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MEMORANDUM FOR ACS Research and Evaluation Advisory Group

From: Deborah Stempowski (signed on December 7, 2015)
Chief, American Community Survey Office

Prepared by: Sandra Luckett Clark
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Subject: 2015 Mail Contact Strategy Modification Test

Attached is the final American Community Survey (ACS) Research and Evaluation report, "2015 Mail Contact Strategy Modification Test." We conducted this experiment to test ways to improve our mail materials and contact strategies. Our goals were to reduce the number of mailings we send to sample addresses by removing the prenotice letter; allow additional time for Internet response by sending the initial mailing earlier; strengthening the mailing materials by replacing the reminder postcard with a letter highlighting the User ID; and, increasing self-response by sending the additional reminder postcard to additional addresses. We evaluated self-response return rates to assess the impact of the changes on respondent behavior and performed a cost analysis to assess impacts from a cost perspective. Our findings are documented in this report. If you have any questions, please contact Sandra Clark at 301-763-5884.

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AMERICAN COMMUNITY SURVEY (ACS)
PROGRAM MANAGEMENT OFFICE

December, 2015

ACS RESEARCH & EVALUATION REPORT

2015 Mail Contact Strategy Modification Test

ACS15-RER-19

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Executive Summary

In an effort to look at ways to increase self-administered response and increase survey awareness to the American Community Survey (ACS), the Census Bureau contracted with Reingold (a communications and marketing firm) to develop a mail implementation strategy. As part of that effort, we also had Dr. Don Dillman (an expert in the survey methodology field) assess our baselined materials and Reingold's proposed materials. Using the April 2015 ACS production sample panel, we conducted the 2015 Mail Contact Strategy Modification Test to test some of Dr. Dillman's suggestions. The suggestions tested in this experiment included:

- Eliminating the prenotice letter and sending the initial mailing four days earlier.
- Using a reminder letter (highlighting the User ID and including the mandatory language, "Your response to this survey is required by law.") in lieu of a reminder postcard.
- Sending the additional reminder postcard to all nonresponding addresses, including those eligible for Computer-Assisted Telephone Interview.

The experiment used roughly 60,000 addresses from the April 2015 ACS production sample panel to construct five test treatments (12,000 addresses per treatment). We used the remaining (approximately 226,000) addresses in the April 2015 sample panel as our control. We compared self-response return rates between treatments to assess the impact of the changes on respondent behavior. Our key findings include:

- Eliminating the prenotice and sending the initial mailing earlier decreased the total self-response return rate by 1.4 percentage points prior to the paper questionnaire mailing. However, at the end of the self-response phase of data collection, there was not a measurable decrease in the total self-response return rate between the prenotice/postcard group and no prenotice/postcard group. Eliminating the prenotice and moving the initial mailing earlier may lead to increases in printing and mailing costs for the extra paper questionnaires, but suggest no changes to nonresponse follow-up workloads.
- Using a reminder letter that highlights the User ID and includes mandatory language significantly increased total self-response return rates by 3.8 percent as compared to a reminder postcard. Increases in self-response return rates save money in nonresponse follow-up costs. It should be noted that there were several differences between the postcard and the letter. For example, the letter highlighted the User ID and included the mandatory response requirement. These features were not included in the postcard. The multiple modifications made it impossible to determine the effects of each feature individually.
- Using the letter reminder in lieu of a postcard reminder and sending the initial mailing earlier offset the decrease in return rates from dropping the prenotice. Total self-response and Internet return rates for the no prenotice/reminder letter treatment were significantly higher than the rates for the prenotice/reminder postcard treatment at all reference points included in the study. Our findings suggest that we can successfully

drop the prenotice as long as we use a letter for our first reminder contact and send the initial mailing earlier. Using the no prenotice/reminder letter strategy would result in annual cost savings.

