

A Comparison of the Kish and Last Birthday Methods of Respondent Selection in Telephone Surveys

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Abstract: Concern over an increasing number of refusals has led survey researchers to seek methods of respondent selection that are less intrusive and which produce higher cooperation rates. Among these methods is the last birthday procedure, in which an interview is attempted with the adult in the household who had the most recent birthday. In this investigation, three experiments were conducted in which samples selected using the last birthday method were compared with those selected with the Kish method in terms of their demographic characteristics and re-

sponses to substantive items, as well as their completion rates. The results indicate that while refusal rates with the birthday procedures are lower, the differences are not statistically significant. In addition, there are only minor differences in the demographic characteristics of the samples and in the substantive responses produced by the two methods.

Key words: Respondent selection; refusal rates; last birthday method; Kish method; telephone methodology.

1. Introduction

In the past twenty years, the emergence of techniques such as random digit dialing have considerably increased the number of surveys conducted by telephone relative to those done in-person. With this growth has come an increasing awareness of some of the distinctions between personal and telephone interviewing and the need to develop alternative means for administering telephone interviews. One such distinction involves respondent selection procedures. On the telephone

a person can easily terminate the interview, so there is a greater need for a respondent selection procedure that is "simple, quick, and not 'impertinent' or invasive" (O'Rourke and Blair (1983, p. 429)).

The most widely recognized procedure for selecting respondents within households is that developed by Kish (1965, pp. 398-399). The Kish procedure requires that all eligible respondents within a household be listed by sex, and within sex groupings by age from oldest to youngest. After all eligible respondents have been enumerated, the interviewer uses one of eight selection tables that aid the interviewer in choosing a person to interview in households with more than one eligible

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Exhibit

Example of Kish respondent selection procedure

“In order to select the right person to interview, we need to list all the people living in your household who are 18 years of age or older.”

1. “First, could you tell me the ages of all the *males* living in your household who are 18 years of age or older – that is, from the oldest to the youngest?” (List below all males 18 or older in order from oldest to youngest.)
2. “Next, could you tell me the ages of all the *females* living in your household who are 18 years of age or older – that is again, from the oldest to the youngest?” (List below all females 18 or older in order from oldest to youngest.)

Sex	Age	Number*	Check**	
			R	Appointment
				Person:
				Date:
				Time:

* Assign a number to each person listed above in the following order: Males from oldest to youngest, then females from oldest to youngest.

** Use *Selection Table A* to determine whom to interview. In the first row of the selection table, circle the number of listed persons 18 or older. The number across from this circled number in the second row of the selection table identifies the person to be interviewed. In the column headed “Check R,” enter a *check* to identify the selected person.

Selection Table A

If the Number of Eligible Persons is:	1	2	3	4	5	6 or more
Interview the Person Numbered:	1	1	1	1	1	1

Note: If the selected person *is* the respondent, begin the interview. If the selected person is *Not At Home*, make an appointment to call back.

person, to select a respondent randomly. An example of this selection procedure is provided in Exhibit 1.

When the Kish procedure was used to select respondents in telephone surveys, there was some concern that the request for information regarding household composition was viewed by respondents as invasive and somewhat threatening, and led to a greater number of refusals and strained rapport between the interviewer and the respondent (Paisley and Parker (1965)). In an effort to overcome these potential drawbacks a number of alternative respondent selection methods have been developed.

The following illustrate some of the alternative respondent selection procedures that have been attempted.

1. The "no selection" method in which the interview is conducted with whomever answers the phone, so long as that person is in the eligible population.
2. Male/female alternation, in which half the interviews are designated for a female respondent and the other half for a male respondent.
3. The Trolldahl-Carter-Bryant method is described most completely in Bryant (1975). In this procedure the interviewer first asks "How many people 18 years or older live in your household, counting yourself?" and "How many of them are men?" Based on this information a respondent is then randomly selected from one of four matrices.
4. The "last birthday" or "next birthday" method. Respondent selection with the last birthday method involves asking to speak with the adult household member who had the most recent birthday, while the next birthday method consists of interviewing the adult who will have the next birthday.

