

The Use of Automated Telephone Reminders as an Alternative to Postcard Reminders in Survey Data Collection

Jaki S. McCarthy
HoaiNam N. Tran

FedCASIC
March 16 – 18, 2010

United States Department of Agriculture
National Agricultural Statistics Service
Research & Development Division



Overview

 Introduction

 Method

 Results

 Conclusion

 Future Research

Introduction

- ✿ Postcards mailed as survey follow-up reminders have been used in the past to increase response rates and are generally accepted best practices in survey data collection.
- ✿ An alternative to a postcard reminder follow-up is an automated telephone message reminder.
- ✿ Auto-dial software dials the telephone numbers of agricultural operators, selected in a survey, and delivers an automated telephone message about the survey.

Investigated Surveys

- 🌿 2006 Pennsylvania County Estimates Survey.
- 🌿 2007 Pennsylvania County Estimates Survey.
- 🌿 2007 Census Of Agriculture.
- 🌿 2008 Organic Production Survey.

Pennsylvania County Estimates Survey Background

- Conducted yearly.
- Collects basic information on land operated, crop production and livestock inventory.
- Conducted by mail beginning in October.
- Response to the County Estimates Survey is not required by law.



Penn. County Estimates Survey

Standard Data Collection Method

- 🌿 Ag. Operations in PA sampled from the NASS maintained list frame were mailed out a 4-page questionnaire.
- 🌿 Second mailing of a questionnaire to initial non-respondents approximately 5 weeks after the initial mailing.
- 🌿 Finally, telephone follow-up attempts were made in another round of data collection for remaining non-respondents 8 weeks after the initial mailing.

Experiment 1: 2006 Penn. County Estimates Survey

Experimental Group Treatments

| | Group 1 | Group 2 | Group 3 | Group 4 |
|---------------------------------|--|---|---|--|
| Treatment | Auto-dialer reminder calls with early message #1 | Auto-dialer reminder calls with late message #2 | Postcard reminder follow-up | Control (No reminder call or postcard) |
| Sample Size | 1,858 | 1,860 | 1,858 | 7,428 |
| Date of initial mailing | October 16 via standard class mailing | | | |
| Date of reminder follow-up | Began after 3 weeks of the initial mailing | Began after 5 weeks of the initial mailing | Mailed after 3 weeks of the initial mailing | NA |
| Date of second mailing | Began after 5 weeks of the initial mailing | | | |
| Phone Data Collection Follow-up | Began after 8 weeks of the initial mailing | | | |

Experiment 1:

Text of Telephone Reminder Message

🌿 Hi there! This is just a reminder to return the County Estimates Survey we recently sent from the National Ag Statistics Service in USDA. It was a green 4-page survey that we use each year to create county statistics for the major commodities in Pennsylvania.

If you already sent it back, “Thank you!” Otherwise, please send it in (even if you are not currently farming), so we don’t have to bother you with another mailing. If you can’t find the green survey form, we will send another copy in [couple of weeks / few days].

County statistics are very important to many in agriculture such as extension, teachers, lenders, agencies that implement government programs and grower organizations that work on behalf of farmers. We need your help to show that “Agriculture Counts” in your county.

🌿 Max number call attempts: 5 times



Experiment 1: Analysis

✚ Outcome of Auto-dialer Attempts

| Disposition | Group 1 | | Group 2 | |
|---------------------------------------|--|-------------|---|-------------------|
| | Auto-dialer reminder calls with early message #1 | | Auto-dialer reminder calls with late message #2 | |
| | No. | % | No. | % |
| Maximum attempt (5), no answer | 65 | 4.0 | 84 | 5.9 |
| Answer by a person | 730 | 45.1 | 616 | 43.4 |
| Answered by answering machine | 508 | 31.4 | 396 | 27.9 |
| Hang up/Partial message left | 211 | 13.0 | 190 | 13.4 |
| Other | 105 | 6.5 | 132 | 9.3 |
| Total Cases Called | 1,619 | 100.0 | 1,418 | 99.9 ¹ |

¹ Not 100% due to rounding.

