

Applying Address-Based Sampling as an Alternative to RDD in a Community Survey

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Abstract

ABS has been proposed as an alternative to RDD sampling; it may ease challenges posed by increasing coverage bias in RDD samples due to the growing number of cell-only households. ABS was used in a mixed mode (web and telephone) survey to measure public opinion of city services among residents of a Midwestern city. Consistent with estimates of telephone number availability in ABS frames, in the original sample of 3,000 addresses, 57% had a telephone number attached to the address and 87% were valid addresses. Data collection through combined modes yielded 836 completed interviews. Findings regarding the reduction in coverage bias were mixed. Although coverage was improved by inclusion of a significant number of cell-only households (13% of the sample), the present study did not reach a greater proportion of young adults than an earlier survey of the same community.

Key Words: Address-based sampling, online surveys, mixed mode

1. Background

Address-Based Sampling (ABS) is often described as a promising new sampling approach (Link et al., 2006; Link et al., 2008). The approach has been proposed as an effective alternative to random digit dial (RDD) surveys and Internet-based sampling (Messer & Dillman, 2010); the sampling method may ease the challenge posed by increasing coverage bias in RDD samples due to the growing number of cell-only households (Link & Mokdad, 2006) and problems with lower Internet response rate (Bech & Kristensen, 2009) and the limitation of access in rural or poorer communities (Messer & Dillman, 2010).

The special nature of ABS is a direct result of how the addresses are compiled. The Delivery Sequence File (DSF) held by the United States Postal Service contains every U.S. delivery point address. Private vendors access the regularly updated DSF, and they organize and distribute it at a cost to researchers centers (Link et al., 2008). Because of the source of the addresses, the coverage of ABS is much greater than either phone or Internet-based sampling and can be further selected for distinct sample characteristics because of the information compiled by the private vendors (e.g., age, gender, education level) (Fahimi, Kulp, & Mulerek, 2009). In addition to addressing coverage bias, research has shown that ABS provides a much more accurate frame in terms of matching listed address to actual address (e.g., Dohrmann, Han, & Mahadger, 2007). The enhanced quality of the samples helps reduce undeliverable-as-addressed mailings and helps increase the speed of the mailings (Fahimi, Kulp, & Mulerek, 2009).

ABS is not without limitations. First, using ABS requires additional resources than RDD because of its dependence on two-way postal service delivery. Not only does it require more time, but it also has the added cost of postage (Messer & Dillman, 2010). The coverage of ABS, while improved, is still not perfect. Rural areas have nearly 20% more undeliverable-as-addressed mailings than urban areas (Dohrmann, Han, & Mahadger, 2007). Families are also able to request that their addresses are not distributed, thereby eliminating a sub-group from the potential population frame (Link, et al., 2008). Because of these and other theoretical limitations, it remains prudent to consider using a mixed-mode survey approach (Messer & Dillman, 2010). Combining ABS design with mixed modes (such as phone and web) can help to compensate for the limitations of individual data collection methods.

Although ABS appears to be a promising alternative to RDD sampling, it is still in its early stages of testing the comparisons. The purpose of this study is to further explore the utility of the method in order to contribute to ABS literature. But rather than doing a well-funded, large-scale test, this study applied ABS in a more routine situation. In this study, ABS was used to conduct a mixed mode (web and telephone) survey to measure public opinion of city services among residents of a small Midwestern city. The purpose of the survey was to assess use of and satisfaction with city services. In the current study we compare two adult population surveys in the same community using RDD and ABS (Lutz et al., 2004; Lutz et al., 2009).

2. 2004 Cedar Falls Citizen Survey

In May of 2004, the Center for Social and Behavioral Research (Center) conducted a telephone survey of Cedar Falls households within the Cedar Falls City limits (ZIP code 50613). The substantive purposes of the study were to 1) determine the number of households using various services offered by the City of Cedar Falls, 2) measure public opinions about the current services provided by the City, and 3) assess public opinion regarding future services provided by the City.

The population frame for the 2004 study consisted of adult Cedar Falls residents with landline telephones who lived within the city's 50613 zip code. RDD sampling was used to select households for inclusion in the study. When an eligible household was contacted, the study was introduced and one eligible respondent was randomly chosen from the household to participate in the study. A total of 2,178 telephone numbers were used yielding 506 completed interviews. For analyses involving the total sample, statistical significance was based on the 95% confidence level with a confidence interval (sampling error) of \pm five percent (5%).