In choosing a procedure for respondent selection within households the first crite-

riion, generally, is that the procedure produces a representative sample of the population of interest. Given several alternatives for producing such a sample, a number of operational considerations, such as ease of administration, interviewer convenience and response rate will affect the choice of a respondent selection method. Prior investigations (Salmon and Nichols (1983); O'Rourke and Blair (1983)) have indicated that the last birthday method produces a representative sample and has a number of operational advantages relative to more invasive procedures. This study tests the generalizability of these favorable results with the birthday selection method, using complete random digit dialing procedures to select two samples of the adult population in Ohio, U.S.A., a major industrial state whose socioeconomic and political characteristics are quite similar to those of the United States as a whole (Tuchfarber (1987)) and one sample in Hamilton County, Ohio, an urban area that includes the City of Cincinnati, and contains a somewhat higher proportion of non-whites than the rest of the state.

As described above, the last birthday method involves asking to speak with the adult household member who had the most recent birthday. Specifically, the person who answers the telephone at a residence (the informant) is read the following statement.

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 the informant does not know all the birthdays of the household members, he or she is asked "of the ones you do know, who had the most recent birthday?" If this is not the informant, the interviewer requests to speak with the person with the most recent known birthday to obtain complete birthday information from them in order to identify the correct re-

spondent. When the informant has the most recent known birthday, the interview is conducted with him or her.

Previous research indicates that the last birthday method is a fairly effective means for selecting respondents within households. Salmon and Nichols (1983), for example, found that this method produced high completion rates, a representative sample, and was easily mastered by interviews. Similarly, O'Rourke and Blair (1983) report that this method resulted in fewer refusals than the Kish selection procedures, yielded samples which were comparable on demographic characteristics, produced no differences on substantive questions, and was preferred by interviewers. While a slight age bias in favor of younger respondents was detected with the last birthday method, they concluded that "... the birthday method of respondent selection is an adequate, non-invasive, probability procedure" (O'Rourke and Blair (1983, p. 432)). This investigation provides a further test of the generalizability of these results.

2. Research Design

In examining the effects of the last birthday method, the results obtained with this procedure were compared with those from the Kish method. We chose to compare the last birthday method with the Kish procedure rather than some other technique, such as Trolldahl-Carter-Bryant or male-female alternation, because the Kish method is the purest probability method among those currently in use and because of its demonstrated utility in telephone interviewing (Groves and Kahn (1979, p. 63)).

While comparisons with other procedures could have been made, the resulting sample sizes for each condition would have been smaller and the statistical power of the analysis lessened. Moreover, the Kish method is the one which our organization has traditionally used and with which our interviewing staff is

most familiar. Introducing additional new respondent selection procedures, while possible, may have introduced some additional variation which would have been difficult to detect and to separate from the differences among methods.

The two statewide surveys covered a wide range of issues, including approval ratings of former President Ronald Reagan and the Governor of Ohio, the nuclear freeze, and the economy. The Hamilton County survey included a number of local policy issues such as transportation, cable communication service, and the quality of police protection. In each of the three surveys, samples were selected through random digit dialing (RDD). Households were randomly assigned to either the Kish method or the last birthday method. It was hypothesized that the last birthday method would produce initial refusal rates and final refusal rates that were significantly lower than those resulting from the Kish procedures, and that there would be no differences in the demographic composition of the samples produced by these methods, nor in their responses to the substantive questions.

In the two Ohio surveys and one Hamilton County survey, contacts were attempted with 1 383; 1 143; and 1 660 residential or potential residential numbers, that produced, respectively, 1 002; 809; and 1 231 fully or partially-completed interviews. With these sample sizes a difference in percentage points of about 4.5 % between the two conditions was required to achieve statistical significance at the .05 level.