Experiment 1: Analysis

+ Response by Treatment

| Treatment | Group 1 | | Group 2 | | Group 3 | | Group 4 | |
|--|--|-------------|---|-------------|-----------------------------|-------------|--|--------------------|
| | Auto-dialer reminder calls with early message #1 | | Auto-dialer reminder calls with late message #2 | | Postcard reminder follow-up | | Control (No reminder call or postcard) | |
| | No. | % | No. | % | No. | % | No. | % |
| Number contacted in follow-up ¹ | 1,619 | 87.1 | 1418 | 76.2 | 1858 | 100.0 | 0 | 0.0 |
| Complete | 1,052 | 56.6 | 1,051 | 56.5 | 1,073 | 57.8 | 3,918 | 52.8 |
| Refusal | 31 | 1.7 | 28 | 1.5 | 43 | 2.3 | 124 | 1.7 |
| Inaccessible | 775 | 41.7 | 781 | 42.0 | 742 | 39.9 | 3,386 | 45.6 |
| Total ² | 1,858 | 100.0 | 1,860 | 100.0 | 1,858 | 100.0 | 7,428 | 100.1 ³ |

$$\chi^2(6, N=13,004) = 30.05, p < 0.0001$$

¹ Treatment not administered for operations who had already returned a questionnaire

² Total based on Complete, Refusal, and Inaccessible categories.

³ Not 100% due to rounding.

Experiment 1: Discussion

- ✿ Postcard reminders and automated telephone reminders significantly increased response rates, with the postcard reminder increased response rates the most.
- ✿ Response rates are similar following the early and late telephone reminders.
- ✿ The use of auto-dialer software appears to be effective.

Experiment 2:

2007 Penn. County Estimates Survey

- 🌿 Data collection method was implemented as in prior survey.
- 🌿 Only difference: testing the standard automated message with the same message recorded by the Pennsylvania Secretary of Agriculture, Dennis Wolff.
- 🌿 The hypothesis is that farmers in Pennsylvania will regard a message from the State Secretary of Ag favorably, prompting higher response rates than a generic message.

Experiment 2: Method

+ Experimental Group Treatments

| | Group 1 | Group 2 | Group 3 | Group 4 |
|---------------------------------|--|--|---|--|
| Treatment | Auto-dialer reminder calls with unidentified speaker | Auto-dialer reminder calls with State Secretary of Agriculture | Postcard reminder follow-up | Control (No reminder call or postcard) |
| Sample Size | 3,855 | 3,858 | 2,521 | 2518 |
| Date of initial mailing | October 15 via standard class mailing | | | |
| Date of reminder follow-up | Began 3 weeks after the initial mailing (No calls on Sunday) | | Began 3 weeks after the initial mailing | NA |
| Date of second mailing | Began 5 weeks after the initial mailing (via standard class mailing) | | | |
| Phone Data Collection Follow-up | Began 5 weeks after the initial mailing | | | |

Experiment 2:

Text of Telephone Reminder Message

🌿 Hi, (**This is just a reminder/ I'm Dennis Wolff, Pennsylvania Secretary of Agriculture, reminding you**) to return the tan colored County Estimates Survey recently sent from the National Ag Statistics Service of the USDA.

If you've already sent yours in, "thank you!"

The results of these surveys are instrumental in planning and implementing the programs that support our agriculture industry. Thanks for helping us show that "Agriculture Counts" in your county.

🌿 Max call number attempts: 5 times



Experiment 2: Analysis

Outcome of Auto-dialer Attempts

| Disposition | Group 1 | | Group 2 | |
|---------------------------------------|--|------------|--|-------------|
| | Auto-dialer reminder calls with unidentified speaker | | Auto-dialer reminder calls with State Secretary of Agriculture | |
| | No. | % | No. | % |
| Maximum attempt (5), no answer | 148 | 3.9 | 162 | 4.2 |
| Answer by a person | 1,868 | 48.6 | 1,891 | 49.1 |
| Answered by answering machine | 1,191 | 31.0 | 899 | 23.4 |
| Hang up/Partial message left | 354 | 9.2 | 646 | 16.8 |
| Other | 282 | 7.3 | 155 | 6.5 |
| Total Cases ¹ | 3,843 | 100.0 | 3,848 | 100.0 |

¹ Call outcomes for 12 cases in group 1 and 10 cases in group 2 were inadvertently lost.

