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# **Pre-Recorded Telephone Messages As An Alternative To Follow-Up Survey Reminder Postcards II: The Effectiveness Of Automated Telephone Reminder Messages Used During The 2007 Pennsylvania County Estimates Survey**

Jaki S. McCarthy

This report was prepared for limited distribution to the research community outside the US Department of Agriculture. The views expressed herein are not necessarily those of NASS or USDA.



## **EXECUTIVE SUMMARY**

During the 2007 Pennsylvania County Estimates Survey, a test of software which dials and delivers automated telephone messages was conducted, comparing it to postcard reminders and a control group with no reminders. The software automatically dialed and delivered a pre-recorded message to two random subsamples of operations selected for the survey. Following the first mailing of the questionnaire, one subsample received a generic message which did not identify the speaker. A second subsample received an equivalent message recorded by the Pennsylvania Secretary of Agriculture. An additional third unique subsample received the same message on a traditional postcard reminder delivered via US Postal Service mail. Response rates for each of these groups were compared to a control group which received no reminder. All three reminder groups had higher response rates than the control group, with the generic autodialer message increasing response the most.

As in previous research (McCarthy, 2007), this experiment showed the use of autodialer software to be effective and relatively inexpensive. Autodialer software is a promising addition to the tools field offices can use to increase survey response rates. Use of a prominent non-NASS agricultural speaker to record the message did not increase the effectiveness of the message. Methods to use this technology should continue to be evaluated.

## **RECOMMENDATIONS**

Based on the positive results of this and previous experiments, the following recommendations are given:

1. Continue to use and evaluate the autodialer in Pennsylvania for follow-up reminders in mail surveys.
2. Test alternatives to the methods employed, such as using a different message, trained or professional speakers, or another non-NASS data user to record the message.
3. Consider additional uses of the autodialer software for reminders, such as for subpopulations in the census of agriculture.

# **Pre-Recorded Telephone Messages As An Alternative To Follow-Up Survey Reminder Postcards II: The Effectiveness Of Autodialer Software Used During The 2007 Pennsylvania County Estimates Survey**

Jaki S. McCarthy <sup>1</sup>

## **Abstract**

Software which dials specified telephone numbers and delivers an automated telephone message was tested as an alternative to postcard reminders in the Pennsylvania County Estimates Survey. Similar to prior research (McCarthy, 2007), software automatically dialed and delivered a pre-recorded message to two randomly selected subsamples of operations. In the present experiment, one subsample received a message recorded by an unidentified speaker (the field office director) following the first mailing of the questionnaire. A second subsample received the same message recorded by the Pennsylvania Secretary of Agriculture. A third random sample received the same reminder message from the field office director, on a traditional postcard reminder delivered via US Postal Service mail. Response rates for each of these groups were compared to a control group which received no reminder. All three reminder groups had higher response rates than the control group, but unlike a previous test, the highest response rate was produced by the generic automated telephone message.

**Key Words:** autodialer, automated message, follow-up reminder, postcard reminder, response rate

## **1. BACKGROUND**

Postcards mailed as survey follow-up reminders have been used in the past to increase response rates and are a generally accepted best practice in survey data collection. An alternative to postcards delivered through the mail are messages left with respondents via the telephone. “Autodialer” software can be used to schedule and call lists of phone numbers and leave messages, either with a person or an answering machine. This technology has been used for many types of telephone messages, such as medical appointment reminders, broadcasts by groups to their membership, and emergency notifications. Research in some of these situations has shown that these reminders are effective and received positively by their recipients (Dini, Linkins, Sigafos, 2000; Franzini, Rosenthal, Spears, Martin, Balderas, Brown, Milne, Drutz, Evans, Kozinetz, Oettgen and Hanson, 2000; Krishna, Balas, Boren and Maglaveras, 2002). There is very little documented use of automated reminder messages in survey research.

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<sup>1</sup> Jaki S. McCarthy is Chief Cognitive Research Methodologist in the Research and Development Division of NASS, Room 305, 3251 Old Lee Highway, Fairfax, VA 22030. The author would like to thank and acknowledge the extra efforts of the NASS Pennsylvania Field Office, who collaborated to develop this experiment and collected the data. Their agreement to include the control group was vital for our experiment, even though they assumed this would lower the response rate for that group. In particular, thanks go to Jillayne Weaber, the leader of the County Estimates Survey team, Christa Eisenhuth and Marc Tosiano.