Cases in which a fully completed interview was obtained from the selected respondent upon initial contact (or at a designated call-back time) are termed *regular completed interviews*. If the respondent or someone else in the household initially refused the interview but was converted to a completed interview at a later time, it is called a *completion from refusal*; if such a refusal was converted to a partial completion it is called a *partial*

completion from refusal. Households where an interview was refused twice are considered *final refusals*. Attempts were made to recontact each household in which the interview was initially refused. If the household could not be recontacted by the end of the field period (after six or more attempts to recontact), it was also counted as a *final refusal*.

Cases where the initial refusal occurred before the selected respondent was identified are designated as *pre-selection refusals*, while refusals that took place after the selected respondent had been identified are labelled as *post-selection refusals*. Respondents who terminated during the interview and who later declined to continue or could not be recontacted are termed *partially completed interviews*. Cases designated as *pre-selection unavailable* are those where a contact was made with the household, but the respondent selection information was not obtained, and the household could not be recontacted during the field period. *Post-selection unavailable* cases are those where a respondent was selected

but an interview could not be completed during the field period. *Non-contacts* are those telephone numbers which produced consistent “no answers.” Such numbers were called at least six times, at different times of the day and week, during the course of the study.

3. Results

One of the principal arguments for using the last birthday method of selection is that, because it is less intrusive, the number of initial refusals using this method should be less than that for the Kish procedure. The data in Tables 1 and 2 demonstrate only weak support for this argument. While the percentage of initial refusals with the birthday method is lower than that for the Kish procedure in all three surveys, the differences are neither large nor statistically significant: 20.1 % vs. 21.8 %, 21.6 % vs. 21.8 %, and 20.7 % vs. 24.9 %, respectively. Moreover, because in each case the percentage of initial refusals who were later converted to completed interviews is larger with the Kish procedure, the advantage

Table 1. Comparison of completion status for Kish and Last birthday methods of respondent selection

Sample disposition	First Ohio Survey					
	Total sample		Kish selection		Last birthday selection	
	N	%	N	%	N	%
Pre-selection						
Refusal	118	10.0	61	10.2	57	9.7
Unavailable**						
Non-contact**						
Post-selection						
Regular completed interview	921	77.8	460	77.2	461	78.4
Completion from refusal	58	4.9	32	5.4	26	4.4
Refusal	64	5.4	33	5.5	31	5.3
Partial completion from refusal	8	0.7	4	0.7	4	0.7
Partially completed interviews	15	1.3	6	1.0	9	1.5
Unavailable**						

(cont.)

Table 1. Comparison of completion status for Kish and Last birthday methods of respondent selection (continued)

Second Ohio Survey						
Sample disposition	Total sample		Kish selection		Last birthday selection	
	N	%	N	%	N	%
Pre-selection						
Refusal	85	7.9	46	8.6	49	8.8
Unavailable	19	1.8	7	1.3	12	2.2
Non-contact**						
Post-selection						
Regular completed interview	751	69.7	378	71.1	373	67.2
Completion from refusal	48	4.5	28	5.3	20	3.6
Refusal	68	6.3	32	6.0	36	6.5
Partial completion from refusal	0	0.0	0	0.0	0	0.0
Partially completed interviews	10	0.9	3	0.6	7	1.3
Unavailable	96	8.9	38	7.1	58	10.4

Hamilton County Survey						
Sample disposition	Total sample		Kish selection		Last birthday selection	
	N	%	N	%	N	%
Pre-selection						
Refusal	174	10.5	83	10.2	91	0.7
Unavailable	15	0.9	5	0.6	10	1.2
Non-contact	100	6.0	48	5.9	52	6.1
Post-selection						
Regular completed interview	1 121	67.5	539	66.3	582	68.7
Completion from refusal	94	5.7	55	6.8	39	4.6*
Refusal	57	3.4	41	5.0	16	1.9*
Partial completion from refusal	8	0.5	1	0.1	7	0.8*
Partially completed interviews	8	0.5	4	0.5	4	0.5
Unavailable	83	5.0	37	4.6	46	5.4

* Significant at the .05 level.

