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In spite of the fact that chain referral sampling has been widely used in qualitative sociological research, especially in the study of deviant behavior, the problems and techniques involved in its use have not been adequately explained. The procedures of chain referral sampling are not self-evident or obvious. This article attempts to rectify this methodological neglect. The article provides a description and analysis of some of the problems that were encountered and resolved in the course of using the method in a relatively large exploratory study of ex-opiate addicts.

Snowball Sampling Problems and Techniques of Chain Referral Sampling

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Snowball or chain referral sampling is a method that has been widely used in qualitative sociological research. The method yields a study sample through referrals made among people who share or know of others who possess some characteristics that are of research interest. The method is well suited for a number of research purposes and is particularly applicable when the focus of study is on a sensitive issue, possibly concerning a relatively private matter, and thus requires the knowledge of insiders to locate people for study. In a different context, Coleman (1958) has even argued that it is a method uniquely designed for sociological research because it allows for the sampling of natural interactional units.

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In the area of deviant behavior, especially research on drug use and addiction, snowball sampling has been used to gather materials for studies now thought of as classics in the field. It was used in Lindsmith's original study of opiate addiction (1968) as well as in Becker's work on marijuana smokers (1966). Both of these works are typical in that they contain only sparse accounts of the sampling method. It is as if the use of the snowball method entailed little more than to start it rolling through a personal contact or through an informant and then simply to sit back and allow the resulting chain to follow its own course.¹

In spite of the widespread use of chain referral sampling in qualitative sociological research, little has been written specifically about it. (For three exceptions to this point, see Coleman, 1958; Goodman, 1961; Becker, 1970.) General textbooks on research methods and techniques rarely devote more than a paragraph to descriptions of the method or the problems entailed in its use (see Smith, 1975; Denzin, 1970; Simon, 1969). Similarly, studies that report on findings gathered wholly or partially through the use of a chain referral sample commonly will only briefly mention the fact while passing on to some other point (see for example, Atkyns and Hanneman, 1974; Bull, 1978; Blumer et al., 1967; Scharse, 1966; Coleman, n.d.)

In addition, textbooks that concentrate solely on qualitative research methods and analysis, although they may have much to say about other qualitative sampling methods, devote little or no attention to the procedures or problems entailed in the use of chain referral sampling. For example, the techniques and problems of theoretical sampling have been discussed in detail by Glaser and Strauss (1967; Glaser, 1978) as well as others, and the qualitative research method of selective sampling has been explicated by Schatzman and Strauss (1973). This apparent ne-

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glect may be a result of the assumption that the problems that may arise through the use of this sampling method are so simple or self-evident that they require little or no explanation.

PROBLEMS AND TECHNIQUES OF CHAIN REFERRAL SAMPLING

Through omission, the existing methodological literature suggests that the chain referral method of sampling is a self-contained and self-propelled phenomenon, in that once it is started it somehow magically proceeds on its own. This, however, is simply not the case; rather, the researcher must actively and deliberately develop and control the sample's initiation, progress, and termination. The purpose of this article is to explore this process and provide a description and analysis of the procedures, the problems, and kinds of resolutions that emerged in the course of using the chain referral sampling method in a relatively large exploratory study of ex-heroin addicts.

A brief description of the research project that provided the materials for the analysis presented in this article is necessary before each of the problem areas can be considered in more detail. The overall objective of the study was to gain some understanding of the processes that result in the "natural" recovery from heroin addiction, that is, to understand how some people manage to break an addiction to heroin without the aid of any therapeutic intervention. The research was planned to include two groups of ex-addicts, 100 who had stopped using on their own and a comparative group of 100 who quit after having been treated. To be eligible for study the respondents had to have been addicted for a minimum of 1 year and nonaddicted for at least the 2 consecutive years prior to the interview.²

The following discussion focuses on a number of methodological problem areas that are analytically distinct but procedurally interrelated in the utilization of the chain referral sampling method. Although some of the areas discussed may seem relevant

only to qualitative research, others have a much broader methodological significance. The specific problem areas are:

- finding respondents and starting referral chains
- verifying the eligibility of potential respondents
- engaging respondents as research assistants
- controlling the types of chains and number of cases in any chain
- pacing and monitoring referral chains and data quality.

FINDING RESPONDENTS AND STARTING REFERRAL CHAINS

The first methodological problem that must be confronted in any research that uses the chain referral method to locate a study sample is the social visibility of the target population. Many possible study populations, for example, police, nurses, or school teachers, have a relatively high social visibility. While the researcher might have some difficulty obtaining access to these types of populations, the knowledge of where to locate them is generally not a problem. Other possible study populations, because of the moral, legal, or social sensitivities surrounding the behavior in question, have a very low visibility and, as a result, pose some serious problems for locating and contacting potential respondents. This would be true, for example, if one wished to study arsonists who were not in institutions, women who had undergone abortions, or, in the case of the study discussed here, ex-heroin addicts—particularly those who had never been in treatment (see Becker, 1970; Henslin, 1972).

