

DOCUMENT RESUME

ED 294 270

CS 506 136

**AUTHOR** Gaziano, Cecilie  
**TITLE** Variations in Survey Respondent Selection by Telephone.  
**PUB DATE** May 88  
**NOTE** 26p.; Paper presented at the Annual Meeting of the American Association for Public Opinion Research (43rd, Toronto, Canada, May 21, 1988).  
**PUB TYPE** Speeches/Conference Papers (150) -- Reports - Evaluative/Feasibility (142)  
**EDRS PRICE** MF01/PC02 Plus Postage.  
**DESCRIPTORS** Comparative Analysis; Data Collection; Information Utilization; \*Public Opinion; \*Research Methodology; Sampling; Surveys; Telephone Communications Systems  
**IDENTIFIERS** Opinion Polls; Research Synthesis; \*Telephone Surveys

**ABSTRACT**

This paper describes seven studies (all that could be found on the subject) comparing nine respondent selection procedures with regard to their potential to reduce refusal rates and to increase representativeness of samples; particular concerns are underrepresentation of men and multiple-adult households. The paper states that (1) the seven studies compare two or more procedures; (2) they have been published or presented to professional meetings; (3) they are described in terms of their historical evolution as improvements on the Kish procedure for telephone surveying; and (4) comparisons show that all the methods vary in their biases. The paper suggests that the last-birthday, Collier-Hagan, and Bryant modification of the Troldahl-Carter method appear to be the most representative procedures and that Kish and Troldahl-Carter techniques appear to lead to less representative samples than other techniques. Other procedures reported in the paper include two non-probability ones, a "Stanford modification" of Troldahl-Carter, and a modification of the Troldahl-Carter-Bryant correction for overrepresentation of women. The paper suggests more systematic testing of different combinations of respondent selection methods and more replication are needed to learn more about external validity, representativeness, and other criteria to help evaluate the most effective selection strategies for specific projects. (Three tables of data and six notes are included, and 26 references are appended.) (MS)

\*\*\*\*\*  
 \* Reproductions supplied by EDRS are the best that can be made \*  
 \* from the original document. \*  
 \*\*\*\*\*

ED 294 270

VARIATIONS IN SURVEY RESPONDENT SELECTION BY TELEPHONE

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Cecilie Gaziano

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

By

Cecilie Gaziano

Market Research Consultant  
Minneapolis, Minnesota

U.S. DEPARTMENT OF EDUCATION  
Office of Educational Research and Improvement  
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it
- Minor changes have been made to improve reproduction quality

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

MAILING ADDRESS:

4511 Fremont Avenue South  
Minneapolis, MN 55409  
Phone (612) 825-8887

Presented to the 43rd Annual Conference  
of the American Association for Public Opinion Research in Toronto, Canada.

MAY 21, 1988

5506136



Cecilie Gaziano  
Session on "How Survey Design Decisions Affect Non-response."  
9 a.m. to 10:30 a.m., Saturday, May 21, 1988.  
AAPOR/WAPOR Conference. Toronto, Canada.

ABSTRACT:

VARIATIONS IN SURVEY RESPONDENT SELECTION BY TELEPHONE

Seven studies comparing nine respondent selection procedures are described in this paper with regard to their potential to reduce refusal rates and to increase representativeness of samples. Particular concerns are underrepresentation of men and multiple-adult households. These seven studies are all of the studies which could be found on this topic, which compare two or more procedures and which have been published or presented to professional meetings. The paper describes them in terms of their historical evolution as improvements on the Kish procedure for telephone surveying. Interest in such modifications has increased in recent years.

All the methods vary in their biases. The last-birthday, Collier-Hagan, and Bryant modification of the Troldahl-Carter method appear to be the most representative procedures. Kish and Troldahl-Carter techniques appear to lead to less representative samples than other techniques. Other procedures reported include two non-probability ones, a "Stanford modification" of Troldahl-Carter, and a modification of the Troldahl-Carter-Bryant correction for over-representation of women.

More systematic testing of different combinations of respondent selection methods and more replication are needed to learn more about external validity, representativeness, and other criteria to help evaluate the most effective selection strategies for specific projects. What we now know about respondent selection methods is disappointingly little.

## VARIATIONS IN SURVEY RESPONDENT SELECTION BY TELEPHONE

Telephone survey selection of adults within households typically presents several problems. One main one is how to determine selection of the appropriate individual within the household to be interviewed. Second, while respondents are being selected, major efforts are required to minimize the refusal rate and simultaneously to maximize representativeness of the sample.

This paper will describe seven studies which compare two or more respondent selection procedures. These seven studies are all of the reports which could be found on this topic, which compare two or more techniques and which have been published or presented to professional meetings. They will be discussed in order of their historical evolution as improvements on the Kish procedure for telephone surveying. Most comparative studies were conducted relatively recently, which suggests that interest in such research has increased.

The relative strengths and weaknesses which such research has revealed in these methods is evaluated, and future research directions are suggested. Not enough is known about the representativeness of each method. This paper will focus primarily on random respondent selection by telephone. Only comparisons of telephone procedures will be described because no comparisons of procedures for in-person surveys have been uncovered in an extensive literature search.