Data collection began on June 15, 2004, ended on July 8, 2004. The response rate (RR3; American Association for Public Opinion Research, 2003) was 55.6%, with a cooperation rate (CR3; American Association for Public Opinion Research, 2003) of 86.8%.

2. 2009 Cedar Falls Citizen Survey

In 2009, CSBR conducted a second survey of Cedar Falls residents to measure public opinion of city services. The 2009 survey sought to provide an updated snapshot of residents' views as well as to compare the 2009 findings with 2004 findings.

A random sample of 6,000 Cedar Falls addresses was purchased from a vendor (MSG). An initial sub-sample of 3,000 addresses was randomly selected from the original list in anticipation that the sub-sample would yield a sufficient response rate to complete the study. Each address in the sample was assigned a unique 6-character alphanumeric access code. Among the 3,000 addresses, 2,764 (92%) were linked with a last name. Informational packets were sent to each address. Packets were addressed to households, using the available last name when possible (e.g. "Smith Household"). When last names were not available in the sample, packets were sent to "Cedar Falls Household" using the addresses listed. Each packet contained a letter inviting residents to participate, a contact information form, and a business reply envelope. The letter and the contact information form included the unique access code for survey completion and tracking purposes.

Eligible households were those within the Cedar Falls city limits (ZIP code 50613). The adult (18 and older) with the most recent birthday was the eligible individual within each household contacted and the invitational letter indicated that this person should complete the survey. There were two ways of participating in the survey. Participants could complete an online questionnaire or they could complete a telephone-based interview with a trained CSBR interviewer. The latter provided with a simple URL and a unique access code to enter the survey website. If participants chose to complete a telephone-based interview, they could fill in the contact information form with the best times to reach them and their preferred telephone number and send it back to CSBR using an enclosed business reply envelope. Households not returning their contact information form but for whom we had a telephone number were eligible to be called.

Among the 3,000 addresses invited to participate, phone numbers were appended to 1,706 (57%). CSBR did not call individuals who completed the online questionnaire. Nor did CSBR call households without a known phone number (unless a resident at that address sent back a contact information form which included a different or additional phone number). CSBR did call all other phone numbers available in the sample. Some households were sent the letter but did not get a phone call because the contact information card was not returned and no phone number was available.

Data were collected between September 9, 2009 and October 4, 2009. Although the original goal was 600 interviews, a total of 836 interviews were completed and used in the analyses in this report. Of these, 350 (42%) were completed via the Internet and 486 (58%) were completed via telephone.

Among the 3,000 original addresses, 396 (13%) were returned as undeliverable. Contact information cards were returned by 129 households (4.3%), but only 117 were usable (the remaining 12 were either unusable due to illegibility or were refusals). Among the 486 interviews completed via telephone, 18 (3.7%) were completed using a telephone number that was added or changed through a returned contact information card.

The response rate, defined as the number of completed interviews divided by the number of eligible residents, (RR3; American Association of Public Opinion Researchers, 2009)¹ was 35%. The cooperation rate, defined as the number of completed interviews divided by the number of residents contacted (CR2; AAPOR, 2009), was 88%. The estimated maximum sampling error at the 95% confidence level for questions involving all respondents is +/- 3.3%.