- Sending additional reminder postcards to Computer-Assisted Telephone Interview eligible addresses increased total self-response return rates for all mail contact strategies tested. While sending additional reminder postcards to Computer-Assisted Telephone Interview eligible addresses would increase mailing costs, increased self-response would reduce Computer-Assisted Personal Interview workloads (which is the most expensive data collection mode). We used two methods to analyze the effects of this change on costs and found conflicting results. Therefore, we plan to conduct further research to see if this change can result in cost savings. We did not see a difference in Computer-Assisted Telephone Interview response rates, however additional research will be conducted to determine if the postcard is able to improve the efficiency of the Computer-Assisted Telephone Interview operation.
- Our cost analysis showed that many of the mail contact strategies tested in the experiment resulted in annual savings for the American Community Survey Program, however the no prenotice/reminder letter combined strategy resulted in the largest savings.Therefore, we implemented the no prenotice/reminder letter strategy beginning with mailings sent to addresses included in the August 2015 ACS sample panel.

1. Introduction

The American Community Survey (ACS) data provide a wealth of information. Government officials rely on the data to inform decisions on matters of public interest such as access to emergency services, public transportation, education, medical needs, and much more. Moreover, businesses in the private sector use the data to determine business risks and opportunities.

However, the data are only as good as the information we collect from sampled addresses. Most people are unaware of the ACS (Hageldorn, Green, and Rosenblatt, 2014). As such, when asked to participate, they are often reluctant, citing the intrusiveness of the questions, wariness about the security of their information, or the time commitment to participate (Zelenak and Davis, 2013). As a result, we spend more to get data from these housing units, often resorting to personal visits to try to collect information from the most reluctant.

The Census Bureau recently collaborated with Reingold, Inc., a communications and marketing firm, and Dr. Don Dillman, a survey methodologist with expertise on mail contact strategies (Dillman et al., 2009), to conduct comprehensive research aimed at enhancing the materials we send to help address these concerns. The goal of this research was to increase public awareness of the ACS, communicate the value of ACS data, and improve the design of and strategies used for the mail materials in hopes of increasing the self-administered response rate. Reingold and Dr. Dillman provided several recommendations to enhance the ACS mailings. This report documents the results from our testing of some of Dr. Dillman's suggestions to improve our mail contact strategies. Future studies will explore other recommendations from Reingold and Dr. Dillman.

In this experiment, we tested the following suggestions from Dillman (2014):

- Eliminating the prenotice letter and sending the initial package four days earlier.
- Strengthening reminder contacts by: making the URL to the survey more prominent; highlighting the User ID; using direct wording; and stating the mandatory nature of the survey.
- Testing the impact of sending the additional reminder postcard to all nonrespondents (instead of the subset ineligible for Computer-Assisted Telephone Interview (CATI), which is current practice).

The prenotice letter is the first mailing we send to respondents in sample for the ACS. It informs them that they were randomly selected for the survey and that they will be receiving additional information soon with instructions on how to complete the survey. It also provides a brief paragraph describing some of the uses of ACS data. We recently tested the removal of the prenotice letter (without any other modifications to the mail strategy), and found that removing the prenotice letter significantly reduced self-response (Murphy and Roberts,

forthcoming). Dillman suggested that the importance of the prenotice may be reduced if the remaining contacts were stronger. In the 2015 Mail Contact Strategy Modification Test, described in this document, we expand on the previous research excluding the prenotice by adding features such as a reminder letter with language about the compulsory nature of the survey in place of the reminder postcard, and by moving the first mailing earlier, to the date when the prenotice would normally have been mailed. Furthermore, we attempt to prompt self-response from CATI eligible addresses by including these addresses in our additional reminder postcard mailing.

The purpose of this Mail Contact Strategy Modification Test was to study the impact of these changes on self-response behavior and on costs to the ACS Program.