Ideally, the method of locating people who maintain low visibility because of past or current histories of deviance, or, in this instance, past histories of opiate addiction, would be to draw a representative sample of all adults in the population. Then, assuming the honesty of the respondents, screen the sample to locate and interview recovered addicts. This method was excluded in the study discussed here primarily because, among

other reasons, the costs involved in drawing a large enough sample to locate 100 untreated ex-addicts would have been prohibitive.³ In addition, the purpose of the research was not to test a series of predetermined hypotheses on a representative sample which would allow for extrapolation to the whole population. Rather, the study's aim was to explore and analyze, in the manner suggested by Glaser and Strauss (1967), the social and psychological processes that worked to bring about a cessation of heroin addiction.

Locating and interviewing ex-addicts who had undergone some form of treatment presented few difficulties. These respondents were easily located with the formal and informal assistance of various program directors and staff personnel who knew people that met the research criteria and would refer them to the project. Some highly visible, treated respondents were directly contacted by the project staff. This latter group, for example, included people who made little or no effort to hide the fact of their past addiction and, in many instances, were drug program directors or community spokesmen and leaders. Ferreting out respondents who met the research criteria for the untreated group, however, was another matter. Obviously, drawing a probability sample was impossible with this group since the characteristics of this universe are not known. In fact, because of the widely held belief that "once an addict always an addict," the group that was focus of the study—naturally recovered ex-addicts—was not thought by either clinicians or researchers to exist at all, at least not in any great numbers. That is, the prevailing image of heroin addiction generally holds that the behavior pattern is so powerfully reinforcing that it is virtually impossible for a person to successfully break the tie to the drug without some form of therapeutic assistance.

Originally it was expected that people in the treated sample would also provide referrals to untreated ex-addicts, but, except in a few instances, this did not occur. In fact, many of the treated respondents, particularly those who had been in therapeutic communities such as Synanon, shared the conventional belief and were skeptical concerning the possibility that addicts could

recover without treatment. This skepticism is probably rooted in their own past experiences of repeated relapses following voluntary attempts at abstinence and the testimonial that their current drug-free state makes for the success of treatment. In addition, the skepticism might be due to the fact, discovered in the course of the research, that naturally recovered ex-addicts are much less socially visible and more isolated from other ex-addicts than are those who have been treated. Although the research revealed a few exceptions to this finding—for example, a small number of groups of untreated ex-addicts were found in larger organizations, such as religious or political action groups—they were relatively infrequent. Moreover, the basis for the formation of these groups was not the common experience of past addiction, as it was with those who had been treated, but a common religious or ideological experience. In any case, we found that treated ex-addicts rarely, if ever, see people who are successful in their personal attempts to break an addiction, and are thus skeptical of the possibility.

Finding untreated ex-heroin addicts and starting referral chains among them was in part accomplished in a manner similar to that which is used when testing hypotheses deduced from existing theory or areas of knowledge. When the research aim is to test existing theory, the theory clearly and specifically identifies the relevant study population. Although the intent of the research reported here was not exclusively to test theory, the relevant available knowledge concerning the recovery from heroin addiction was used, whenever possible, to determine where data outcroppings (Webb et al., 1966) might exist and referral chains initiated. To illustrate, a number of available studies suggested that some addicts recover from addiction without treatment (Waldorf and Biernacki, 1979) and, although these studies offered little in the way of substantive analysis of the processes involved, they were nevertheless initially helpful in directing the researchers to possible sources of data. One source of direction was provided by Robins's (1973) study of Vietnam war veterans. Her research showed that very few of the veterans who had been addicted in Vietnam were still using narcotics three years after

they returned to the United States and an even smaller number had been in treatment. This suggested that one possible source for locating naturally recovered ex-addicts would be contacts that could be developed among groups of Vietnam war veterans.