** Information on “unavailable” respondents and “non-contacts” was not tabulated by form for all three of these studies, so that these percentages are not strictly comparable across studies since they are calculated on different bases.

of the birthday selection method in producing a higher overall completion rate is even less. These results show that the birthday selection method can slightly reduce initial refusals, though this difference is not statistically significant. In addition, households

which initially refuse an interview in this condition may be less likely to be persuaded to complete one in later attempts, so that the overall difference in completion rates with the last birthday and Kish procedures for respondent selection is even smaller.

Table 2. Summary refusal rate comparisons¹

	First Ohio Survey				Second Ohio Survey				Hamilton County Survey			
	Kish		Last birthday		Kish		Last birthday		Kish		Last birthday	
	N	%	N	%	N	%	N	%	N	%	N	%
Total initial refusals	130	21.8	118	20.1	106	21.8	105	21.6	180	24.9	153	20.7
Total final refusals	94	15.8	88	15.0	78	16.0	85	17.5	124	17.2	107	14.5
Total completions	492	82.6	487	82.8	406	83.4	393	81.0	594	82.2	621	84.0
	N	(596)	(588)		(487)		(485)		(723)		(739)	

(Base for calculating percentages is the sum of pre-selection refusals, regular completed interviews, completions from refusals, post-selection refusals, partial completions from refusals, and partially completed interviews.)

¹ No differences were statistically significant at the .05 level.

Table 3. Comparison of sample demographic characteristics, using Kish and Last birthday methods of respondent selection

	First Ohio Survey		Second Ohio Survey		Hamilton County Survey	
	Kish	Last birthday	Kish	Last birthday	Kish	Last birthday
Education						
Grade school	5.5	6.6	5.0	5.4	6.5	6.8
9–11 grades	11.0	11.3	11.9	14.5	12.2	12.4
High school grad.	24.4	23.8	20.8	20.9	21.4	21.3
Vocational training	22.2	19.5	23.6	20.2	17.0	13.8
Some college	21.0	22.4	22.6	21.2	22.8	25.3
College graduate	15.9	16.4	16.1	17.8	20.2	20.5
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(491)	(487)	(403)	(392)	(589)	(621)
Significance test ¹		N.S. ²		N.S.		N.S.
Income						
Less than \$10 000	14.5	14.5	18.1	21.7	16.8	20.7
\$10 000–19 999	27.3	26.1	27.0	26.0	25.5	25.2
\$20 000–29 999	30.6	24.9	25.2	26.1	23.2	22.5
\$30 000–39 999	13.1	15.5	15.1	12.8	16.8	14.4
\$40 000 and over	14.5	14.0	14.6	13.4	17.7	17.2
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(414)	(406)	(349)	(322)	(487)	(507)
Significance test		N.S.		N.S.		N.S.

Table 3. Comparison of sample demographic characteristics, using Kish and Last birthday methods of respondent selection (continued)