2. Methodology

2.1 Research Questions

To study the success of Dillman's suggestions, we answered the following research questions:

1. What is the impact on self-response return rates of removing the prenotice and sending the initial mailing at the time when the prenotice would normally be sent (four days sooner)?
2. In the absence of a prenotice letter, does changing the first reminder contact from a postcard to a letter (with a mandatory message and highlighting the User ID) impact the self-response return rates?
3. Does the use of a letter reminder along with the earlier mailing of the initial package overcome the loss of self-response from the removal of the prenotice? What is the impact on self-response of removing the prenotice and using a reminder letter with mandatory messaging in lieu of a reminder postcard?
4. What is the impact on self-response and CATI return rates of sending an additional reminder postcard to all nonresponding addresses compared to sending only to nonresponding addresses ineligible for CATI?
5. What would be the impact on the cost of data collection if the new mail contact strategies were implemented into ACS operations?

2.2 Experimental Design

The ACS sample includes the division of the monthly sample into 24 groups of approximately 12,000 addresses each. Each group within a monthly sample is representative of the entire monthly sample panel, and each monthly sample is representative of the country. We tested five treatments in the April 2015 ACS production sample, using five groups (one per treatment) while the balance of the sample (~226,000 addresses) was the control. Thus, each treatment used a mailout sample of roughly 12,000 addresses. The experimental treatment panels are shown in Table 1. The materials listed in bold are the items we tested in the experiment. They are displayed in the appendices. Appendix A displays the prenotice letter; Appendix B shows the first reminder letter; Appendix C shows the first reminder postcard; and Appendix D shows

the additional reminder postcard. Figure 1 shows the timing of the mailings for the control and experimental treatments.

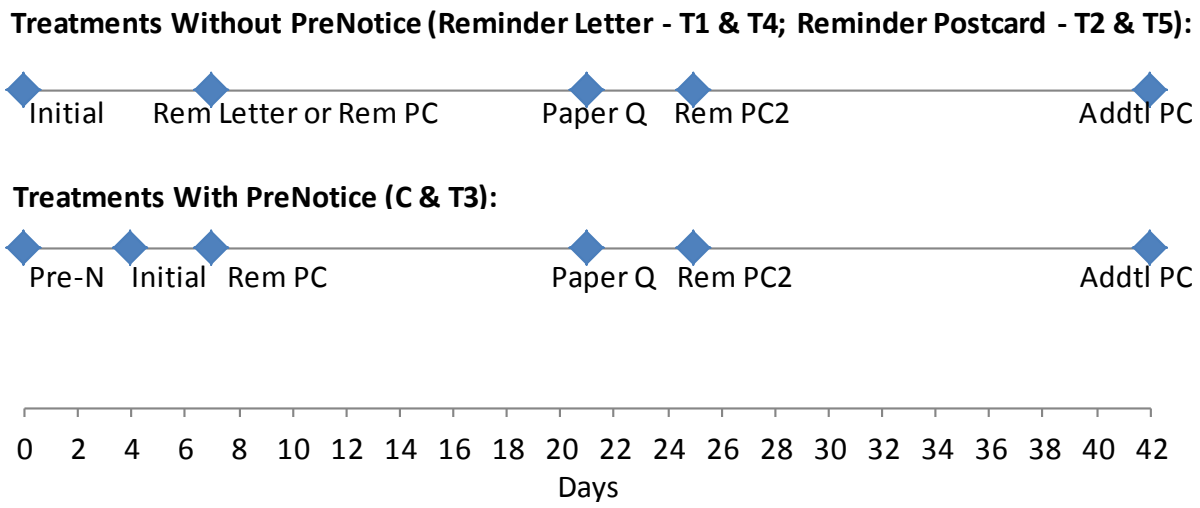
Table 1. Experimental Design Panels and List of Mailings