Similarly, other studies suggested additional data sources. For example, it is widely known that some ex-addicts, although they no longer use heroin or use it only on occasion, develop serious problems with alcohol. This information indicated that respondents might be found among such groups as Alcoholics Anonymous and in various urban missions—which proved correct. A number of contacts and referral chains were successfully developed with people who had become users of alcohol following addiction. Still other studies had shown that heroin addicts, because of the lifestyles associated with the use of heroin, frequently commit crimes and are imprisoned. This suggested that still other ex-addicts might be found among certain groups of ex-felons. A number of naturally recovered ex-addicts were found in prison reform groups and special university programs for ex-offenders.⁴

Occasionally, contacts and referral chains can be initiated fortuitously. This is not entirely a process of chance but results from an increasing sensitivity and attentiveness to information related to the study's focus that develops as the researcher becomes steeped in the research area. In a sense, it is the prepared mind that both knows and can take maximum advantage of opportunity. In the ex-addict study a number of fortuitous contacts were made, and a few, but not all, of them sprung a series of additional referrals and interviews. For example, some untreated respondents were located through the news media, and in one instance four interviews were obtained as the result of one of the project staff participating in a poetry workshop. In this instance, a guest poet read one of his works that dealt in part with his past experiences as a heroin addict. The poet agreed to be interviewed and he, in turn, made referrals to three more respondents; three of the four had known each other while they were addicted some years ago in Greenwich Village.

Once the original contacts used to start chains in any study are exhausted, the researcher is faced with the problem of initiating new ones. When the researcher moves into areas where there are few or no preestablished contacts, new problems arise as he or she has little reason to trust or accept at face value the respondents that may be referred to the project. In addition, some areas that theoretically would be expected to yield a high number of respondents may turn out to be false starts or yield too few respondents relative to the effort required to gain access in order to initiate new chains. For example, in the recovery study the successful efforts to locate ex-addicts in a Pentecostal church directed the sampling effort to the Black Muslims, where it was thought other converted ex-addicts would be found. However, after spending a number of weeks establishing the project's legitimacy in order to gain entry, only a single respondent was located in one particular mosque.

Verification of eligibility, as well as the accounts provided by respondents, becomes increasingly problematic as the sources used to initiate referral chains become more distant and knowledge about the sources less personal. One problem here is related to training *de facto* research assistants. In the recovery study, once the original contacts were exhausted, the sampling effort was theoretically directed to different groups (such as Pentecostal churches, women's political organizations, and various offender programs on university campuses) wherein it was thought new chains might be started. Engaging program or organizational personnel to assist required that ethical issues concerning confidentiality be resolved and that they be trained so as to be able to find, screen, and refer possible respondents to the study. Ethical concerns prevented the research staff from directly contacting many potential respondents, consequently program directors or personnel who knew of possible respondents would make initial contacts and then ask those who were willing to cooperate to personally contact the project. In each instance the newly recruited research assistant had to be trained to understand and accept the eligibility criteria of the research, which often was

difficult because it violated some commonsense understandings concerning treatment and nontreatment. For example, many people define themselves as untreated in spite of possible long stays in civil commitment programs because their commitments to these institutions were involuntary and/or because they had become readmitted upon release and then recovered at a later time.

Similar problems emerge as word of the study is spread among the researchers' friends and colleagues, who also provide occasional referrals. These referrals in some instances also turn out to be false starts. For example, in a number of instances, referrals made by friends of the research staff to people they thought were untreated ex-addicts were, on the contrary, found to have been treated. These false starts were often the result of confusing negative or relatively limited experience with treatment as indicating natural recovery. That is, many recovered ex-addicts have received some form of treatment but do not in any way attribute their cessation of heroin use to the experience; consequently such repudiations are defined by other people as meaning no treatment.

In still other instances it might be advantageous to canvass and hopefully stimulate new chains through letters sent under the auspices of some program believed to contain a good potential for revealing respondents. Soliciting respondents might also be done through various kinds of advertising, public notices, newspaper or magazine stories about the research, or possibly through radio or television news coverage. It is recommended, however, that these strategies be used only as a last resort and, when they are used, that special care be given not to reveal all the criteria of eligibility for the study nor too few of them. Revealing too many of the eligibility criteria can result in problems related to verification, while revealing too few details can create management problems related to screening and perhaps difficulties in turning away noneligible but willing study participants. Certainly, however, in terms of the veracity of the study findings and in spite of the management problems it might pose, the latter course would be the most desirable.

VERIFYING THE ELIGIBILITY OF POTENTIAL RESPONDENTS

In many areas of research the self-presentations made by voluntary respondents cannot be taken at face value (Douglas, 1976). In the recovery study this proscripton was particularly evident because of the focus of inquiry and the fact that a \$20.00 honorarium was given to each respondent—a seemingly small amount of money that unexpectedly proved enticing enough for numerous people to attempt a ruse and pose as ex-addicts. In any case, it could not be assumed that the people who presented themselves as ex-addicts had even been addicted or, if addicted, had recovered. The researchers had to assume a distrustful stance toward potential respondents; verification of the accounts that they provided was accomplished through independent sources.

