	5	1	8	1
3	5	0	6	0	8	0
4	4	0	6	0	6	0
5	1	0	0	0	1	0
6	0	0	0	0	0	0
7	1	1	1	1	2	1
8	0	0	1	0	1	0
9	0	0	0	0	0	0
10 or more	0	0	0	0	0	0
Mean number of contacts	3.4	1.1	3.4	1.1	3.4	1.1

[a] The total number of separate tracks—i.e., the total number of tracks through the 1947 and 1957 communities minus the number of tracks where the 1947 and 1957 residences defined exactly the same track.

The leads obtained from marriage records generally reflected data that were 15 to 20 years old. Nevertheless, over 60 percent of the tracks that were successful yielded the address in three or fewer contacts. For almost all of the unsuccessful contacts no marriage record for the subject was found and the track was terminated with the courthouse visit. This was counted as a single contact even though it was in general much more costly in terms of time than were other contacts.

Real Estate Records as a Source of Information. During the two decades that had elapsed since high school, the subjects might be expected to have acquired property. If so, their names would appear on real estate records, and their correct mailing addresses would be listed in the tax assessor's files. Direct checking of the tax records, however, was not feasible since the listings were filed by address rather than name. Hence, the property transfer records from 1950 to date were consulted.

In Pennsylvania, grantee and grantor indexes were used to indicate where the relevant deeds were filed. Appearance of the respondent's name in the grantee index indicated that he had acquired property. A search of the grantor index specified whether he still held that property. If it had been sold, the track was dropped. If not, information on the property location drawn from the deeds was used in the tax assessor's office to learn the address to which tax notices were sent. If the address belonged to a bank or other lending agency, its cooperation was sought. Addresses received from the courthouse or lending agencies were confirmed by letter, telephone, or visit.

Since real estate records do not contain identifying data on the property owner (such as birthdate or parents' names), it was often impossible to determine whether the listing was actually for the respondent or for someone with the same name. Consequently if five or more separate property owners with the respondent's name were listed, and there was no way to be certain whether any one of them was the subject, the track was terminated.

Real estate records were not a very effective source of tracking information. Of 140 tracks undertaken, just 11 (8 percent of the total) resulted in acquisition of the respondent's address (Table 9). Six of these tracks required two or more contacts beyond the courthouse.

Wills as a Source of Information. The respondents were not expected to be the decedents, but it was likely that their parents might have died during the past two decades. In this event, names and addresses of heirs and/or executors might provide leads to the subjects' current

TABLE 9. *Effectiveness and Efficiency of the Real Estate Record Track, by Contact Community.*

Criteria	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=8)	Respondent not located (N=71)	Respondent located (N=8)	Respondent not located (N=83)	Respondent located (N=11)	Respondent not located (N=129)
EFFECTIVENESS						
Percent	10	90	9	91	8	92
EFFICIENCY						
Total number of contacts	— — — — — — — — — — — — Number of subjects — — — — — — — — — — — —					
1	0	67	0	80	0	123
2	3	2	4	3	5	4
3	1	2	2	0	2	2
4	3	0	2	0	3	0
5	0	0	0	0	0	0
6	1	0	0	0	1	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10 or more	0	0	0	0	0	0
Mean number of contacts	3.4	1.1	2.8	1.0	3.1	1.1

[a] The total number of separate tracks—i.e., the total number of tracks through the 1947 and 1957 communities minus the number of tracks where the 1947 and 1957 residences defined exactly the same track.

whereabouts. Wills for *all* persons with the respondent's surname[10] were checked and if either the respondent or his parent was named in a will, address information was obtained on all persons named therein. These leads were followed by telephone and personal visit. In 21 cases the names were extremely common (i.e., there were more than 10 listings in the index for the given surname), and the documents were checked only for persons with the respondent's or parent's exact names.

In 51 of the 140 tracks there were no listings at all in the respondent's surname, and thus no follow-through: In 56 additional cases, the respondent's surname was listed in the index (necessitating checking of the wills) but the decedent was apparently unrelated to the subject being tracked. Only six cases (four percent of the total) resulted in successful tracks (Table 10). In four instances no records were available for use.