	Prenotice	No Prenotice; Reminder Letter with Mandatory Message	No Prenotice; Reminder Postcard
Additional Postcard to Nonresponding addresses ineligible for CATI	*Control* 1. **Prenotice letter** 2. Initial package 3. **1st Reminder postcard** 4. Paper questionnaire package 5. 2nd Reminder postcard 6. **Additional postcard for addresses not in CATI**	*Treatment 1* 1. Initial package[1] 2. **1st Reminder letter (with mandatory message)** 3. Paper questionnaire package 4. 2nd Reminder postcard 5. **Additional postcard for addresses not in CATI**	*Treatment 2* 1. Initial package[1] 2. **1st Reminder Postcard** 3. Paper questionnaire package 4. 2nd Reminder postcard 5. **Additional postcard for addresses not in CATI**
Additional Postcard to All Nonresponding addresses	*Treatment 3* 1. **Prenotice letter** 2. Initial package 3. **1st Reminder postcard** 4. Paper questionnaire package 5. 2nd Reminder postcard 6. **Additional postcard to all nonresponding addresses**	*Treatment 4* 1. Initial package[1] 2. **1st Reminder letter (with mandatory message)** 3. Paper questionnaire package 4. 2nd Reminder postcard 5. **Additional postcard to all nonresponding addresses**	*Treatment 5* 1. Initial package[1] 2. **1st Reminder Postcard** 3. Paper questionnaire package 4. 2nd Reminder postcard 5. **Additional postcard to all nonresponding addresses**

Note: Mailing pieces that vary between treatments and are part of the test are bolded. The Initial package, paper questionnaire package, and second reminder postcard were not part of the test.

[1]The package that contains the prenotice letter also contains a multi-lingual brochure so that people who do not speak English can understand the materials and respond. For the treatments 1, 2, 4, and 5, this brochure was in the initial mailing. We cannot tease out the effect of this movement in this test; however, past research has shown no differential impact on response between placement of the brochure in either mailing (Joshipura, 2010).

Figure 1. Timing and Sequence of Mailings for the Treatments with a Prenotice versus those Without



Initial = Initial Mailing
Rem PC = Reminder Postcard
Rem PC2 = Second Reminder Postcard
Pre-N = Prenotice
Rem Letter = Reminder Letter
Paper Q = Paper Questionnaire Package
Addtl PC = Additional Postcard

In production (control), the prenotice is sent four days before the initial mailing. To maximize the amount of time for Internet and mail responses before we move on to a more expensive mode, we decided to mail the initial mailing on the date we previously mailed the prenotice. Thus, the treatments without a prenotice received their initial mailing earlier than the treatments with the prenotice, providing them four extra days of access to the Internet survey[2]. The same day the no prenotice group received the initial mailing, the prenotice group received the prenotice. The Internet survey was accessible to both groups at the same time, even thought the no prenotice group had direct instructions for completing it earlier.

Moving up the initial mailing for the no prenotice group introduces some variation into the design. However, keeping the initial package at its current timing for the treatments without the prenotice may have resulted in more confounding, as the no prenotice group would have no knowledge that they were selected for the survey until four days after the prenotice group. We have no reason to believe that this timing difference would affect return rates at the end of the self-response phase of data collection. Also, we know from previous testing that the removal of the prenotice (without moving the initial mailing sooner) reduces total self-

[2] We make the assumption that the no prentice group received the intial mailing four days prior to the prenotice group, however this could vary depending on postal delivery times.

response. In the 2014 Pre-Notice Test, the response rate for the treatment without the prenotice was 1.0 percentage point lower than the response rate for the treatment with the prenotice (Murphy and Roberts, forthcoming). For the purposes of this experiment, the removal of the prenotice is inseparable from the earlier timing of the initial mailing.

2.3 Analysis Methodology

2.3.1 Return Rates

We calculated self-response return rates to answer the research questions. All self-response comparisons include looking at the total self-response return rate, the Internet return rate, and the mail return rate. The first three research questions involved testing materials in the self-response mailings; therefore, the universe used in the calculation to answer these questions was all mailable and deliverable sample addresses (defined in Section 2.3.2). For this part of the research, we calculated return rates for two points in the data collection cycle: before the paper questionnaire mailing (April 10, 2015) and before the first nonresponse follow-up operation (CATI beginning May 1, 2015). Analyzing return rates at different points in time provides a better understanding of response patterns between treatments, which can help predict changes in mailing and nonresponse follow-up workloads and costs.