Verification of the respondents' accounts was accomplished, when possible, through third parties—the data sources were triangulated (see Denzin, 1970; Webb et al., 1966). Persons who knew the respondents were asked to validate such critical aspects of their accounts as the fact of their recovery and the length of addiction and treatment experience. In many cases third-party verification was accomplished through a person (a locator) who would start a snowball by contacting respondents personally known by him or her to fit the research criteria.

Although independent verification was possible for most cases, in a few instances the claims made by respondents were still suspect. This suspicion was grounded in such things as perceived discrepancies in a respondent's story or a respondent's becoming unusually agitated during an interview (which might indicate the onset of withdrawal symptoms); suspicion was also sometimes aroused by a potential respondent or a number of respondents coming into the project office, requesting to be interviewed without having been referred by someone related to the project. A number of strategies, some that were planned and others that evolved in the course of the research, were used to temper suspicions concerning the veracity of various respondents. These strategies, although they were not definitive tests of validity, were

nevertheless especially crucial in helping to indirectly confirm that a respondent was not currently addicted.⁵

One strategy used to corroborate the veracity of a respondent's presentation was made possible through a feature of the chain referral method itself. By definition, a chain referral sample is created through a series of referrals that are made within a circle of people who know one another. In the specific study discussed here it was quite common to interview individuals who formed groups of friends and, in some instances, who were spouses. The respondents would often discuss their own experiences as well as the experiences of others during interviews; this volunteered information was used as an additional source of verification in related cases.

In other questionable cases, the researchers would ask to examine a respondent's arms in order to check for relatively fresh signs of needle injections. It was assumed here that an individual who was currently addicted would not go through the trouble to inject the narcotics in other body areas to allow the arms to heal in order to give the impression of not using just to collect the \$20.00 honorarium.

A general screening policy was also developed after two different referral chains turned into avalanches and the project office was deluged with unvouched-for people demanding to be interviewed. The policy was to avoid interviewing any unsolicited walk-ins immediately, but, if upon screening they were found to meet the research criteria, to make separate interview appointments for them at a time at least one week in the future. This was done particularly in those instances when a number of people would arrive at the office together without a prior referral and appointment. The assumption here was that the relatively chaotic life associated with addiction would make it highly unlikely that a currently addicted person would schedule and be able to keep an appointment made for a week or two in the future.

Other, somewhat more fortuitous, means to indirectly verify cases also emerged and were utilized in the course of the research. In one instance an ex-felon who had become associated with the project staff had the opportunity to observe two study respon-

dents refuse an offer to use heroin while he was visiting a friend in a downtown fringe-area hotel. A field report was recorded for the cases in question as they were for others when various kinds of relevant information reached the project staff. In two instances information shared with the research staff suggested that two respondents had suffered relapses and were once again addicted. Field reports were made for these cases and they were removed from the successfully recovered sample until the information was substantiated. Later, when the readdiction was confirmed, these cases were permanently removed from the recovered group and used for comparative analysis.

ENGAGING RESPONDENTS AS RESEARCH ASSISTANTS

Finding possible data outcroppings on the basis of existing and emerging theory and knowledge often restricts the initiation of referral chains to those areas of which the researcher is aware and that are easily accessible. From time to time in the study discussed here, it was fruitful to use both paid and unpaid persons to help locate new respondents and start additional referral chains. These locators served two interrelated purposes; first, because of their particular pasts, occupations, social positions and/or lifestyles, they had relatively easy access to certain data sources and, as a result, could make contacts for possible interviews more efficiently than could the researchers. Second, because the locators often knew the persons referred to the study, they could verify the respondents' accounts.

The use of locators in snowball sampling is akin to the use of significant informants in field studies. Their use assumes that knowledge is differentially distributed and that certain persons, as a result of their past or present situations, have greater accessibility and knowledge about a specific area of life than do others. These persons can more easily develop referral chains because they may already be aware of potential respondents or may be more likely to have others reveal their potential to them.

In the recovery study, one excellent locator was an ex-addict and ex-felon whose lifestyle was related to his current political activities, which resulted in his home serving as a stopping-off place for other ex-felons, who were often also ex-addicts or who knew other people who were. Another key locator who developed numerous contacts and referrals was a publicly known ex-addict and social scientist who was still involved with "the life."