Some evidence indicates people who refuse or resist surveys tend to be older, to be among lower socioeconomic groups, and to live in urban areas (Nelson, 1982; Lavrakas, 1987). On the other hand, people difficult to reach have somewhat different characteristics (O'Neil, 1979). They tend to be younger, to be better educated and more affluent, to have white collar jobs, and also to live in urban areas.

The optimum method of selecting respondents within households would minimize the refusal rate and improve representativeness by including people who

tend to be refusers or resisters since all individuals in their kinds of household do not have an equal chance of being selected. It is then necessary to call these households back at least three times. Some evidence indicates generally that the first call nets only about 25% of people in a sample, and the second call nets another 25%, but the point of diminishing returns is reached with the fourth call to a household (Dunkelberg and Day, 1973). Increasing refusal rates compound these problems (Steeh 1981).

Improving representativeness becomes an especially important issue when the research topic is related to characteristics of the sample which are affected by nonresponse and lack of representativeness. One of the best arguments for the need to overcome such problems is Traugott's (1987) comparison of several national surveys showing variations in relationships between political party identifiers and candidate preference. These variations were linked to respondent selection method (enumeration of individuals in households and subsampling designated respondents), as well as call-back persistence and full-shift interviewing (as opposed to evenings only). Number of call-backs affected the proportions of different kinds of groups represented, as well as accuracy of results.

The following methods of selecting adult respondents within households by telephone were compared among the seven studies (Table 1 shows which studies used which methods):

1. Interview anyone who answers the phone -- that is, no selection, as well as a variant on this, alternating males and females.
2. Another non-probability method, asking for "the head of the household" or asking alternately for male and female heads of household.
3. The Kish procedure, developed for personal interviewing (1949).
4. The Trolldahl and Carter (1964) modification of Kish for telephone surveys.
5. The computerized "Stanford modification," of Trolldahl-Carter developed by Paisley and Parker (1965) to correct for a small non-random bias.
6. Bryant's (1975) modification of the Trolldahl-Carter method, correcting for over-representation of women.

7. The Salmon and Nichols (1980, 1983) birthday method.

8. A modification of the Bryant version of Trolldahl-Carter, correcting for overrepresentation of women, developed by Czaja, Blair, and Sebestik (1982)

9. An "alternative non-invasive" modification of Trolldahl-Carter and Trolldahl-Carter-Bryant versions, introduced by Hagan and Collier (1982, 1983).

#### Non-random Methods

Lavrakas (1987) has noted that non-random, or uncontrolled, respondent selection lacks representativeness because the most cooperative and the most available people will be interviewed, yielding a mix which can change from one survey to another. This mix is neither scientific nor high in external validity. Lavrakas also hoped that an increasingly knowledgeable public would come to expect respondent selection procedures in surveys and would believe non-probability methods are unprofessional.

Surveys which select heads of household run the risk of disproportionate representation of women, especially in urban areas where there are more women-headed single-parent families (Lavrakas, 1987). If this method is chosen, the researcher should be aware of the area's demographic make-up and keep daily tallies by sex in order to ask for more males if female representation becomes too high (a violation of random sampling to correct for a particular bias).

#### The Kish Procedure

A very rigorous and widely used method is the Kish (1949) procedure, developed during a time when most interviews were in person. The interviewer lists by name all men in the household and their relationships to others in order of decreasing age, then similarly lists all women. Asking age is not necessary in one-adult households or in households with two related adults. The informant's answers are used to choose the appropriate respondent among six (or eight) random number tables with rotations of possible combinations of sex and age. The Kish method is considered to be the most "pure," because it is the

only well-known one which allows all household members to have an equal chance of being chosen.

One principal criticism, however, is that Kish's method requires so much time for complete enumeration at the beginning of interviews that respondents' suspicions of these questions increase the refusal rate (Paisley and Parker, 1965). Rapport between interviewer and respondent is more difficult to establish than by shorter methods, interviews are frequently too lengthy, and the complexity of the procedure sometimes leads interviewers to introduce their own ad libbed modifications, which inhibit comparability.

Further, the Kish method appears to lead to refusals early in the interview before substantive questions can be asked (Dillman, Gallegos, and Frey, 1976). This was recognized as a special problem for telephone surveys, because rapport between interviewer and respondent is more tenuous and more easily ended at the outset than in face-to-face interviews (Troidahl and Carter, 1964). Troidahl and Carter also suspected the Kish technique gave interviewers too much time for writing and for substituting their own selection procedures, and therefore, too much room for error. Experienced and skilled interviewers may, however, compensate for the intrusiveness of Kish questions (Lavrakas, 1987). The Kish procedure is less complex and problematic for one- and two-person households than it is for larger households.

#### The Troidahl-Carter Method

Troidahl and Carter modified Kish's procedure, primarily to meet the needs of their 1960 telephone survey in Minneapolis, St. Paul, and surrounding suburbs. Their technique also was verified by work in Champaign-Urbana, Illinois (Parker, 1961). The number of questions was reduced to two: 1) "How many people 18 years or older live in your household, counting yourself?" and 2)

"How many of them are men?" (p. 72). The interviewer had just four selection matrices from which to choose respondents.