The fourth research question addresses the impact of sending the additional reminder postcard to all nonresponding addresses, instead of just those ineligible for CATI. To answer this question, we calculated self-response (total, Internet, and mail) return rates while restricting the universe to only those eligible for CATI. This provided a clean comparison for studying the success of the additional postcard reminder. We compared self-response return rates to see if the additional postcard prompted self-response, which is less expensive than conducting CATI. In addition, we calculated CATI return rates to see if mailing the additional postcards had any impact on CATI response. For this part of the research, we calculated self-response and CATI return rates at a single point in the data collection cycle, at the end our CATI operation (May 31, 2015). Our second stage of nonresponse follow-up (Computer-Assisted Personal Interviews (CAPI)) comes after CATI and could affect return rates after this point in the data collection cycle. For this reason, we did not study return rates past CATI closeout.

All self-response return rate comparisons were also broken out by mode (Internet and mail), and were calculated using the following formulas:

$$\text{Total Self-Response Return Rate} = \frac{\text{\# of mailable and deliverable sample addresses that provided a non-blank[3] mail return, TQA interview[4], or a complete or sufficient partial Internet response[5]}}{\text{Total \# of mailable and deliverable sample addresses[6]}} *100$$

$$\text{Internet Return Rate} = \frac{\text{\# of mailable and deliverable sample addresses that provided a complete or sufficient partial Internet response[5]}}{\text{Total \# of mailable and deliverable sample addresses[6]}} *100$$

$$\text{Mail Return Rate} = \frac{\text{\# of mailable and deliverable sample addresses that provided a non-blank[3] mail return or TQA interview[4]}}{\text{Total \# of mailable and deliverable sample addresses[6]}} *100$$

For the second part of the analysis, we calculated the self-response return rates shown above for the CATI eligible universe (defined in Section 2.3.2). In addition, we calculated CATI return rates using the following formula:

$$\text{CATI Return Rate} = \frac{\text{\# of CATI eligible sample addresses that provided a complete or sufficient partial CATI interview[5]}}{\text{Total \# of CATI eligible sample addresses}} *100$$

[3] A blank form is a form in which there are no data defined persons and the telephone number listed on the form by respondents is blank.

[4] Telephone Questionnaire Assistance (TQA) allows respondents to call a toll-free number to receive help completing the survey. Respondents can either complete the mail or Internet form or complete the survey over the phone with an interviewer. TQA responses are included with mail responses since they usually occur during the mail data collection month.

[5] A response is considered complete if the respondent reached the end of the survey. A sufficient partial response is when the response is not fully complete, but the respondent got to at least one question in the detailed person section.

[6] We excluded Undeliverable as Addressed (UAAs) (see Section 2.3.2 for more information). For the second set of rates, the universe only includes nonresponding addresses eligible for CATI.

2.3.2 Universe Eligibility and Response Criteria

Universe Eligibility for First Three Research Questions

To answer the first three research questions we calculated self-response (total, Internet, and mail) return rates. The universe used for these calculations, included addresses that could receive mail and therefore have a chance to respond in the Internet or mail modes. We excluded addresses designated as "unmailable" (meaning we do not have a valid mailing address) and addresses for which our mailing was returned because the post office determined the address was "undeliverable as addressed" (UAA).[7] All addresses not excluded by one of these criteria we counted as eligible for both the Internet and mail modes.[8]

Universe Eligibility for Fourth Research Question

To answer the fourth research question we calculated self-response and CATI return rates. For these calculation we used a different universe from the one mentioned above. We only included addresses eligible for the CATI mode. Cases eligible for CATI are previous non responding addresses. We determine whether the sample address is eligible for CATI a few days before we begin the CATI operation. If we received a return from a CATI eligible case prior to the start of the CATI operation, we removed the sample address from our calculations.