However, using automated telephone messaging does appear to increase response rates. The US Census Bureau found that response rates were higher for households who had been left a reminder message than for those which received either no reminder or a postcard reminder (Bouffard, Brady, Stapleton and Imel, 2003)<sup>2</sup>. A test by the National Science Foundation (NSF) also showed that telephone reminder messages prompted slightly higher survey response rates (Fecso, 2006). An earlier test by the National Agricultural Statistics Service (NASS) Pennsylvania Field Office resulted in an increase in response rate for the groups given telephone reminders, although not as great an increase as that shown with reminder postcards (McCarthy, 2007).

Mailing postcards is relatively inexpensive, but autodialer systems are also inexpensive and over time may be cheaper than postcards. Long term operating costs of using telephone reminders would approach zero, if individual calls do not result in extra charges. For our previous study of autodialer reminder messages, the total estimated cost to call (2,224 calls; 1,652 minutes) was \$34.12 in telephone company charges.<sup>3</sup> After the initial investment for the system, in this case, approximately \$1000, this is clearly cheaper than printing and mailing postcards. Telephone calls are more easily controlled by the office, are not affected by mail delays, and are easily tailored as appropriate.

The present experiment again compares use of the autodialer messages and postcard reminders to no reminders. However, in the present study, we are comparing the standard 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 their state secretary of agriculture favorably, prompting higher response rates than a generic message.

In this test, two different autodialer messages and postcard reminders (the currently planned operational procedure) were compared to a control group which did not receive any reminder follow-ups. This allowed a comparison of the two messages and an opportunity to see the impact over doing no reminders.

## **2. METHODS**

The NASS Pennsylvania Field Office mailed questionnaires for the county estimates program to potential agricultural operations beginning in October 2007 as shown in Table 1. Data collection methodology was implemented as in prior surveys. A four page survey questionnaire collecting basic information on land operated, crop production, and livestock inventory was mailed to sampled operations. This was followed by a second mailing of the questionnaire to initial non-respondents. Finally, telephone follow-up was made in another round of data collection for remaining non-respondents.

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<sup>2</sup> However, this Census Bureau study had several methodological limitations. Notably they did not use comparable samples, since only the small number of households where a telephone number look up was successful were included in the subsample receiving an automated reminder message.

<sup>3</sup> Estimate by the NASS Pennsylvania field office, email dated 8/24/07.

For this experiment, an additional follow-up reminder was added to data collection for three randomly assigned experimental groups. For the first two groups, an autodialer telephone reminder (one using a generic message and another recorded by the State Secretary of Agriculture) was added between the first and second questionnaire mailings. For a third group, a follow-up reminder postcard was added with similar content to the autodialer messages. The content of the messages is shown in Appendix A. The control group used the standard data collection procedures used in the past. Interviewers conducting the follow-up telephone interviews were not aware of which operations were in the experimental groups.

The table below summarizes the experiment, with details following:

Table 1. Experimental Group Treatments

	Group 1	Group 2	Group 3	Group 4
Treatment	Autodialer reminder calls with unidentified speaker	Autodialer reminder calls with State Secretary of Agriculture	Postcard reminder follow-up	Control (no reminder call or postcard)
	Conducted by Pennsylvania FO	Conducted by Pennsylvania FO	Mailed by print mail center	
Sample size (n)	3855	3858	2521	2518
Date of initial mailing	October 15 (via standard class mailing)			
Date of reminder follow-up	Began November 6 ended on November 19 (no calls on Sundays)		Mail on November 5	N/A
Date of second mailing	November 19 (via standard class mailing)			
Phone Data collection Follow-up	Began December 3, continuing through January for all groups			

Respondents without phone numbers were excluded from all comparisons. The remaining experimental sample was randomly assigned to subsample replicates. Based on the previous success of automated messaging, larger samples were allocated to these groups.

Because standard mail was used, exactly how long it would take the questionnaires to be delivered was unknown. A delivery time of at least one week, but possibly up to three weeks was estimated. However, we did not want to have the postcards or messages delivered before the questionnaires. For this reason, reminders did not begin until several weeks after the first mailing. The autodialer message and the content of the reminder postcard were comparable and are shown in Appendix A. They were written with the most critical information first, so in the event of a recipient hanging up early, they would hear the purpose of the call.

The two autodialer reminder call groups differed only with respect to the speaker. The first message did not identify the speaker. The second message was the same as the first, except that



the message was prefaced with Secretary of Agriculture Dennis Wolff identifying himself<sup>4</sup>. The message recorded by Secretary Wolff had a slower pace and less color and intonation than the generic message.

The autodialer software was capable of handling both messages at once, so both messages were delivered to the appropriate respondents throughout the calling period. The autodialer software was programmed to begin at 8:00 am and end at 9:00 pm, calling up to five times for unanswered numbers. The software was also set to hang-up after six rings with no answer. The software also hung up if it reached an automated answering machine with an outgoing message longer than 25 seconds (these are assumed to be problem numbers or messages that do not take recordings). The pre-recorded message was left regardless of whether a person or answering machine took the call.