When the snowball sampling method is used and study respondents are enlisted to help find other potential respondents, they become de facto research assistants. Although all of a study's respondents might be asked to refer others, all of them cannot and should not be engaged to assist the research on a regular basis. The characteristics of study respondents differ and so do their abilities to help with the research effort. Probably the most important factor used to select respondents to assist regularly in the research, in addition to those characteristics mentioned above, is the extent to which the researchers can trust the person to understand the goals of the research and present the project to others in an acceptable and serious manner. Respondent-research assistants come to represent the project in the community and it is important that the information they disperse be credible and compatible with the research effort. Knowledge about a project can and often does become distorted, and rumors can develop which might hinder or completely stymie the endeavor. For example, in one instance numerous people began to phone and drop by the project office to be interviewed. They all used the name of one man who had taken it upon himself to refer people to the project. All of the people referred by this self-appointed assistant in one way or another did not meet the research criteria. Rejecting these people often was done only with great difficulty. Many became indignant when they were rejected because they felt they were qualified for the study. A decision was made not to accept any respondents who used the name of the questionable locator and in a short time the contacts stopped.

Respondents who are engaged as assistants must also receive some training, however minimal. The training may take the form of simply being sure that they clearly understand the eligibility

criteria at any time. In addition, as the research progresses, the respondent-assistants might also need to receive retraining as new research needs emerge—for example, the need to locate new types of respondents—or need to be informed of the reasons a particular chain was prematurely terminated.

The use of locators, in addition to their importance in generating a sample, can also help solve another important problem. This problem is an ethical one which emanates from the possible suspicions and consequences of the researcher directly contacting individuals whose success in breaking the bond of heroin addiction is related to their ability to hide the facts about their pasts from such persons as employers. In many instances, if the fact of past addiction were to be made known it could seriously jeopardize the person's current adjustment. A locator, who may also be a friend of the potential respondent, can more easily overcome this problem as a result of the already existing personal ties and thereby ease the way for an interview (see Henslin, 1972). In this study, the locators also helped to temper suspicions that the researchers might be connected with federal or state law enforcement agencies, who might somehow obtain the information provided by the respondents and use it in unwanted ways.

CONTROLLING THE TYPES OF CHAINS AND NUMBER OF CASES IN ANY CHAIN

The type of data needed in any exploratory research endeavor will differ depending on the stage of the study. When using the chain referral sampling method, different types of chains will be commenced for different reasons during each stage of the research. At first, the data-gathering effort is purely exploratory and the goal is simply to get started. The effort at this point is akin to the chumming techniques used by some fishermen, in which bait is scattered over an area in hopes of luring fish into it. Of course, at the study's start, the researcher begins by making contacts, if possible, with people who are personally known to

meet the research criteria. The study might also be publicized in various ways. At this stage, respondents are interviewed as they are located and become available.

As the research progresses, control over the referral chains becomes more specific and is based on *substantive* considerations (see Broadhead, 1978). Control is exercised in an attempt to ensure that the sample includes an array of respondents that, in qualitative terms, if not rigorous statistical ones, reflect what are thought to be the general characteristics of the population in question. The concern here might be, for example, that the sample includes both men and women, that it contains persons from all class and racial backgrounds, or that it contains people from different geographic areas and occupations.

As the data gathering continues, the early interviews and the characteristics of the respondents are subjected to an ongoing analysis. The analysis, at this point, is done in part to direct and guide existing and future referral chains. The sampling is still substantive but control is more selective than it was earlier. For example, in the ex-addict study, an analysis of the characteristics of the first twenty cases showed that a large proportion of the treated respondents were currently working in drug treatment programs. In order not to bias the sample with drug abuse, counselors, a decision was made to be more selective and exclude from study potential respondents who were employed in drug treatment unless they were of research interest for other reasons.

At the selective sampling stage the research effort is not as simple as it might appear. Depending on the particular focus of study, it might be extremely difficult to start referral chains that will yield certain types of respondents. In the recovery study, in spite of excellent entrees into the various black communities in California and in spite of the fact that both samples included numerous black respondents, the concentrated efforts of the project staff (including a black research assistant) resulted in only a single interview with an untreated black female.

As the data gathering and analysis progresses, various patterns will begin to be sorted out and conceptualized; these conceptualizations will provide the basis for future sampling. At this point,

control over the referral chains is not only selective, but is also based on *theoretical* considerations. To illustrate, in the ex-addict study a major factor discovered to affect the recovery process was whether the person identified himself as an addict and the degree to which that identity both symbolically and behaviorally inundated such other possible identities as son, father, or student. The concept of "inundation" (Broadhead, 1978) was used to refer to this aspect of the recovery process. Inundation appeared to be most extensive and dramatic with those persons who were addicted in situations in which the drug was, among other things, relatively difficult to obtain and expensive to purchase. This analysis guided future sampling efforts toward groups that might contain persons who were addicted in situations in which opiates were more accessible and less costly. Thus attempts were made to start referral chains among such medical personnel as nurses and physicians.