Response Criteria for Internet Return

We counted a case as an Internet response if the address was in the applicable universe defined in Section 2.3.2, and one of the following conditions was satisfied:

- There was a completed Internet response.
- There was a sufficient partial Internet response. That is, not all items were answered, but the respondent got through the basic person and housing sections and to at least one of the questions in the detailed person section.
- The unit is suspected to be vacant based on the Internet response received. Vacancy is not confirmed, but at the point in time for which we are calculating the Internet return rate, this is considered a valid and complete Internet response.

[7] Note that there are situations where the first or second mailing is designated UAA, yet there is a valid Internet or Mail response from the other mailing. In these cases, we do NOT consider the case UAA, so we count it in both the self-response denominator and the appropriate numerator.

[8] When calculating final response rates, we exclude cases where a telephone contact via Failed-Edit Follow-Up (FEFU) or TQA determined that an address was out of scope for ACS (often a business). We do not exclude them when calculating return rates.

- The unit is suspected to be a business based on the Internet response received. While businesses are considered out-of-scope for the survey, when calculating return rates we considered them a valid response.

Response Criteria for Mail Return

We counted a case as a mail mode response if the address was in the applicable universe defined in Section 2.3.2 and one of the following conditions was satisfied:

- There was a non-blank mail response.
- There was a completed or sufficient partial response via TQA.

Response Criteria for CATI Return

We counted a case as a CATI response if the address was in the second universe defined in Section 2.3.2, and, through a CATI interview, we obtained enough information for the response to be considered a complete or sufficient partial response.

Multiple Returns

Occasionally, we receive more than one response for a sampled address and must choose which return to use. For the first three research questions, we chose the first self-response (Internet, TQA, mail) return received. We did the same for the fourth research question, unless there was a CATI response. If there was a CATI response, the CATI response was considered the mode of response.

2.3.3 Calculation of Margin of Error

We estimated variances using the Successive Differences Replication (SDR) method with replicate weights.[9] Since we are calculating return rates, we use the replicate base weights that account only for sampling probabilities. For each type of rate and treatment, we calculated the return rate for the 80 half-sample replicates. Then, for each replicate, we calculated the difference between the treatments.

[9] Chapter 12 of the ACS Design and Methodology document (U.S. Census Bureau, 2014) has details and references regarding the SDR method for variance estimation.

The variance for each rate and group, and each difference, was calculated using the formula

$$Var(RR_0) = \frac{4}{80}\sum_{r=1}^{80}(RR_r - RR_0)^2$$

where

RR_0 = the return rate or difference estimate calculated using the full sample base weights,

RR_r = the return rate or difference estimate calculated for replicate r.

Next, we calculated the standard error (se) for an estimate by taking the square root of the variance.

Finally, we calculated the margins of error (MOEs) based on a 90-percent confidence level,

using the following formula:

Margin of error = se X 1.645

The MOEs are included in the report tables in parentheses next to the estimates.

We conducted statistical testing to identify differences between the estimates shown in the report. The more statistical tests we perform, the more likely we are to reject the null hypothesis when it is true (i.e., a false alarm or Type I error). We used the Holm-Bonferroni method (Holm, 1979) to control for this error. The tables in the report include a column indicating if the differences were statistically significant. This determination was based upon the Holm-Bonferroni adjusted p-values.

2.3.4 Cost Analysis

We also reviewed the effect of the experimental treatments on the operational cost of data collection to answer research question 5. Many variables feed into data collection costs. For each experimental treatment, we calculated the potential annual cost savings in printing and postage for each treatment assuming standard production check-in rates[10].

[10] The denominator used to calculate check-in rates includes UAAs. This is important for cost analysis because there is a cost associated with the mailing, even though the Post Office determined it undeliverable. UAAs are not included in the calculation of return rates because returns cannot be received from sample addresses that never receive mailings.

Check-in rates from the field test are used to refine printing and postage costs, as well as evaluate cost differences from the control for data capture, mail package assembly, and nonresponse follow-up operations. Combining cost impacts from each of these areas allows us to predict the annual cost difference for each experimental treatment compared to the control treatment.