One disadvantage to this approach is the matrices allow selection only of the oldest or youngest man or woman. Adults in households with more than two adults whose ages fall in between the oldest and the youngest have no chance of being selected. Trolldahl and Carter believed this violation of random sampling theory was quite minor, affecting only two to three percent of a sample. (Kish estimated that one percent of selected households would include more than five adults in the late 1940's.)

#### The Paisley-Parker "Stanford Modification"

Paisley and Parker (1965) thought the error rate was five percent in the Trolldahl-Carter version, and they offered a solution. Whereas Trolldahl and Carter needed only four tables, what Paisley and Parker called the "Stanford modification" required a vastly increased number of tables (60) to satisfy a necessary condition of maintaining equal selection probabilities for households of any number of adults.<sup>1</sup> They described this necessary condition as follows:

It is that number which allows all family sizes to 'come out even.' It is that number which allows a 3-adult family to be completely enumerated  $x$  times, with no persons left over, which allows a 4-adult family to be completely enumerated  $y$  times, and which allows a 5-adult family to be completely enumerated  $z$  times. The required number, therefore, is the least common denominator of 3, 4, and 5, or 60. A 3-adult family cycles 20 times in 60 versions, a 4-adult family 15 times, and a 5-adult family 12 times. No smaller number of versions will allow all family sizes to 'come out even.' (p. 433)

Until that time, no technique had been developed which allowed for households larger than six adults. Computers were seen as the best method of dealing with prodigious numbers of tables, given the considerable financial and time costs of paper duplication methods.

#### The Bryant Correction for Too Many Females

Bryant (1975) proposed a quite different modification of the widely-used Trolldahl-Carter (T-C) method. By the 1970 census the proportion of all



households headed by males had decreased to 71.6% from 77.2% in 1960. Both the proportion of households with female heads and households composed of unrelated individuals had increased, a trend continuing into the 1980's (Dyer, Hill, and Vedlitz, 1985).

Although the proportion of men to women remained unchanged, the distribution of females and males within households had changed. The proportion of households with adults who would be missed in surveys by the Troldahl-Carter (T-C) method was predicted to increase with the continued growth of multiple-adult "primary" or unrelated adult households.

Bryant was concerned that the T-C procedure led to over-representation of women in samples, a problem further complicated by the rising probability of young males to be away from home. Even increasing the number of call-backs was not improving the representation of younger men in surveys.

The results of 19 major market and statewide surveys in 1973 and 1974 led Bryant to conclude that changing trends in household composition resulted in 3-, 4-, and 5-adult households which were disproportionately female and 6- and 7-adult households which were disproportionately male. She reported no solution for the problem of unavailable young men; however, a violation of random selection in the T-C method could help to overcome the difficulty of female over-representation.

One solution was an increase in the number of men who could be selected in "modal households," those with two adults, one male and one female. This was accomplished by eliminating the fourth T-C matrix, requiring a woman in this kind of household.<sup>2</sup> Although, mathematically, over-representation of males might be expected to result, this happened in only three of 12 additional markets tested, mainly because of the counter-balancing effect of the male nonresponse problem.

However, a second modification of T-C appeared to be a better solution. This involved use of the fourth T-C matrix only half as often in surveys as the

other three: thus the order of versions used was 1, 2, 3, 4, 1, 2, 3. This innovation decreased the probability of male selection from the estimated 55.0% male/45.0% female for the first modification to an estimated 48.4% male/51.6% female ratio for the second modification. Bryant preferred the second for being closer to the 1970 census figures of 47.4% male and being less likely to be affected by substitution of women for not-at-home men. (Kish also had reported problems with under-representation of men in his 1949 article because of male nonresponse and unauthorized interviewer substitutions.)

Both of these methods were within the 95% confidence range of sampling error for the samples studied, although some bias might be systematic. The second method appeared to be less biased and more representative of the general population on demographics and at least one behavior.

#### The Czaja-Blair-Sebestik Modification

No researchers appear to have published any comparisons of the most-used methods, Kish and T-C (or T-C plus Bryant -- T-C-B) until Czaja, Blair, and Sebestik published their results testing Kish and two modifications of T-C-B in 1982. Their Kish procedure involved eight tables, with four of the patterns having a relative frequency of use 1/6th of the time and four patterns a frequency of 1/12th. One T-C-B version asked for the number of men (T-C-B/men) and the other asked for the number of women (T-C-B/women).

Both T-C-B modifications had an advantage over Kish in sex representation. Despite similarities of response rates and some demographic characteristics, other dissimilarities in results suggested caution in choice of these respondent selection methods when survey topics could be related to method biases. These authors concluded that T-C-B/women had the most advantages, including better completion rates. Incidentally, T-C-B/women produced the highest proportion of listed telephone numbers, but the reason for this was not apparent.