The final effort in controlling the types of referral chains is made on the basis of *verification* considerations alone. Once the analysis has been developed to the point where it adequately comes to terms with the materials in question, some referral chains might be continued and individual cases deliberately selected for the purpose of confirming various aspects of the analysis. In some exploratory studies in which the researchers are obligated to collect a predetermined number of interviews, it might be prudent to plan to leave some of them to be conducted only at the latter stages of the study for verification purposes. (A more detailed discussion of both theoretical and verificational sampling can be found in Glaser and Strauss, 1967; Glaser, 1978.)

Another problem that must be addressed and controlled when using the chain referral sampling method is that of limiting the number of cases within any subgroup in the sample. The researcher must continually ask: How many more cases should be collected and in what direction should the referral chain be guided? The decision here should be based on at least two considerations: representativeness of the sample and repetition of the data.

When the purpose of a study is to generate theory, the incoming data should be analyzed on an ongoing basis. The

analytic effort, as has already been argued, should be both substantive and theoretical. The substantive analysis of the types of respondents will provide information on which to base decisions to limit the size of any subgroup in the sample. This analysis will help to assure that the sample characteristics will at least broadly correspond with those that are thought to exist in the actual population. (This procedure, to some extent, resembles "quota sampling"; Smith, 1975.) For example, in the ex-addict study a decision was made to limit the number of respondents in the treated sample who had been in therapeutic communities. This subgroup was limited to about one-third of the entire treated sample in order to have it correspond with the proportion of ex-addicts of this type believed to exist in the population. The reasoning behind this decision was simply to prevent the possibility of so misshaping the sample that it would unduly reflect only the experiences of graduates from therapeutic communities.

The number of cases provided through any type of referral chain should also be limited when the data becomes repetitious. At this point the researcher should be confident that the possible variations extant in that particular subgroup have been exhausted. In actuality, both these criteria are sometimes compromised in light of practical considerations. In certain instances additional but nonessential interviews might be conducted so as not to alienate or offend an enthusiastic respondent who could jeopardize the continuation of some referral chains.

PACING AND MONITORING REFERRAL CHAINS AND DATA QUALITY

The speed with which referral chains are initiated and developed must be deliberately paced by the researchers. It is important to make a distinction here between the natural evolution and dissipation of a referral chain as it builds and exhausts itself through a social network, and the deliberate regulation of the speed with which new contacts and interviews are developed and conducted. Certain social pressures combine to create a sense of urgency and tend to rush the development of

new contacts and the completion of interviews. One problem here results from the nature of the method itself, in that referrals have a tendency to be made in groups as knowledge of the research quickly spreads out from the original source. A fear commonly exists that if referrals are not immediately followed up, the leads will become cold and possibly lost. In some projects an additional source of pressure results from trying to meet sample quotas promised to a funding agency; this works only to compound the problem. Thus a strong tendency exists to complete interviews as soon as possible, this can result in serious problems, especially if a number of different snowballs are proceeding simultaneously. If it is followed in an unrestrained manner, the inclination will have a direct effect on the characteristics of the developing sample, the study's data, and, thus, the analysis. Consequently, the speed with which a chain referral sample develops must be paced in the sense that from time to time its progression must be stimulated, slowed, or temporarily stopped.

Monitoring the quality of data being collected is certainly not a problem unique to chain referral sampling; however, certain particular problems emerge when the method is used in an exploratory study utilizing open-ended interviewing. At any point in the course of the research there must be some certainty that the correct information is being gathered. The quality of the data being collected can be affected by many factors, including such problems as growing fatigue and disinterest among the interviewers or misunderstandings concerning precisely what should be explored and probed in each new interview. Whatever the reasons, the data afforded through the chain referral sampling method must be monitored in a regular manner.

In studies in which interviews are being tape-recorded, the monitoring of the quality of information that is being gathered may present some formidable problems. This is particularly true when the actual monitoring is done only after the tapes have been transcribed into typescript. This may create a rather long delay between obtaining the actual interview and the analysis of the material it contains. At some points, interviews will be completed at a greater rate than they can be transcribed (a problem of

spacing) and a large backlog of untranscribed tapes will be accumulated. In this situation the monitoring of data quality may be months behind; this may result in the collection of incorrect or poor quality interviews that may have to be excluded from the analysis. One strategy used in the recovery project to help prevent this was to conduct a sort of debriefing with the staff after each interview was completed. These debriefings were instructional, served as a means to monitor the kinds of material being collected, and, at the same time, allowed the interviewers to share feelings and discuss any problems they may have encountered.