The date of receipt for each questionnaire was recorded. In addition, mode of data collection (mail or telephone) was tracked to determine whether questionnaires were returned by mail or were completed during telephone follow-up.

### **3. RESULTS AND DISCUSSION**

#### **3.1 Outcome of Autodialer Message Attempts**

Although calls to a large number of operations in our experimental groups were made, not all were successful in reaching either a person or answering machine. As shown in the following table, a person was reached and listened to the entire message in a little less than 50% of the cases<sup>5</sup>. In addition, 9% of Group 1 and 17% of Group 2 resulted in a person listening to only part of the recorded message. Finally, messages left on answering machines comprised the remainder of cases where the message was delivered to an operation (31% for Group 1 and 23% for Group 2). The percentages for Group 1 are similar to that obtained in a previous experiment with a similar message (McCarthy, 2007). However, for Group 2, where the message was left by the Pennsylvania Secretary of Agriculture, it appears that more people picked up the phone to listen to the message and then hung up before the complete message was delivered rather than let the answering machine record the message.

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<sup>4</sup> The messages differed slightly from those used in our previous experiment, since the Secretary of Agriculture edited and approved the message.

<sup>5</sup> Autodialer results for 12 records in Group 1 and 10 records in Group 2 were inadvertently lost due to technical problems. They were excluded from this table.

Table 2. Outcome of Autodialer Attempts

<b>Disposition</b>	<b>Group 1 n (%)</b>	<b>Group 2 n (%)</b>
Maximum attempts (5), no answer	148 (3.9)	162 (4.2)
Answered by a person	1868 (48.6)	1891 (49.1)
Answered by answering machine	1191 (31.0)	899 (23.3)
Hang up/Partial message left	354 (9.2)	646 (16.8)
Telephone Company Message (bad #)	173 (4.5)	155 (4.0)
Fax or Modem	17 (0.4)	18 (0.4)
Other	92 (2.4)	77 (2.0)
Total Cases <sup>6</sup>	3843	3848

### 3.2 Follow-Up Reminder Effects on Response Rates

Overall, postcard reminders and automated telephone reminders significantly increased response rates as shown in the next table,  $\chi^2(6, n=12752) = 17.18, p < .01$ . In contrast to previous research (McCarthy, 2007), the postcard reminder did not produce the highest increase in response rate. The follow-up reminders also appear to reduce some data collection costs, as more of the completions are received by mail instead of with more costly telephone enumeration (see Table 5 in Appendix B).

Table 3. Response by Treatment Group

<b>Treatment</b>	Autodialer reminder calls with message #1 % (n)	Autodialer reminder calls with message #2 % (n)	Postcard reminder follow-up % (n)	Control (no reminder call or postcard) % (n)
Number contacted in follow-up	3855	3858	2521	2518
Complete	58.6 (2259)	55.83 (2154)	56.37 (1421)	54.65 (1376)
Inaccessible	40.23 (1551)	43.11 (1663)	42.17 (1063)	43.57 (1097)
Refusal	1.17 (45)	1.06 (41)	1.47 (37)	1.79 (45)

$\chi^2(6, N=12752) = 17.18, p < .01$

The cumulative response rates by the date questionnaires were checked into the office are shown in Figure 1 in Appendix C. While individual responses cannot be directly tied to receipt of either messages or postcards, the chart shows no real difference in response until the second mailing. At this point, the returns for Group 1 jump and remain higher than the other groups for the remainder of the data collection period.

Previous research suggested that postcards may be more effective than autodialer reminders due to the fact that they have a physical presence that telephone messages do not. However, in the

<sup>6</sup> Call outcomes for 12 cases in group one and 10 cases in group 2 were inadvertently lost.

present experiment, postcards did not prompt a higher response rate than the generic autodialer message. Between the two autodialer message groups, it appears that the increased number of messages that were only partially listened to for Group 2 may have adversely impacted response rates for that group. Perhaps in these cases, the person listening to the message was someone other than the targeted respondent who may not have passed that message on to the respondent. Screened messages on answering machines are recorded and can be replayed by other members of the household. This is not the case for messages that are partially listened to.

Autodialer calls which were answered by a person (and listened to completely) were more likely to result in a completion (53.0%) than were calls where a message was left (47.4%) or where the person answering the phone hung up before the message had finished (41.9%). One interesting, but not surprising, finding from the autodialer outcomes is that certain types of autodialer outcomes are much more likely to remain inaccessible. Combining the two experimental autodialer groups, 56% of the operations which had invalid numbers (i.e. disconnected, fax or modem, etc.) never returned a questionnaire and were ultimately coded as inaccessible. In contrast, the percentage of cases which remained ultimately inaccessible was lower for groups where a message was delivered. Details are shown in Table 4 below.