Czaja, et al. noted that Groves and Kahn (1979) used a Kish procedure in a

personal interview survey and a T-C procedure asking for women, not men, in a telephone survey being compared with the personal one, obtaining results different from their own study. One reason may have been that Groves and Kahn used T-C with the question asking for women, and Czaja, et al. used T-C-B/women, which would lead to some differences in sex distribution (with T-C-B/women favoring greater representation of males). T-C and T-C-B have never been compared with each other in any published studies. Groves and Kahn thought that, compared to Kish, the T-C/women version underestimated household size and tended to under-represent young adults, particularly sons and daughters aged 18 to 21. This led them to use Kish procedures in telephone surveys as well as face-to-face surveys, resulting in improved respondent selection and response rates equivalent to the personal interviews. However, the Groves and Kahn test of Kish and T-C/women is not exactly comparable to Czaja, et al, who used T-C-B/women, nor is it comparable to the surveys analyzed here because of differences between face-to-face and telephone survey modes.

#### The Hagan-Collier "Alternative Non-invasive" Procedure

Another respondent selection method was proposed by Hagan and Collier in a paper presented to the 1982 conference of the American Association for Public Opinion Research (published the next year). Intended to be a simplified, non-invasive improvement on T-C or T-C-B because no household composition questions are asked, it uses four respondent selection forms distributed randomly to interviewers: (A) the oldest man, (B) the youngest man, (C) the youngest woman, and (D) the oldest woman. Heeding Bryant's advice, Hagan and Collier used forms A, B, and C two times out of seven and form D one time out of seven. If the household had no such person requested, then the interviewer asked for the opposite sex of the same age group.

They also compared their innovation with T-C-B/men in a split-half national survey test, finding essentially no differences between the two samples in

completion rates and demographics. The new alternative method achieved a higher cooperation rate at the respondent selection phase, however.

Lavrakas (1987) cautioned that interviewers can be confused because a woman in a one-person household qualifies either as the "youngest woman" or the "oldest woman."<sup>3</sup> Respondents also can think the interviewer wants an old man or a young woman. Further, interviewers need to be instructed, for example, that the "youngest man" in a household can be an 80-year-old man. The non-invasive procedure lacks ability to sample other adults in a household with more than two adults, like T-C-B and T-C, on which it is based.

#### The "Next Birthday"/"Most Recent Birthday" Method

In 1980 Salmon and Nichols presented a different method, the birthday technique, in a paper for a Chicago meeting of the Midwest Association for Public Opinion Research, later published in 1983. They described four respondent selection methods, including "next-birthday" (also "last-birthday" according to a proposed improvement). The birthday technique requires neither enumeration of household members nor selection tables. The interviewer simply asks to speak to the adult household member with the next (or last) birthday. Their sample was small, 230 respondents in two Kentucky counties. Four selection techniques were compared: next-birthday, T-C, no selection, and male/female alternation.

Salmon and Nichols added the caveat that, since data on individuals collected from a sample of household units often should be weighted, birthday-method survey data should be weighted by household size if demographic characteristics may vary by household size. Kish (1949) had noted such weighting could increase sampling error, but he wrote that this error could be mitigated by the high concentration of the population in two-adult households. He was especially cautious, however, about weighting for household size if characteristics studied were related to household size. Most authors of the

surveys described here stated that data were weighted according to the number of adults in the household.

Theoretically, the birthday method allows all household members to have an equal probability of selection, regardless of household size. No potentially intrusive questions come at the beginning of the interview, and the sample should be representative of the population at large. They explained:

The next-birthday method is based on the assumption that the assignment of birthdates is a random process. When viewed as a single-stage sampling process, the next-birthday method will not produce a sample in which all household members have an equal probability of being selected. For example, suppose two people, one with a birthday of April 1 and the other with a birthday of April 2, reside within a selected household. If the interview takes place on a randomly selected day, the person with the birthday on April 1 has 364/365 probability of being selected while the person with the birthday on April 2 has only a 1/365 probability of being selected. However, when the next-birthday method is viewed as the second stage of a two-stage sampling process, in which the first stage is completed when the person is born, the method produces an equal probability sample within a household. (p. 271)

However, Lavrakas (1987) reported: "Theoretically these [birthday] methods represent true random selection, but in practice there is still some uncertainty whether this in fact results" (p. 97). He suggested researchers keep up with findings on validity by following published comparisons of the birthday method with other methods.

O'Rourke and Blair (1983) compared the most-recent birthday method with the Kish procedure in a state-wide Illinois omnibus survey.<sup>4</sup> Demographic and substantive data were comparable between the two methods. They preferred the birthday method for ease of use, interviewer acceptance, and lower refusal rate.

Tarnai, Rosa, and Scott (1987) also compared Kish and birthday methods, finding the birthday method surpassed Kish for increased interviewer ease of use, completions, and response rates, as well as for shorter interviews. The birthday method represented more multiple-adult households, and Kish was linked to more refusals to participate. Although both samples were comparable in demographic representation of the general population, Tarnai, et al. concluded

that both procedures have somewhat different biases.

Difficulties with both methods occurred more often in multiple-adult households. These authors suggested Kish produces greater non-response error because of higher refusal rates. The birthday method is flawed because some respondents do not know all household members' birthdays, and the likelihood of knowing birthdays decreases as household size increases.