	First Ohio Survey		Second Ohio Survey		Hamilton County Survey	
	Kish	Last birthday	Kish	Last birthday	Kish	Last birthday
Age						
18–29	25.9	29.3	23.3	25.3	28.5	28.5
30–45	32.6	30.9	34.1	32.2	28.5	31.8
46–64	24.0	22.1	29.2	25.1	26.8	21.6
65 and over	17.5	17.6	13.4	17.4	16.3	18.2
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(491)	(488)	(404)	(391)	(583)	(611)
Significance test ¹	N.S.		N.S.		N.S.	
Sex						
Male	42.4	39.0	43.0	41.5	39.9	37.2
Female	57.6	61.0	57.0	58.5	60.1	62.8
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(502)	(498)	(409)	(400)	(599)	(632)
Significance test	N.S.		N.S.		N.S.	
Race						
Blacks	7.1	9.0	6.0	10.6	13.4	14.2
Whites	92.9	91.0	94.0	89.4	86.6	85.8
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(481)	(477)	(403)	(387)	(588)	(612)
Significance test	N.S.		Sig.		N.S.	
Region						
Northeast	38.1	37.8	37.2	39.3	–	–
Northwest	16.1	16.0	16.4	14.0	–	–
Southwest	25.9	23.0	27.1	23.3	–	–
Central and Southeast	19.9	23.2	19.3	23.4	–	–
	100.0	100.0	100.0	100.0		
(N)	(502)	(500)	(409)	(400)		
Significance test	N.S.		N.S.			
Number of adults						
One	23.9	27.8	22.5	27.0	26.9	28.2
More than one	76.1	72.2	77.5	73.0	73.1	71.8
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(502)	(492)	(409)	(392)	(592)	(618)
Significance test	N.S.		N.S.		N.S.	
Household size						
One	18.9	22.5	17.9	21.2	22.9	23.1
More than one	81.1	77.5	82.1	78.8	77.1	76.9
	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(491)	(488)	(403)	(392)	(589)	(616)
Significance test	N.S.		N.S.		N.S.	

Table 3. Comparison of sample demographic characteristics, using Kish and Last birthday methods of respondent selection (continued)

	First Ohio Survey		Second Ohio Survey		Hamilton County Survey	
	Kish	Last birthday	Kish	Last birthday	Kish	Last birthday
Party identification						
Democrats	49.0	44.6	51.1	52.4	—	—
Independents	15.7	20.4	14.4	15.2	—	—
Republicans	35.3	35.0	34.5	32.4	—	—
	100.0	100.0	100.0	100.0		
(N)	(485)	(480)	(397)	(380)		
Significance test	N.S.		N.S.			
Location						
City	—	—	—	—	41.5	41.7
Suburbs	—	—	—	—	58.5	58.3
					100.0	100.0
(N)					(595)	(624)
Significance test					N.S.	

¹ Based on a chi-squared test of significance.

² Not significant at the .05 level.

— Not asked in this survey.

Even a small reduction in refusal rates may be of practical importance if the last birthday procedures produce samples which are equivalent in other respects. The data in Table 3 indicate that, with one exception, the method of respondent selection has no significant effect on the representativeness of the sample. On only one demographic variable, race, were there significant differences between the two methods ($\chi^2=5.03$, $p=.02$ in the second statewide survey; non-significant differences in the same direction in the first statewide survey and the Hamilton County survey). In each case, more blacks were included in the sample with the last birthday procedure. Moreover, the percentage of blacks interviewed is closer to what would be expected from the 1980 census data with the last birthday method than with the Kish method. Perhaps blacks perceive the household enumeration questions as somewhat more intrusive than do whites. The last birthday procedure may therefore produce a racially more representative sample than the Kish method.

Two other characteristics which show consistent, though not statistically significant, differences across the three surveys are the number of adults in the household and the sex of the respondent. With the last birthday procedure, the number of respondents who report being the only adult is one to four percentage points higher than that found with the Kish procedure. If replicated consistently, such results would conform to the notion that those in single-adult households are less likely to refuse when approached using the last birthday procedure because less information concerning household composition is required. The results concerning the sex of the respondent, while again rather small, may be of practical importance if they occur repeatedly. As the data in Table 3 show, the percentage of males in the sample is lower with the last birthday procedure than with the Kish method. Since males tend to be underrepresented with all respondent selection procedures of this type, the last birthday method may add to an already significant problem (Dyer, Hill,

and Vedlitz (1985)). One characteristic for which the birthday selection procedure obviously produces a very skewed distribution is month of birth. Birthdays of the respondents selected by this procedure should be skewed toward the months immediately preceding the interview, and previous research has found this to be the case (O'Rourke and Blair (1983, p. 431)). It is unlikely, however, that month of birth will be related to many, if any, responses to substantive questions among adults.