CONCLUSION

Qualitative sociological researchers have often been criticized on the basis that their data-gathering methods in many instances are not clearly stated and explained. In other instances, when the research methods are described, they are criticized for being too vague or unsystematic. Some of this criticism has been well founded and, although an increasing amount of attention is now being given to qualitative methodological procedures and problems, much still remains unstated and unanalyzed.

The particular methodological procedures and the problems that are encountered and resolved in their use in the course of any study reflect to some degree the singularities of the social phenomena being investigated (Becker, 1970). A description and analysis of the problems and decisions made to overcome them in any single research endeavor would help to temper some of the criticism of qualitative sociology and increase its credibility with some audiences. In addition, the analysis of the qualitative methods as they are actually implemented and altered in research practice would provide the basis for possible future comparative analysis. An analysis of qualitative research methods as they have been used in different but substantively comparable sociological studies would likely yield more broad and systematic statements concerning qualitative methodological procedures than those currently available.

Although chain referral sampling has been widely used in qualitative social research, the procedures and problems entailed in its use have received only cursory attention. Although many sociological researchers may think otherwise, it is quite clear that the problems and procedures involved in using the chain referral method are not necessarily simple or self-evident. A number of problems are involved in using it to gather study materials, some of which are purely methodological in nature and others which emanate from particular constraints formed by the research focus. Some of the difficulties in using the method recounted in this article resulted from the fact that this study's focus was a phenomenon that is at the fringes of deviant behavior. This fact should not, however, lead to a dismissal of the analysis on the basis that it is in some way completely idiosyncratic. Many of the problems in using the method, and the ways these problems were resolved (as discussed here), are inherent in the method and would be likely to emerge in research projects in a wide range of substantive areas.

Obviously, this article only begins to address the problems entailed in using the chain referral sampling method. Much remains to be done by sociologists of both the qualitative and quantitative persuasions. One broad issue to be addressed concerns the generality of data provided by the snowball method. Are the findings limited to the sample alone? Can the findings be generalized to a wider population, one that shares the sociodemographic characteristics of the sample? Or is the sample's generality limited only to a population that has undergone similar social experiences?

Another issue concerning snowball sampling, and one that should be addressed from a quantitative perspective, is related to sociometrics. The major issue here is the extent to which snowball sampling is dependent on social networks. In this context one problem concerns whether or not the phenomenon being studied is one that results in the formation of social networks and, if so, what types of networks? On the other hand, if the phenomenon is a relatively private matter, and snowball sampling is network-dependent, the problem becomes the extent to which the method

will reveal the possible variations that might be extant in the population. Or will the exclusive use of the method yield a biased sample by revealing only those cases discovered through existing social networks?

Finally, there is the issue of analytic induction and theory construction. Although some methodologists have begun to explicate the procedures used to conceptualize and construct theory from qualitative materials (see Glaser and Strauss, 1967; Glaser 1978), quantitative methodologists could help further this work. For example, models constructed from contingency tables (log linear methods and the like) might help to formalize qualitative, analytic induction procedures. Quantitative methodologists might also help by providing guidance on such problems as whether or not the distribution of data collected through chain referral sampling shows adequate variance.

NOTES

1. These are only two of a large number of studies in deviance that have utilized the chain referral sampling method. For others, see Atkyns and Hanneman (1974), Blumer (1967), Graeven and Graeven (n.d.), Schare (1966), Smith (n.d.), Redlinger (1975), Coleman (n.d.), Harding et al. (1979), and McAuliffe and Gordon (1974).
2. For a fuller discussion of the recovery project discussed here, see Waldorf and Biernacki (1981).
3. For example, O'Donnell and his colleagues (1976), in a sample of all males in the United States born between 1944 and 1954 who were known to draft boards (N = 2510), found only 2% (50) of the cases could possibly be thought of as having been addicted (heavy users were defined as having used heroin 100 times or more).
4. This procedure is quite similar to the theoretical sampling procedures discussed by Glaser and Strauss (1967), but the direct intent here is to find possible sources of data and only indirectly to explore and develop emerging concepts and processes.
5. Urinalysis was considered as a possible method of verifying opiate abstinence, but the method was rejected for two reasons. First, it is known that addicts, in some situations, will go to extraordinary lengths to present themselves as clean. For example, addicts have been known to substitute the urine of a nonaddicted person in order to pass a monitoring or surveillance system. Direct, on-the-spot observation would have been required to ensure the validity of the urine, and it was thought that this would be demeaning to both the potential respondents and the research staff. In addition, even if urinalysis was used in the study, it would not show how long a respondent had or had not used opiate drugs. Also, an a priori decision to exclude from study potential respondents whose urinalysis proved positive might omit from the research a possible important variation of the

recovery process people who are no longer addicted but who continue to use heroin on occasion in a controlled manner (see Zinberg and Jacobson, 1976).