In the Tarnai, et al, study, 26% did not know birthdays for all household members, and another 29% of informants made incorrect respondent selections. In contrast, O'Rourke and Blair reported that 9% of their informants were inaccurate in respondent choices and 1.1% did not know some of the birthdays for the household. They suspected, but could not calculate, a similar rate for their Kish sample. Sometimes informants were confused about the reason for the selection procedure and chose the person who would have the next birthday instead. Oldendick (1987) reported the lowest proportion of incorrect respondent selections, 2.3% (no mention was made of number of informants who did not know birthdays for all persons in the household). His Kish comparison sample also had selection errors, but he thought it impossible to calculate the rate.

Oldendick (1987) compared Kish and last birthday methods in three surveys in Ohio, concluding that the birthday means of selection slightly reduced initial refusals.<sup>5</sup> However, Kish-contacted respondents were more likely to be converted to completed interviews, so that overall completion rates were similar. Demographic characteristics also were similar except on race. The last birthday method represented more blacks, and the distribution of blacks was more similar to 1980 Census data than was the Kish sample.

Substantive questions in Oldendick's report showed only one statistically significant difference -- on affirmative action -- in a direction suggesting relationship to the greater representation of blacks in the birthday sample. However, neither Hagan and Collier (1983) nor Zukin, et al (1987) found any

difference in race between their comparisons (birthday and an alternative to T-C-B and a non-random method, respectively). Czaja, et al (1982) found only 2% more blacks with Kish than with either T-C-B version.

Incidentally, all three of Oldendick's birthday samples over-represented persons in single-adult households and females, a non-significant but consistent difference. However, O'Rourke and Blair (1983) and Tarnai, et al (1987) found more multiple-adult households in their birthday samples than in their comparison Kish samples.

Oldendick explained differences between his study and similar comparisons of Kish and birthday methods: populations were different, callbacks were pursued more vigorously in his survey, more refusals were re-contacted to attempt conversions to completions, and his interviewing service had had much more experience with the birthday method than other interview firms may have had. Another difference may have been sample size.

Even though Oldendick reported fewer differences between birthday and Kish procedures, his survey organization switched from Kish to birthday because the birthday method was easier to administer, produced demographically equivalent samples, led to similar substantive results, and improved response rates. Increased representation of blacks may have been a strong factor also.

Zukin, Carter, and Schulman (1987) compared the last birthday method and a non-random method, interviewing the first eligible respondent contacted, in two matched cross-sectional samples in New Jersey in 1986. No substantial differences were found between the two samples for representativeness of "basic demographics" (education, age, race, income) "basic political orientations" (partisanship, ideology), or "substantive questions in a number of policy areas."

Eighty percent of interviews in their last-birthday sample were completed with the respondent who answered the phone, even after screening for the designated respondent. (O'Rourke and Blair reported a rate of about two-



thirds.) Zukin, et al, argued for use of the non-probability method because of a significantly high refusal rate (size not reported) and greater administration expense with the birthday method.

Their study apparently included much respondent substitution, but how much was not reported. If the person with the most recent birthday was unavailable for the duration of the survey, the person with the next most recent birthday was chosen.

Both the Zukin, et al, samples of about 400 respondents used sex quotas to obtain more males after the first 200 interviews. This characteristic suggests that they should have compared four groups, not two: the birthday and the non-random samples by the first and second sets of 200 interviews.

#### Assessment of the Seven Comparative Studies

In Table 2, the most relevant comparisons are within studies, not across studies, since the bases differ among them. On the whole, the overall highest completion rates occur for the birthday, no-selection, and T-C-B/women procedures, when these are compared with other procedures. The "alternative" method did just slightly better than T-C-B/men, and T-C-B/men had the lowest completion rate when compared with T-C-B/women and Kish methods. Kish completion rates are respectable but not quite as good as other methods with which Kish has been compared. Only one study used a "pure" T-C method (Salmon and Nichols, 1983). Other variables, however, can account for differences among studies, including variation in research staff experience and training, region, size of community, and rigorousness of control over all phases of the surveys.

It is difficult to tell which method might be "best" because many potential combinations have not been tested, as Table 1 shows. Seven studies are too limited a number to allow firm conclusions. Some results vary somewhat among those methods which have been compared in more than one study. Only Oldendick (1987) built replication into his design.



The seven studies taken together indicate the non-probability no-selection method is the least representative, as would be expected, and that the birthday method, T-C-B/men, T-C-B/women, and the Collier-Hagan alternate method result in the most representative samples. Kish and Troldahl-Carter methods theoretically should be the best, but they seem to have a bias toward disproportionate representation of women, smaller households, and lower SES characteristics. This bias, however, could counterbalance the high-SES bias in random-digit-dialing surveys.

The four methods which seem to be most representative seem to be the best candidates for continued testing: Hagan-Collier, birthday, T-C-B/men, and T-C-B/women. Each of these methods has drawbacks. The Hagan-Collier method tends somewhat to under-represent multiple households, and the birthday method has the advantage of representing such households better. It is difficult to tell how representative T-C-B/men and T-C-B/women are in comparison with each other from reports with household size data (Czaja, et al, 1982; Hagan and Collier, 1982). Only a comparison with census data can show which method leads to results most in line with population household characteristics -- assuming that up-to-date census data are accurate and available.