The absence of a will in the record of death and estate disposition is common. For this study, however, an estate was used as a lead only if a will was registered, since the file of materials in such cases would be more detailed and hence more likely to provide tracking information. Extension of the track to include an examination of all estates might have slightly increased the number of subjects located through this channel.

Despite the difficulties inherent in using public records and the possibility of a low rate of success, these materials may provide useful leads for tracking respondents when other sources fail. It seems likely that the utility of various records is dependent largely upon the characteristics of the subjects being tracked. Thus, marriage licenses would seem to be more appropriate sources to consult when tracking people in their early twenties; estate records would be more likely to aid in tracking the elderly where a high rate of mortality is expected; welfare rolls might help in finding indigent subjects. Similarly, other records available to the public such as rosters of medical personnel, college alumni records, or professional society membership lists could contribute to locating selected people.

10. For most male members of the sample, only one surname was available for use in tracking through wills. Even if the man were married, the maiden name of the wife was not part of the information taken to the field. In the case of women, however, plural surnames were at hand for all who had married prior to the last interview in 1957. For a very limited number of sample members, both male and female, multiple surnames could be used as a result of guardianship arrangements in childhood. Such a married woman could be tracked on at least three surnames: natal, guardian, and married. Such a man could be tracked by dual surnames: natal and guardian.

TABLE *10. Effectiveness and Efficiency of the Wills Track, by Contact Community.*

Criteria	1947 Residence		1957 Residence		Total[a]	
	Respondent located (N=5)	Respondent not located (N=74)	Respondent located (N=5)	Respondent not located (N=86)	Respondent located (N=6)	Respondent not located (N=134)
EFFECTIVENESS						
Percent	6	94	6	94	4	96
EFFICIENCY						
Total number of contacts	— — — — — — — — — — — — Number of subjects — — — — — — — — — — — —					
1	0	73	0	85	0	132
2	1	0	2	0	2	0
3	0	0	0	0	0	0
4	0	1	0	1	0	2
5	2	0	2	0	2	0
6	2	0	1	0	2	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10 or more	0	0	0	0	0	0
Mean number of contacts	4.8	1.0	4.0	1.0	4.5	1.1

[a] The total number of separate tracks—i.e., the total number of tracks through the 1947 and 1957 communities minus the number of tracks where the 1947 and 1957 residences defined exactly the same track.

GUIDELINES TO AID THE RESEARCHER

In this study, the separate tracking methods were analyzed as discrete operations to investigate the effectiveness and efficiency of various procedures for locating respondents in longitudinal research. But if an investigator is concerned with finding his subjects, he will almost assuredly use a variety of techniques. The question must therefore be raised: How might the different tracking methods be combined to achieve maximum effectiveness at minimum cost? While detailed cost data on the procedures are not available, some guidelines for sequencing the various tracks can be suggested. The effectiveness of these combined procedures was evaluated with the sample of 320 cases originally selected for this study (Table 11).

The postal service is probably the least expensive means of tracking that has general utility and hence represents a logical first step in most efforts to locate respondents. Location of about half of the respondents by mail is not uncommon, and the average cost per subject located is not great.

Telephone tracking is a highly effective and relatively low-cost way to follow-up the mail contact. More than 80 percent of the respondents were tracked by phone calls through each of the tracking sites used in this study. When the labor cost involved in calling each subject was considered, the cost of a telephone location was more than that for a successful mail contact. However, it was much less than the expense of traveling to the area of the subject's former residence for tracking. Directory information from the telephone operators can be obtained free of charge and actual calls to the subjects or persons with the same surname were surprisingly inexpensive and effective in obtaining current addresses.