Table 4. Final Case Disposition for Telephone Reminder Groups by Message Outcome

Final Case Disposition	Answered by a Machine n (%)	Answered by a Person n (%)	Answered, Hung up Before Message Completed n (%)	Other <sup>7</sup> n (%)
Complete	1134 (54.26)	2369 (63.02)	539 (53.90)	365 (43.35)
Inaccessible	936 (44.78)	1341 (35.67)	450 (45.00)	471 (55.94)
Refusal	20 (0.96)	49 (1.30)	11 (1.10)	6 (0.71)
Total	2090 (100)	3759 (100)	1000 (100)	842 (100)

One benefit to the use of the autodialer is that it helps to verify telephone numbers. Invalid and disconnected numbers may indicate that these are not currently operating agricultural operations. Indeed, more of these numbers ultimately are not reached than the group of working numbers. However, some of these “invalid” numbers (i.e. faxes, answering machines which do not accept messages, non-working numbers) do return questionnaires. Of the 420 records with “invalid” numbers, 187 (44.5%) did return completed questionnaires.

#### 4. FUTURE WORK

This study confirms that autodialer software can be an effective tool to increase response rates. However, the test did not show any increased effectiveness for using an outside speaker, in this

<sup>7</sup> Invalid numbers included all cases where either the call was answered with a telephone company (Tri-Tone) S.I.T. tone (disconnect/change); no signal was detected after dialing (indicating phone number is probably not valid); FAX or modem answered; call was answered by a machine but the outgoing message was longer than 25 seconds; or any other error was detected during the call.

case, the Pennsylvania Secretary of Agriculture, to deliver the message. Perhaps results would be different for a different “celebrity” speaker, a professionally trained speaker or a speaker with different vocal qualities.

The set up and administration time for autodialing is minimal and can easily be done by office staff. Messages can be tailored for different subgroups or can be altered during data collection. There are additional tests of the system that could be done to help optimize its effectiveness. For example:

- Using another speaker from outside NASS to record the message. While the State Secretary of Agriculture did not prompt a higher level of response, perhaps another speaker such as a “celebrity” or farm group representative might be effective. The individual speaker chosen should be one likely to be viewed positively by the operations in the sample.
- Modification of the content of the message to include more, less, or different information, such as specific uses of the data (tailored to specific types of operations), whether we intend to contact non-respondents by telephone, etc.
- Customization of messages for subgroups of respondents
- Changes to the timing of the reminders (including use as a pre-survey notification)
- Use of the automated message in combination with a postcard reminder
- Allowing the person called to connect to a live person in the office.

In addition, the autodialer software may also be helpful in other mail out/mail back data collections such as the census of agriculture. Use of the autodialer messaging for the census of agriculture prior to mailing the forms is currently being tested. It could also be used with selected subgroups of respondents, such as low response counties, to help boost response rates.

The software can also have uses beyond telephone reminders -- any messages can be left for any groups of phone numbers. For example, information or reminders can be broadcast to office staff, NASDA enumerators, or data users. Field offices may want to consider these and other uses for this software.

## **5. RECOMMENDATIONS**

Based on the positive results of this and previous experiments, the following recommendations are given:

1. Continue to use and evaluate the autodialer in Pennsylvania for follow-up reminders in mail surveys.
2. Test alternatives to the methods employed, such as using a different message, trained or professional speakers, or another non-NASS data user to record the message.
3. Consider additional uses of the autodialer software for reminders, such as for subpopulations in the census of agriculture.

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Appendix A. Reminder messages

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.

\*alternate wording for treatments 1 and 2

Text of Postcard Reminder

**2007 County Estimates Survey**

November 6, 2007

Hi there!

This is just a reminder to return the tan-colored **County Estimates Survey** we recently sent from the National Ag Statistics Service in USDA.

If you already sent it back, "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.

- - *Marc Tosiano, Director, USDA, NASS-PA Field Office*

Appendix B.

Table 5. Response by Mode.

Treatment	Autodialer reminder calls with message #1	Autodialer reminder calls with message #2	Postcard reminder follow-up	Control (no reminder call or postcard)
Sample Size n	3855	3858	2521	2518
Mail completes n (%)	1993 (51.7)	1863 (48.3)	1240 (49.2)	1176 (46.7)
Telephone completes n (%)	266 (6.9)	291 (7.5)	181 (7.2)	200 (7.9)
Overall Response %	<b>58.6%</b>	<b>55.83%</b>	<b>56.4%</b>	<b>54.7%</b>

$\chi^2(3, N=7191) = 6.47, p=.09$

Figure 1 - Cumulative Response by Group