Experiment 2: Analysis

Response by Treatment

| Treatment | Group 1 | | Group 2 | | Group 3 | | Group 4 | |
|-------------------------------|--|-------------|--|-------------|-----------------------------|---------------------|--|---------------------|
| | Auto-dialer reminder calls with unidentified speaker | | Auto-dialer reminder calls with State Secretary of Agriculture | | Postcard reminder follow-up | | Control (No reminder call or postcard) | |
| | No. | % | No. | % | No. | % | No. | % |
| Number contacted in follow-up | 3,855 | 30.2 | 3,858 | 30.3 | 2,521 | 19.8 | 2,518 | 19.7 |
| Complete | 2,259 | 58.6 | 2,154 | 55.8 | 1,421 | 56.4 | 1,376 | 54.7 |
| Refusal | 45 | 1.2 | 41 | 1.1 | 37 | 1.5 | 45 | 1.8 |
| Inaccessible | 1,551 | 40.2 | 1,663 | 43.1 | 1,063 | 42.2 | 1,097 | 43.6 |
| Total | 3,855 | 100.0 | 3,858 | 100.0 | 2,521 | 100.1 ^{1/} | 2,518 | 100.1 ^{1/} |

$\chi^2(6, N=12,752) = 17.18, p < 0.01$

^{1/}Not 100% due to rounding



Experiment 2: Discussion

- ✿ Postcard reminders and automated telephone reminders significantly increased response rates.
- ✿ The highest response rate was produced by the generic automated telephone message.
- ✿ The use of auto-dialer software appears to be effective.

Experiment 3: Census of Agriculture

- ✿ Conducted every five years.
- ✿ Leading source of uniform, comprehensive agricultural data for every state and county in the U.S.
- ✿ Provides a detailed picture of the U.S. farms and ranches and the people who operate them.
- ✿ Conducted by mail.
- ✿ Response to the Census of Agriculture is mandatory and required by law.

Experiment 3:

2007 Census of Agriculture

- ✿ Tested on a subgroup of non-respondents.
 - Operations who did not respond to the screening for agricultural activities before the census (Agricultural Identification Survey aka AIS).
 - Operations who were added to the census mail list too late to be included in the AIS.
 - Whether or not these non-respondents are agricultural operations is unknown.
 - Very low response rate.

Experiment 3: Method



Auto-dial protocol:

- Similar automated message content
- Max number of call attempts: 3 times

Experiment 3: Analysis

✚ Outcome of Auto-dialer Attempts

| Disposition | Auto-dialer reminder calls | |
|---------------------------------------|----------------------------|--------------|
| | No. | % |
| Maximum attempt (3), no answer | 63,129 | 40.0 |
| Answer by a person | 82,396 | 41.8 |
| Answered by answering machine | 21,778 | 11.0 |
| Hang up/Partial message left | 473 | 0.2 |
| Other | 197,352 | 15.0 |
| Total Cases Called | 197,352 | 100.0 |

Experiment 3: Analysis

#

| Treatment | Auto-dialer reminder calls | | Control (no reminder call) | |
|----------------------------------|-------------------------------|------|-------------------------------|------|
| | No. | % | No. | % |
| Number contacted in follow-up | 197,352 | 90.0 | 21,963 | 10.0 |
| Complete | 63,956 | 32.5 | 7,004 | 31.9 |
| Inaccessible | 131,471 | 66.6 | 14,706 | 67.0 |
| Refusal | 1,925 | 1.0 | 253 | 1.2 |

$\chi^2(2, N=219,315) = 8.1782, p=0.0168$

Experiment 3: Discussion

- 🌿 Automated telephone reminders slightly increased response rates.
- 🌿 The use of auto-dialer software appears marginally effective.

Experiment 4: 2008 Organic Production Survey

- 🌿 First-ever, wide-scale survey of organic farming in the U.S.
- 🌿 Seeks information on current organic and transitional producers, such as production, marketing, income and expenses.
- 🌿 Conducted by mail.
- 🌿 Response to the Organic Production Survey is required by law.