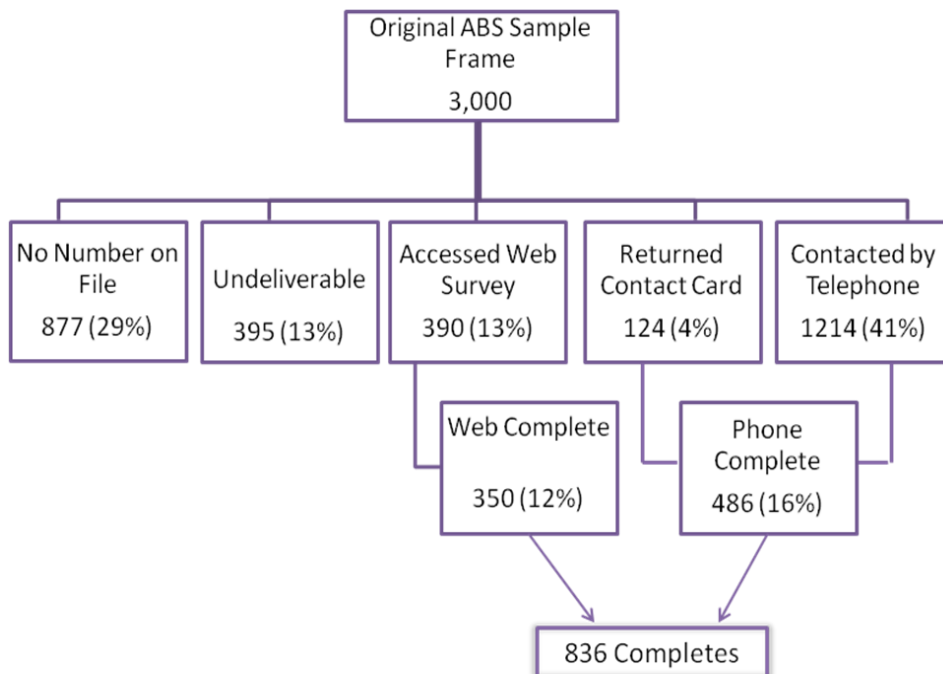


Figure 1: Interview Flowchart

2.1 Telephone Status of Respondents

Among all completed interviews, 15% identified themselves as landline-only households, 72% used both landline and cellular telephones, and 13% were cellular-only households (Table 1).

Table 1: Telephone Profile of Households

	Percent of total sample	Web completes	Phone completes
Landline-only	15%	4%	11%
Landline and cellular	72%	27%	45%
Cellular-only	13%	11%	2%

2.2 Mode Differences

Analyses were conducted to assess whether results differed for participants who completed the online survey versus those who completed the survey over the telephone, males versus females, and younger versus older participants. Results suggest that such differences were few and generally small in magnitude. To this very limited extent, more positive ratings were provided by those responding by phone, those who were female, and/or those who were older.

3. Discussion

3.1 ABS Positives

Although this study was not a scientific comparison of ABS and RDD, our experience yielded the discovery of several practical advantages of ABS over RDD. First, we were able to reach 99 respondents by web that did not have a phone number in the ABS frame (12% of the final sample). Of these 99 respondents, 73 were cell-only, 7 were landline-only and 19 were cell and landline respondents. We were also able to reach 16 cell-only respondents by phone (3% of the final sample). Combined, we reached a total of 89 cell-only respondents that would not have been reached by RDD methodology (11% of the final sample). A second advantage of ABS was that it was perceived by the client as more legitimate and credible than other methodologies due to the potential for reaching cell-only respondents. Finally, overall ABS provided greater telephone data collection efficiency than RDD, with 2.6 phone numbers dialed per completion from the ABS frame, as compared to 4.3 in the RDD frame.

3.2 ABS Negatives

Despite the advantages of ABS described above, it was not without its limitations. ABS required significantly more work and resources than the previous survey of the same community using RDD. Additional resources were invested for two separate questionnaire programmings and testing periods, one for phone and one for web. Additional resources were also required for the printing and assembly of the mailing component of ABS, as well as to account for the added complexity of integrating more than one mode. Furthermore, ABS increased the complexity of and details required for record-keeping and sample management during the data collection period.

3.3 Conclusions

While other studies (Link & Mokdad, 2006) have cited ABS as an effective means of addressing the challenges posed by increasing coverage bias in RDD samples, findings in this study were mixed. Although coverage was improved by the inclusion of a significant number of cell-only households (13% of the sample), the ABS study did not reach a greater proportion of young adults than an earlier survey of the same community; proportionally, the reverse was true.

In comparison to an earlier RDD survey of the same community, ABS required significantly more resources due to mailing preparation and assembly, web hosting, multiple programmings and testing periods (web and phone), and the added complexity of integrating more than one mode. ABS also increased the complexity of record-keeping and sample management. Despite the additional resources required, however, ABS data collection did not cost more per completion when compared to a previous RDD study of the same community. This may have been due in part to a high web response and the scale difference in sample sizes.

The study does have additional limitations. Comparisons are from two points in time, 2004 and 2009. The content of the survey may not have been equally engaging at the two points in time. The geographic location of the study may not be representative of other areas. Finally, this was not a scientific test of designs.

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