The point is often made that the relevant comparisons are the data from each comparative study. However, it is difficult to assess surveys on respondent selection without knowing comparable census data as well. If one sample is relatively younger and better educated, and another one is relatively older and less educated, it is difficult to determine which is more representative unless population characteristics are compared to each sample. Because random-digit-dialing samples actually represent telephone lines rather than households, such samples tend to over-represent older persons, whites, non-Hispanics, and those with high incomes (Schmidley, 1986). It is likely that RDD samples, therefore, should be weighted according to distribution of these

characteristics in the population, especially if these characteristics are related to topics studied. (Czaja, Blair, and Sebestik, 1982, appear to be the only investigators among the seven comparative studies who weighted data according to number of telephone lines.)

The birthday method's own biases present some problems, sometimes severe ones.<sup>6</sup> Only O'Rourke and Blair have looked for -- and found -- a skew of more respondents' birthdays in months occurring closest to interviewing. In addition, respondents may lie about who in the household has the next birthday, either because they are too lazy to call that person to the phone, or possibly because they themselves want to be interviewed.

The proportion of informants who actually do not know birthdays for the household ranges widely so far, from 2.3% to almost 30%. Degree of substitution in birthday-method samples impedes comparability. Most studies using birthday methods have done some substitution if the appropriate person was not available for the duration of the study.

Little, if any, evidence since Bryant's article shows what sex quotas do to probability samples. The Zukin, et al, survey offers the opportunity to look into this issue. Such a comparison is important because proportionate representation of males and females is a frequent survey problem. Is it better to build in a preference for males in a selection method before interviewing, or is it better to use a quota for males and females, when an imbalance appears to be increasing? Or, should random selection never be violated, and corrections for sex imbalances made only by weighting data after the survey?

The problem of over-representation of women may not be substantially related to any particular method. First, women tend to answer the phone more often than men do -- about two-thirds of the time (Dillman, 1978). Answering the phone may be part of women's roles in the home. Second, women are more likely to be at home. and men, especially young men, are less likely to be at

home. Third, the number of households headed by a woman -- either family or non-family households, including female one-person households, has been increasing (Lavrakas, 1987; Dyer, Hill, and Vedlitz, 1985).

More work should be done on estimating the number of respondents selected incorrectly by informants, not only for the birthday method, but also for other methods. Further, though several studies record little distortion in variables besides demographics, such as attitude variables, much work is needed also on differences in bivariate and multivariate distributions.

More national surveys are needed. Six of the seven surveys reviewed were regional, state-wide, or smaller areas. Only Hagan and Collier had a national sample (see Table 3). Most surveys have the effects of urbanism mixed in among other influences on variation.

Few researchers give the wording of their respondent selection questions. Even this wording could influence results and survey comparability. Much more replication of comparative research designs is desirable. Further, amount of interviewer experience with different methods should be considered a variable if it is not possible to use interviewers or interview services with comparable experience in the methods tested. Another possibility is to have all interviewers administer all methods tested.

Other information often omitted from research reports includes: topics studied, interview length and dates, how completion rates were calculated, number of callbacks, or degree of respondent substitution. If future research reports better addressed these points, comparisons of studies would be facilitated. It is surprising that more comparisons have not been made of respondent selection techniques, especially for research using random-digit-dialing samples. The available information on such comparisons is not adequate for researchers who need to evaluate the most effective strategies for their research projects.

## Notes

1. According to Paisley's and Parker's Table 2 on p. 435, one example of question wording, from the third of the 60 versions, is:

First, would you tell me how many persons in your home are over 18 and no longer in school -- (CIRCLE NUMBER IN FIRST COLUMN BELOW)

How many of them are women -- (CIRCLE NUMBER IN SECOND COLUMN BELOW)...

Then, according to my instructions, I'm supposed to interview the (PERSON INDICATED ABOVE). Is (HE, SHE) available now -- ....

2. For a number of reasons informants (those persons who answer the phone first) get hurt feelings when told the interviewer wants to speak to another person (the chosen respondent). Lavrakas (1987) suggested a standardized response for interviewers:

I have a sheet here that tells me the one person in your household whom I can interview. Sometimes this sheet picks a woman, and other times it picks a man. Only by using this method to select people to interview in each household we contact will we end our survey with a fair and proper balance of females and males. (p. 93)

3. The question wording is: "May I please speak to the [NAME, c.g., 'youngest man?']" (p. 549). Lavrakas (1987) pointed out that it is a good idea to add words stating that the person wanted is not the one who happens to be at home at the time but is instead the one who lives in the household. He also gave several wording examples, such as: "For this survey, I need to speak with the youngest adult male in your household over the age of 17, if there is one." [IF NONE:] "Then may I please speak with the youngest adult female?"

4. The wording of the Kish question in O'Rourke and Blair (1983) is:

In order to determine whom to interview, I need to list household members who currently live in this household. I just need their age and sex -- not their names -- and how they are related to you. Let's start with you. How old are you? Now, can you tell me the sex and age of all other current household members and how they are related to you? (RECORD ON CHART.) Now I'm going to number the people in your household to determine whom I should interview. The total number of persons is \_\_\_\_, so I am to interview person # \_\_\_\_, who is (RELATIONSHIP). (p. 430)

The wording of the birthday question is:

In order to determine whom to interview, could you tell me, of the people who currently live in your household who are 18 or older, who had the most recent birthday? (IF DON'T KNOW ALL BIRTHDAYS): Of the ones that you do know, who had the most recent birthday?