Visits to the communities were expensive but highly successful. They seem to be reasonable to use when mail and telephone pro-

TABLE 11. *Cumulative Effectiveness of the Sequence of Tracking Methods Suggested, by Contact Community (Original Sample of 320 Cases)*

Tracking method	1947 Community		1957 Community	
	Cumulative number located	Cumulative percentage located	Cumulative number located	Cumulative percentage located
Mail	—	—	153	47.8
Long distance telephone	273	85.1	264	82.5
Community visit	319	99.7	310	96.9
Public records	319	99.7	310	96.9

cedures fail. Visits to the 1947 community increased the success rate from 85 to 99 percent; in the 1957 area, from 82 to 96 percent.

The use of public records as sources of leads can be recommended only as a last resort. Not only was the overall success rate of tracks low using the public records of marriage licenses, real estate, and wills, but all of those persons who were located through these procedures were also found by other tracks.

Tracks through the 1947 community were more successful than those in the 1957 area. That it should be easier to locate persons through a 20-year-old address than one just a little over 10 years old may seem strange. It suggests, however, that residents of the home town (particularly where the the town is small) may continue to follow the person's activities and accomplishments for many years. The presence of kin (especially parents or siblings) also enhances the probability of continuing local knowledge about the subject.

In this study the availability of two residence sites provided dual locations from which tracking could proceed. Such multiple points of contact increase the likelihood of finding the person, with each location providing a new set of potential leads on which the researchers can draw. Moreover, this analysis has shown that the most recent is not necessarily the most useful locale in which to track.

With only the 1947 residence as the basis of the tracks, just one of the 320 original sample members was not found. That person was found through his 1957 address. Thus, when the tracks through the two communities were combined, *all* of the subjects in the original sample were located.

The percentage of successful locations obtained in the present study may seem at first to be extraordinarily high. But it is not particularly atypical. A number of researchers, in various states, using both rural and urban respondents, and doing follow-up studies spanning a few months to more than 30 years, have also reported success rates in excess of 80 percent. Summary lists of such findings are available (4, 17). Thus, the widely held belief that many cases are certain to be lost in longitudinal research is simply false. Most cases apparently can be retrieved if the investigator is willing to spend the necessary time and effort. Persistency in tracking can be extremely costly, however. Precise data on costs are almost never reported, but it seems clear that: "Largescale follow-up is an expensive business, however it is done, and increasingly so as efforts are continued to induce nonresidents to respond" (7, p. 377). Continued research on the effectiveness and efficiency of various tracking methods should provide needed suggestions to aid the researcher engaged in longitudinal studies to locate his subjects at minimum cost.

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DIGEST

The problem of locating respondents across time is often given as a primary reason for not conducting longitudinal or follow-up research. This study was undertaken to ascertain the degree to which people could be found after a decade or more and to assess different tracking procedures. A sample of 320 persons was drawn from a larger grouping of persons from rural Pennsylvania. Each person was tracked through both his 1947 residence community (where he lived as a high school sophomore) and his 1957 community (where he was interviewed at about 26 years of age). The following procedures were used: (1) mail, (2) long-distance telephone calls, (3) community visits, and (4) search of selected public records.

First-class letters, mailed to the 1957 address, resulted in the receipt of return postcards giving the addresses of slightly less than half the subjects. Long distance telephone calls, placed person-to-person with the respondent's surname, provided addresses for about 80 percent of the sample in each community.

Community visit tracks were carried out only for those persons not located by long-distance telephone calls. These were initiated at post offices, residence neighborhoods, schools (in the 1947 area), and the last known employers (in the 1957 area). Leads obtained at these locations were followed until the address was received or the leads exhausted. These community visits were more costly than other methods, but led to the location of almost all of the subjects not found by long-distance telephoning.

The use of public records as a source of leads was disappointing. Search was successful for just 19 percent of the marriage license tracks, 8 percent of the real estate transfers, and 4 percent of the will registrations.

All of these persons located through public records were also located with other tracks. Cumulatively, the various techniques led to current addresses for all but two of the persons tracked. Thus, the widely held belief that many subjects are certain to be lost in longitudinal research was not substantiated by this study. High levels of success in respondent retrieval across time are possible if the researcher expends the necessary time and effort.

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