TELEPHONE NON-RESPONSE: A FACTORIAL EXPERIMENT OF TECHNIQUES TO IMPROVE TELEPHONE RESPONSE RATES

Katherine Lind, Timothy Johnson, Vince Parker,
Survey Research Laboratory, University of Illinois at Chicago
Sam Gillespie, Illinois Department of Health and Human Resources
Katherine Lind, SRL, 412 S. Peoria, 6th Fl. Chicago, IL 60607

Key Words: Non-Response, RDD, telephone surveys, telephone answering machines, respondent selection procedures, refusal conversion, call attempts, telephone survey introductions.

Response rates to random digit dial (RDD) telephone surveys have been declining over the past several years (O'Rourke et al. 1998). This decline is often attributed to the saturation of tele-marketing, the use of screening devices such as answering machines and caller ID, and perhaps a general distrust of strangers calling and asking for personal information. In an attempt to identify some of the factors of telephone survey designs that may influence response rates, we implemented a multi-factorial experiment. Our design included variations in respondent selection, number of call attempts, number of refusal conversion attempts, answering machine messages, and the introductory script.

Background

The last birthday method of respondent selection is one of the more commonly used respondent selection methods due to its relatively simple and efficient application (Salmon & Nichols 1983). Troldahl-Carter-Bryant is also popular, and is considered by some to be a more random selection method, but also potentially more invasive (Bryant 1975, Troldahl & Carter 1964). It also has been our organization's experience that the Last Birthday method of respondent selection frequently produces a final sample with considerably higher proportions of females than are represented in the general adult household population. Despite the frequent use of these methods for the selection of respondents in RDD studies, no recent studies have examined the effect of these methods on response rates (O'Rourke & Blair 1983; Salmon & Nichols 1983).

Most survey organizations include refusal conversion attempts as standard protocol in telephone research. Generally this consists of a more experienced interviewer recontacting a person who initially refused an attempt to complete the interview. Such recontact attempts are standardly made at least one week after the initial refusal. Refusal conversion success is attributed to the "softness" of the initial refusal, how well the interviewer is able to quell the concerns of the respondent, and the development of rationale for refusal by the respondent (Groves & Lyberg 1988). Other studies have found that up to 40% of persons who initially refuse to participate will subsequently complete an interview upon being recontacted (Groves & Lyberg 1988; Allison & Yoshinda, 1989; Collins et al., 1988). Our experience suggests that between one-quarter and one-third of all initial refusers can be expected to complete the interview during a subsequent call. In this experiment, we examined the effectiveness of a second refusal conversion attempt.

The number of call attempts can dramatically affect final response rates in telephone surveys. Groves and Kahn (1979) reported that, on average, 3.4 calls were required to reach most RDD samples. For some cases, many more calls are required to obtain a complete interview. In a random digit dial study concerning cancer risk behaviors, Kristal et al. (1993) found that 82% of the interviews were completed within 11 call attempts. An additional 3% of the completes were finalized after 12 to 22 call attempts, with the majority of those completed within 12 to 15 call attempts. Following up with respondents who at initial contact did not complete the interview either because they were too busy or refused, resulted in an additional 13% of completes. The Survey Research Laboratory (University of Illinois at Chicago) recently increased its standard number of call attempts from 10 to 20. In this experiment, we examine the effectiveness of up to 30 call attempts compared to 20.

Twenty-five percent of non-profit research firms routinely leave messages when an answering machine is reached (O'Rourke et al. 1998). Prior research suggests that leaving answering machine messages can improve response rates (Koepsell et al. 1996, Xu, et al. 1993). Others have suggested that the increased use of answering machines as screening devices by respondents may become a threat to the representativeness of RDD samples (Oldendick 1993; Oldendick & Link 1994). We compared leaving an answering machine message indicating that we had called and would call

again, the first time answering machine was reached versus our standard of not leaving any type of message when an answering machine is reached.

Finally, due to the proliferation of sales calls, it was suggested at the 1997 International Field Directors/Field Technologies Conference that including the statement "We're not selling anything" in the introduction to telephone interviews may improve response rates. We examined the effect of including this statement in the introduction versus not including it.

Methods

In the fall of 1997, the Survey Research Laboratory began a statewide (Illinois) RDD survey of adults age 18 and older, concerning alcohol and drug use. As part of this study, we included a multi-factorial experimental design to examine the five conditions mentioned above that might influence response rates. The experiment included a fully-crossed assessment of these five conditions (Table 1) resulting in 32 experimental strata.

Table 1. Experimental Conditions

1. Respondent selection: Troldahl-Carter-Bryant vs. Last Birthday method.
2. Number of call attempts: 20 vs. 30 call attempts.
3. Refusal conversion attempts: 1 vs. 2 refusal conversion attempts (after the initial refusal).
4. Answering Machines: Leaving a message the first time an answering machine is reached vs. never leaving a message when an answering machine is reached.
5. Introduction: A standard introduction vs. an alternative introduction that included the statement "We're not selling anything".

For example, a piece of sample could be assigned to the Troldahl-Carter-Bryant method of respondent selection with a standard introduction, have a maximum of 30 call attempts, receive up to two refusal conversion attempts, and never have a message left if an answering machine was reached.

This analysis included 11,595 residential telephone numbers, with approximately 365 numbers randomly assigned to each of the 32 strata. Each condition was programmed into the CATI questionnaire prior to the survey in order to avoid manual manipulation and the danger of assignment errors.

Categorical modeling, using the SAS CATMOD procedure, was used for the analysis of the multi-factorial experiment (SAS 1990). Categorical modeling allows for the analysis of a set of nominally measured independent and dependent variables in a multi-factorial model and permits assessments of each factor independently as well as group interactions. The dependent variable was whether or not the interview was completed for each residential telephone number. The independent variables included the five experimental conditions (independently and as interaction models among the five conditions).