5. The wording of the birthday question in Oldendick's report is slightly different from that of O'Rourke and Blair, according to their communications to him about respondent reactions:

In order to determine who to interview, could you tell me, of the people who currently live in your household who are 18 or older -- including yourself -- who had the most recent birthday? I don't mean who is the youngest adult, but rather, who had the most recent birthday? (IF INFORMANT DOES NOT KNOW ALL BIRTHDAYS:) Of the ones you do know, who had the most recent birthday? (p. 2)

6. This may vary by region. It is possible that the birthday method works better in some regions than in others. (Telephone communication from Charles T. Salmon in November 1984.)

## References

- Bryant, Barbara E. (1975)  
"Respondent selection in a time of changing household composition."  
Journal of Marketing Research 12:129-135.
- Czaja, Ronald, Johnny Blair, and Jutta Sebestik (1982)  
"Respondent selection in a telephone survey: a comparison of three techniques." Journal of Marketing Research 19:381-385.
- Dillman, Don A. (1978)  
Mail and Telephone Surveys: The Total Design Method. New York: Wiley.
- Dillman, Don A., Jean Gorton Gallegos, and James H. Frey (1976)  
"Reducing refusal rates for telephone interviews." Public Opinion Quarterly 40:66-78.
- Dunkelberg, William C., and George S. Day (1973)  
"Nonresponse bias and callbacks in sample surveys." Journal of Marketing Research 10:160-168.
- Dyer, James, David B. Hill, and Arnold Vedlitz (1985)  
"Where have all the men gone: the increasing problem of male underrepresentation in surveys." Presented to the 40th annual meeting of the American Association for Public Opinion Research, McAfee, N.J.
- Groves, Robert M. and Robert L. Kahn (1979)  
Surveys by Telephone: A National Comparison with Personal Interviews. New York: Academic Press.
- Hagan, Dan E. and Charlotte Meier Collier (1982)  
"Respondent selection procedures for telephone surveys: must they be invasive?" Presented to the 38th annual meeting of the American Association for Public Opinion Research, Buck Hill Falls, Pa.
- (1983)  
"Must respondent selection procedures for telephone surveys be invasive?"  
Public Opinion Quarterly 47:547-556.
- Kish, Leslie (1949)  
"A procedure for objective respondent selection within the household."  
Journal of the American Statistical Association 44:380-387.
- Lavrakas, Paul J. (1987)  
Telephone Survey Methods: Sampling, Selection, and Supervision. Beverly Hills: Sage Publications.
- Nelson, James E. (1982)  
The Practice of Marketing Research. Boston: Kent Publishing Company.
- Oldendick, Robert W. (1987)  
"The last birthday method as a means of respondent selection."  
Presented to the Field Directors' Conference, Raleigh, N.C.

- O'Neil, Michael J. (1979)  
 "Estimating the nonresponse bias due to refusals in telephone surveys." Public Opinion Quarterly 43:218-232.
- O'Rourke, Diane, and Johnny Blair (1983)  
 "Improving random respondent selection in telephone surveys." Journal of Marketing Research 20:428-432.
- Paisley, William J. and Edwin B. Parker (1965)  
 "A computer-generated sampling table for selecting respondents within households." Public Opinion Quarterly 29:431-436.
- Parker, Edwin B. (1961)  
 The Audience for Educational Television in Champaign-Urbana. Report of the Institute of Communications Research, University of Illinois (July).
- Salmon, Charles T. and John Spicer Nichols (1980)  
 "Respondent selection techniques for telephone surveys." Presented to the Midwest Association for Public Opinion Research, Chicago.
- (1983)  
 "The next-birthday method of respondent selection." Public Opinion Quarterly 47:270-276.
- Schmidley, A. Dianne (1986)  
 "How to overcome bias in a telephone survey," American Demographics 8(11):50-51.
- Steeh, Charlotte G. (1981)  
 "Trends in nonresponse rates, 1952-1979." Public Opinion Quarterly 45:40-57.
- Tarnai, John, Eugene A. Rosa, and Lesli Peterson Scott (1987)  
 "An empirical comparison of the Kish and the most-recent-birthday method for selecting a random household respondent in telephone surveys." Presented at the 42nd annual meeting of the American Association for Public Opinion Research, Hershey, Pa.
- Traugott, Michael W. (1987)  
 "The importance of persistence in respondent selection for preelection surveys." Public Opinion Quarterly 51:48-57.
- Troldahl, Verling C. and Roy E. Carter, Jr. (1964)  
 "Random selection of respondents within households in phone surveys." Journal of Marketing Research 1:71-76.
- U.S. Department of Commerce, Bureau of the Census (1982)  
 Statistical Abstract of the United States.
- Zukin, Cliff, Bob Carter, and Mark Schulman (1987)  
 "Trade-offs in respondent selection methods: theoretical purity versus real world concerns." Presented at the 42nd annual meeting of the American Association for Public Opinion Research, Hershey, Pa.