As noted above, each of these surveys covered a wide range of issues. Of the 22 substantive questions examined in the first statewide survey, none of the differences between responses on the birthday selection and Kish forms of the questionnaire were statistically significant at the .05 level. For the 23 substantive questions asked in the second statewide poll, only one statistically significant difference emerged between the two respondent selection forms. This was a question on affirmative action, and the direction of the difference suggests that it probably arose from the higher percentage of blacks obtained through the last birthday selection procedure. In the county-wide survey, 58 substantive questions were asked. Of these, three were statistically significant. Neither the nature of the questions (evaluation of the cost of tuition at a local college, knowledge of neighborhood support groups, and likelihood of using a transportation pass) nor the direction of these differences provide any indication that these results are anything other than what would be expected on the basis of chance. Overall, the demographic composition of the samples and the substantive results produced by the Kish and the last birthday respondent selection procedures appear to be essentially equivalent.

4. Discussion

Why do the results presented here, particu-

larly the data on refusal rates, differ from those of previous comparisons of the last birthday method with other respondent selection procedures? Although we have no definite answer to this question, several possibilities can be suggested. One obvious explanation is that the populations studied were different. The Salmon and Nichols study was conducted in two counties in Kentucky, while the O'Rourke and Blair research was done in Illinois. Along these same lines, prior studies used some form of telephone directory sampling, whereas complete RDD methods were used in the three surveys reported here. Furthermore, the Salmon and Nichols study did not use the Kish procedure as a point of comparison.

A second possibility lies in the manner in which initial refusals were handled. Our procedure was to attempt to call back all households that initially refused. While basically the same procedures were followed in the O'Rourke and Blair study (callbacks were tried with all but a small percentage of extremely hostile refusals), it seems unlikely that reinterview attempts were made in the Salmon-Nichols study, given the large difference in completion rates between the birthday method and the more intrusive procedures. Although this may, again, partially account for the differences between this and prior research, reinterview efforts cannot account for the lack of variation in initial refusal rates that we found.

A third plausible explanation involves "house-effects," in this case, differences between interviewing staffs. All three studies were conducted by professional interviewing staffs, but as previously mentioned, the interviewers used in this project had a good deal of previous experience using the Kish procedure. We do not know how much prior experience the telephone interviewing staffs of other organizations have had with the procedures with which the birthday method was compared, but if it was limited this factor

may also account for some of the reported variation.

In addition to comparable response rates, the equivalence of the demographic composition of the samples, and the similarity of substantive responses, there are several other considerations in comparing the last birthday method with other procedures of respondent selection. Interview length is one. Given that the birthday procedure requires fewer questions, it should be quicker to administer. The time which other methods such as the Kish procedure add to the typical interview is, however, proportionately rather small. Other things equal, interviewer attitudes are also important in that if they feel more comfortable with and confident in a procedure, it is likely to be reflected in their performance. Discussions with the interviewers who worked on this project did not reveal any strong preference for the birthday procedure, though this may be due to their previously mentioned familiarity with the Kish procedure.

5. Conclusion

The great bulk of evidence presented here indicates that very few differences exist between the Kish and last birthday methods of respondent selection in terms of response rate, demographic composition of the sample, or substantive results. Since both methods, as well as other respondent selection procedures, produce representative samples, the choice is largely one to be made on a study by study basis. For example, if the interviewing staff is inexperienced or racial issues are of particular concern, the last birthday procedure may be preferred. On the basis of the evidence presented here, there is little difference between the Kish and last birthday methods of respondent selection.

Further research is obviously required to better delineate the circumstances under which each respondent selection procedure has more utility. For example, a study in-

volving some type of list sample in which the race of the respondent is known in advance and then comparing response rates between races would provide a further test for the racial differences presented here. Additional investigations of the characteristics of those who refuse telephone interviews and the reasons for such refusals would also be most useful in the design of respondent selection procedures.

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