REFERENCES

- ATKINS, R. L. and G. J. HANNEMAN (1974) "Illicit drug distribution and dealer communication behavior." *J. of Health and Social Behavior* 15: 36-43.
- BECKER, H. S. (1970) "Practitioners of vice and crime," ch. 2 in R. Habenstein (ed.) *Pathways to Data*. Chicago: Aldine.
- (1966) *Outsiders: Studies in the Sociology of Deviance*. New York: Macmillan.
- BLUMER, H. with A. SUTTER, R. SMITH, and S. AHMED (1967) *The World of Youthful Drug Use*. Berkeley: Regents of the University of California, School of Criminology.
- BROADHEAD, R. (1978) "Professional identity and private life: the impact of professional socialization on the private lives of medical students." Ph.D. dissertation, University of California Medical Center, San Francisco.
- BULL, J. L. (1978) "Coming alive: the dynamics of personal recovery." Ph.D. dissertation, University of California, Santa Barbara.
- COLEMAN, J. S. (1958) "Relational analysis: the study of social organizations with survey methods." *Human Organization* 17.
- COLEMAN, J. W. (n.d.) "A theory of narcotic abstinence." Department of Social Science, California Polytechnic State University, San Luis Obispo. (mimeo)
- DENZIN, N. (1970) *The Research Act*. New York: Macmillan.
- DOUGLAS, J. (1976) *Investigative Social Research: Individual and Team Research*. Beverly Hills, CA: Sage.
- GLASER, B. (1978) *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory*. Mill Valley, CA: Sociological Press.
- and A. STRAUSS (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.
- GOODMAN, L. (1961) "Snowball Sampling." *Annals of Mathematical Statistics* 32: 245-268.
- GRAEVEN, D. B. and K. A. GRAEVEN (n.d.) "Treated and untreated addicts: factors associated with participation and cessation of heroin use." Department of Sociology, California State University, Hayward. (mimeo)
- HARDING, W., N. ZINBERG, S. STEMACK, and M. BARRY (1979) "Formerly addicted now-controlled opiate users." *Int. J. of Addictions* 14.
- HENSLIN, J. M. (1972) "Studying deviance in four settings: research experiences with cabbies, suicides, drug users and a horticulturist," pp. 35-50 in J. Douglas (ed.) *Research on Deviance*. New York: Random House.
- INDJESMITH, A. R. (1968) *Addiction and Opiates*. Chicago: Aldine.
- McAULIFFE, W. E. and R. A. GORDON (1974) "A test of Lindesmith's theory of addiction: the frequency of euphoria among long-term addicts." *Amer. J. of Sociology* 79: 795-840.
- O'DONNELL, J. A., H. L. VOSS, R. R. CLAYTON, G. T. SLATTIN, and R. ROOM (1976) *Young Men and Drugs: A Nationwide Survey*. NIDA Research Monograph.
- REDLINGER, J. J. (1975) "Marketing and distributing heroin: some sociological observations." *J. of Psychodelic Drugs* 7: 331.
- ROBINS, L. N. (1973) *The Vietnam Drug User Returns*. Washington, DC: Government Printing Office.
- SCHARSE, R. (1966) "Cessation patterns among neophyte heroin users." *Int. J. of the Addictions* 1: 23-32.
- SCHATZMAN, L. and A. STRAUSS (1973) *Field Research: Strategies for a Natural Sociology*. Englewood Cliffs, NJ: Prentice-Hall.
- SIMON, J. L. (1969) *Basic Research Methods in Social Science: The Art of Empirical Investigation*. New York: Random House.
- SMITH, H. W. (1975) *Strategies of Social Research: The Sociological Imagination*. Englewood Cliffs, NJ: Prentice-Hall.
- SMITH, R. (n.d.) *The Market Place of Speed: Violence and Compulsive Behavior*. Amphetamine Research Project, San Francisco. (mimeo)
- WALDORF, D. and P. BIERNACKI (1981) "The natural recovery from opiate addiction: some preliminary findings." *J. of Drug Issues* 11 (Winter).
- (1979) "The natural recovery from heroin addiction: a review of the incidence literature." *J. of Drug Issues* 9: 281-290.
- WEBB, E. J., D. T. CAMPBELL, R. D. SCHWARTZ, and L. SECHREST (1966) *Unobtrusive Measures: Nonreactive Research in the Social Sciences*. Skokie, IL: Rand McNally.
- ZINBERG, N. and R. JACOBSON (1976) "The natural history of 'chipping.'" *Amer. J. of Psychiatry* 133: 37-40.
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