Results

Two independent factors were significant with respect to whether or not each case resulted in a completed interview: the use of two refusal conversion attempts and the Troldahl-Carter-Bryant method of respondent selection (Table 2). No significant group interactions were found.

Table 2. CATMOD Factorial Model – Main Effects

Factors	X^2	Significance
Troldahl-Carter-Bryant	5.07	.024
30 Call Attempts	3.22	.073
2 Refusal Conversion Attempts	38.94	.000
Message left on answering machine	0.33	.534
Alternative Intro	0.98	.333

$N = 11,539$

Table 3 shows that the mean response rate of the households assigned two refusal conversion attempts was 6% higher than those assigned only one refusal conversion attempt (58.2% vs. 52.3%). The use of Troldahl-Carter-Bryant respondent selection method improved response rates by 2% (56.2% vs. 54.1%).

In addition, we found the Last Birthday respondent selection method resulted in an over-selection of females. The male-female distribution when the respondent was selected via the Last Birthday method was 39% male, 61% female. The Troldahl-Carter-Bryant selection method resulted in a relatively equal distribution of males and females (48% males and 52% females). Contrary to past concerns about the invasiveness of this method, we also noted that the refusal rate among households in which the respondent was selected using Troldahl-Carter-Bryant did not differ from that of households assigned to the Last Birthday selection method. Prior research at SRL concerning the Last Birthday method found that for households with more than three adults, the incorrect respondent is nominated 33% of the time (Lind et al. 1997). Thus, we feel that the Last Birthday method may be a less effective method for the random selection of RDD telephone respondents.

Table 3.
Response Rates for Experimental Conditions

Conditions	(*N*)	CASRO Response rates	X^2
Troldahl-Carter-Bryant	5681	56.2%	5.07**
Last Birthday	5912	54.1	
20 Call Attempts	5903	54.5	3.20
30 Call Attempts	5690	55.8	
1 Refusal Conversion	5980	52.3	9.04***
2 Refusal Conversion	5613	58.2	
No Message left	5786	55.5	0.36
Message left on answering machine	5807	55.8	
Standard Intro	5800	54.6	1.04
Alternative Intro	5793	55.7	

**p < .01 ***p < .001

Recommendations

Based on our findings from this factorial-design experiment and prior research at SRL, we make the following recommendations for RDD telephone surveys. First, two refusal conversion attempts may substantially improve response rates in RDD telephone surveys. Second, the Troldahl-Carter-Bryant method of respondent selection continues to be a practical alternative for respondent selection, as it may produce a more balanced ratio of male-to-female respondents, may be less invasive than previously feared, and may even produce slightly higher levels of respondent cooperation.

References

Allison, K. Yoshinda, K. 1989. "Increasing response rates in community health surveys administered by telephone." *Canada Journal of Public Health. 80*:67-70.

Bryant, B; 1975 "Respondent selection in a time of changing household composition." *Journal of Marketing Research. 12*:129-135.

Collins M; Sykes, W; Wilson P; Blackshaw, N. 1988. in *Telephone Survey Methodology*. eds. R. Groves, P. Biemer, L. Lynberg, et al. New York: John Wiley & Sons. pp. 191-212.

Groves, R; Kahn, R. 1979. *Surveys by Telephone – A national comparison with personal interviews*. New York: Academic Press.

Groves, R; Lyberg, L. 1988. "An overview of nonresponse issues in telephone surveys." in *Telephone Survey Methodology*. eds. R. Groves, P. Biemer, L. Lyberg, et al. New York: John Wiley & Sons. pp. 191-212.

Koepsell, T; McGuire, V; Longstreth, T; et al. "Randomized trial of leaving messages on telephone answering machines for control recruitment in an epidemiologic study." *American Journal of Epidemiology. 144*:704-706.

Kristal, A; White, E; Davis, J; et al. 1993. "Effects of enhanced calling efforts on response rates, estimates of health behavior, and costs in a telephone health survey using random-digit dialing." *Public Health Reports. 108*:372-379.

Lind, K; Johnson, T; Gwiasda, V. 1997. "Accuracy of the most recent birthday method for random selection of household respondents" presented at the American Association for Public Opinion Research annual meeting, Norfolk, VA, May 1997.

O'Rourke, D; Blair, J. 1983. "Improving random respondent selection in telephone surveys." *Journal of Marketing Research 20*:428-432.

O'Rourke, D; Chapa-Resendez, G; Hamilton, L; Lind, Owens, L. Parker, V. 1998 "An inquiry into declining RDD response rates: Part 1: Telephone survey practices." *Survey Research. 29*:1-4.

Oldendick, R. 1993. "The effect of answering machines on representativness of sample in telephone surveys." *Journal of Official Statistics. 9*:663-672.

Oldendick, R; Link, M. 1994. "The answering machine generation: Who are they and what problem do they pose for survey research?" *Public Opinion Quarterly. 58*:264-273.

Salmon, C; Nichols, J. 1983. "The next-birthday Method of respondent selection." *Public Opinion Quarterly 47*:270-276.

SAS. 1990. *SAS/STAT User's Guide, Version 6, 4th Edition*. North Carolina: SAS Institute.

Troldahl, C; Carter, R. 1964. "Random selection of respondents within households in phone surveys." *Journal of Marketing Research 1*:71-76.

Xu, M; Bates, B; Schweitzer, J; 1993. "The impact of messages on survey participation in answering machine households." *Public Opinion Quarterly. 57*:232-237.