Table 1. Respondent Selection Methods Compared in Research.

Authors and Dates of Articles or Papers							
	Czaja, Blair, & Sebestik, 1982	Hagan & Collier, 1983	Oldendick, 1987	O'Rourke & Plair, 1983	Salmon & Nichols, 1983	Tarnai Rosa, & Scott, 1987	Zukin, Carter, & Schulman 1987
Method							
No-Selection (Non-random)					X		X
Male/Female Alternation (Non-random)					X		
Kish	X		X	X		X	
Troldahl/ Carter (T-C)					X		
Troldahl/ Carter Bryant (T-C-B/men)	X	X					
T-C-B Version Asking for Women	X						
Next- Birthday/ Most Recent Birthday			X	X	X	X	X
Non-invasive Alternative to Troldahl/ Carter		X					



Table 2. Refusals, Respondent Substitution, and Comparability of Research.

Authors and Dates of Articles or Papers							
	Czaja, Blair, & Sebestik, 1982	Hagan & Collier, 1983	Oldendick, 1987	O'Rourke & Blair, 1983	Salmon & Nichols, 1983	Tarnai Rosa, & Scott, 1987	Zukin. Carter, & Schulman 1987
Comple- tion rate	Kish: <sup>a</sup> 68.6%	TCB/men: <sup>a</sup> 64.6%	Kish 1: 82.6%	Kish: <sup>b</sup> 61%	No-selec- tion: 69%	Kish: 70%	No-selec- tion: 80%
	TCB/women: 70.3%	Alterna- tive method: 64.9%	82.8%	B'day: 67%	M/F alter- nation: 43%	B'day: 77%	B'day: 60%
	TCB/men: 64.6%		Kish 2: 83.4%		Next b'day: 69%		
			B'day 2: 81.0%		Troldahl/ Carter: 41%		
			Kish 3: 82.2%				
			B'day 3: 84.0%				
Tell how refusal rate cal- culated?	Yes	Yes <sup>d</sup>	Yes	Yes	No	Yes	No
Question- naires identical each version?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Respondent substitu- tions allowed?	Apparent- ly not	No <sup>e</sup>	No	Apparent- ly not	Not given	Yes <sup>f,g</sup>	Yes <sup>f</sup>

<sup>a</sup> Figures based on recalculation of original authors' data, excluding nonhouseholds and people ineligible by the survey's definition.

<sup>b</sup> The major portion of refusals occurred at the respondent selection procedure.

<sup>c</sup> Authors do not give exact figures for refusal rates; therefore, these figures are guesses, based on wording of Zukin, et al, paper.

<sup>d</sup> This survey had a part 2 mail questionnaire portion. These data are for part 1.

<sup>e</sup> If selected respondent was unavailable, any "responsible adult" was interviewed about household demographics. Questionnaire mailed to designated respondent.

<sup>f</sup> If respondent was not available for the duration of the study, interviewers took another individual in the same household with the next most recent birthday.

<sup>g</sup> Information supplied by John Tarnai in phone call. May 11. 1988.

Table 3. Survey and Sample Characteristics.

Authors and Dates of Articles or Papers							
	Czaja, Blair, & Sebestik, 1982	Hagan & Collier, 1983	Oldendick, 1987	O'Rourke & Blair, 1983	Salmon & Nichols, 1983	Tarnai <sup>a</sup> Rosa, & Scott, 1987	Zukin, Carter, & Schulman 1987
Survey dates	Not given	Not given	June 1983 Oct. 1983 Nov. 1984 <sup>a</sup>	June 1982	Not given	May 1986 <sup>b</sup>	2 waves July '86
Location	Cook County, Ill.	National sample	2 surveys in Ohio, 1 in Cincinnati	State of Illinois	Two counties in Kentucky	Four counties in Wash- ington st.	Two separate surveys in N.J.
Sample size	Kish: 2,650  TCB/women: 1,322  TCB/men: 1,322	TCB/men: 1,237  Alterna- tive method 1,236	Kish 1: 596 B'day 1: 588  Kish 2: 487 B'day 2: 485  Kish 3: 723 B'day 3: 739	Kish: 499  B'day: 557	No-selec- tion: 72  M/F alter- nation: 46  Next b'day: 69  T-C 43	Kish: 877  B'day: 950	No-selec- tion: 399  B'day: 400
Sample type	Random- digit- dialing	Random- digit- dialing	Random- digit- dialing	Chicago SMSA: directory- based RDD; Other: systematic phone book sample	Systematic RDD, sample of numbers from phone book	Systematic RDD, stratified by county dialing	Random- digit- dialing
No. of calls	Up to 10	Up to 4	Up to 6	Up to 10	Up to 3	Up to 4 <sup>b</sup>	Up to 4
Survey topics	Issues related to per- sonal safety, etc.	Consumer topics	First 2: political, economic; 3rd metro: local	Road condi- tions, city government, education, energy, etc.	Politi- cal atti- tudes	Socioec. well- being, job training <sup>b</sup>	Political public policy issues

<sup>a</sup>Information supplied by author.

<sup>b</sup>Information supplied by John Tarnai in phone call. May 11, 1988.