Experiment 4: Method

- 🌿 Auto-dial protocol:
 - Similar message content
 - Treatment 1: automated telephone reminders delivered before the due date.
 - Treatment 2: automated telephone reminders delivered after the due date.
 - Max number call attempts: 3 times.

Experiment 4: Analysis

Including All Records

Response by treatment

| Response | Treatment 1 Call Before Due Date | | Treatment 2 Call After Due Date | | Control (No reminder call) | |
|--------------|--|-------------|---------------------------------------|-------------|-------------------------------|-------------|
| | No. | % | No. | % | No. | % |
| Complete | 9,549 | 87.7 | 9,389 | 87.3 | 6,305 | 87.3 |
| Refusal | 442 | 4.1 | 479 | 4.5 | 297 | 4.1 |
| Inaccessible | 883 | 8.1 | 876 | 8.1 | 612 | 8.5 |
| Other | 11 | 0.1 | 8 | 0.1 | 8 | 0.1 |
| Total | 10,885 | 100.0 | 10,752 | 100.0 | 7,222 | 100.0 |

$$\chi^2(6, N=28,859) = 3.8971, p=0.6934$$

Experiment 4: Analysis

Outcome of auto-dialer attempts

Outcome of Auto-dialer Attempts

| Disposition | Treatment 1 Call Before Due Date | | Treatment 2 Call After Due Date | |
|---------------------------------------|--|-------------|---------------------------------------|-------------|
| | No. | % | No. | % |
| No call attempt | 4,406 | 40.5 | 5,431 | 50.4 |
| Maximum attempt (3), no answer | 2,792 | 25.6 | 2,889 | 26.7 |
| Answer by a person | 1,821 | 16.7 | 1,545 | 14.3 |
| Answered by answering machine | 442 | 4.1 | 0 | 0 |
| Hang up/Partial message left | 698 | 6.4 | 499 | 4.5 |
| Other | 726 | 6.7 | 454 | 4.1 |
| Total cases | 10,885 | 100.0 | 10,752 | 100.0 |

Experiment 4: Analysis

Including only cases where message was delivered


⊕ Response by treatment

| Response | Treatment 1 Call Before Due Date | | Treatment 2 Call After Due Date | | Control (No reminder call) | |
|---------------------|--|-------------|---------------------------------------|-------------|-------------------------------|-------------|
| | No. | % | No. | % | No. | % |
| Complete | 2,567 | 86.7 | 1720 | 84.1 | 6305 | 87.3 |
| Refusal | 159 | 5.4 | 166 | 8.1 | 297 | 4.1 |
| Inaccessible | 231 | 7.8 | 157 | 7.7 | 612 | 8.5 |
| Other ^{/1} | 4 | 0.1 | 1 | 0.1 | 8 | 0.1 |
| Total | 2,961 | 100.0 | 2,044 | 100.0 | 7,222 | 100.0 |

^{/1} "Other" category was excluded from the Chi-square analysis. □

$$\chi^2(4, N=12,214) = 54.6575, p < 0.0001$$

Experiment 4: Discussion

-  In this survey, auto-dial messages are not effective.
- Overall the response rate was very high (87.3%)
 - Many operations never received a message due to limited call attempts.

Conclusion

- ✿ In cases where response rates are already high, automated message does not help to increase response.
- ✿ In some cases, automated message increased the response.
- ✿ Automated telephone reminders follow-up is relatively inexpensive method.
 - Equipment costs approximately \$1,000 plus phone calls.

Future Research

- ✿ Message content may impact the effectiveness.
 - The most appropriate message may differ from survey to survey. Test alternatives to the methods employed.
 - Different message, trained or professional speakers, etc.
- ✿ Guidelines for dialing protocol need to be reviewed.
 - Many treatment groups' operators never received the auto-dial message when only three attempts were made.

Contact Information

 Jaki McCarthy

- Jaki_McCarthy@nass.usda.gov
- (703) 877-8000 x142

 HoaiNam Tran

- HoaiNam_Tran@nass.usda.gov
- (703) 877-8000 x110
- <http://www.nass.usda.gov/research/>