2.4 Assumptions and Limitations

2.4.1 Assumptions

This research assumes that a single ACS monthly sample panel is representative of an entire survey year (12 panels) with respect to both return rates and costs. It also assumes that a single test group is representative of the full annual sample. Both of those assumptions are part of the ACS sample design methodology.

2.4.2 Limitations

1. When designing the message used for the reminder letter, the focus was to make the Internet URL more prominent and to include the User ID to make it easier for respondents to log into the online survey. However, it is important to point out that there were other differences between the letter and the postcard. The reminder letter included the mandatory language, "**Your response to this survey is required by law.**" The letter also included the following, "Your response is critically important to your local community and your country. Responding promptly will prevent your receiving additional reminder mailings, phone calls, or personal visits from Census Bureau interviewers." In addition, the reminder letter asked respondents to "Respond Now", while the postcard stated "as soon as possible" in the message. Because of the multiple modifications, when comparing the reminder letter and the reminder postcard, it is impossible to know how and whether each message contributed individually to differences found in the analysis.

2. We sent the initial package to the treatments without a prenotice (Treatments 1, 2, 4, and 5) four days before we sent the initial package to the treatments with the control mail strategy (Control and Treatment 3). We did this to maximize the amount of time respondents had to self-respond through the Internet mode. However, because the removal of the prenotice and the earlier mailing of the initial package were tested in combination, we are not able to analyze the effects of each of these modifications separately.

3. The cost analysis assumes that the costs of various operations are fluid; however, in reality, many costs tend to fluctuate, that is, they take time to adjust to changes in workloads and methodology. For example, we might not see an immediate decrease in the cost of data capture even if we reduce the workloads for this operation. This is especially true for operations that rely heavily on staff to complete work (as opposed to operations like printing or postage that are charged by unit). In the long run, we assume staffing plans will adjust to the new workloads.

4. Finally, it is important to understand that the self-response return rates documented in this analysis reflect only the mailable and deliverable universe for this test and are therefore different from the published ACS production response rates.

3. Results

3.1 What is the impact on self-response return rates of removing the prenotice and sending the initial mailing at the time when the prenotice would normally be sent (four days sooner)?

We compared return rates between the treatments with the prenotice (Control and Treatment 3) and the treatments without the prenotice (Treatments 2 and 5) to determine the impact of removing the prenotice and sending the initial mailing earlier. The letter included in the prenotice is shown in Appendix A.

Table 2 shows self-response, Internet, and mail return rates for prenotice group (PN (C&T3)) and the no prenotice group (No PN (T2&T5)) at different points in the data collection cycle. The only difference between the groups was the presence of a prenotice and the timing of the initial package mailing. Both groups used a postcard for the first reminder contact. This comparison allowed us to study the effects of both removing the prenotice and moving the initial package in its place.

Table 2. Return Rates by Data Collection Mode – Prenotice (C&T3) versus No Prenotice (T2&T5)

Total Self-Response (Internet & Mail combined)

Point in Data Collection Cycle	PN (C&T3)	No PN (T2&T5)	Difference	Significant*
Before Paper Questionnaire Mailing[11]	23.0 (0.2)	21.6 (0.6)	1.4 (0.6)	Yes
Before CATI	46.7 (0.2)	46.3 (0.7)	0.3 (0.7)	No

Internet

Point in Data Collection Cycle	PN (C&T3)	No PN (T2&T5)	Difference	Significant*
Before Paper Questionnaire Mailing	22.7 (0.2)	21.3 (0.6)	1.4 (0.6)	Yes
Before CATI	29.3 (0.2)	27.7 (0.6)	1.6 (0.6)	Yes

Mail

Point in Data Collection Cycle	PN (C&T3)	No PN (T2&T5)	Difference	Significant*
Before CATI	17.4 (0.2)	18.6 (0.5)	-1.2 (0.5)	Yes

Source: U.S. Census Bureau, American Community Survey, 2015 Mail Contact Strategy Test
Margins of error are shown in parenthesis. *Significant at α=0.1 level, adjusting for multiple comparisons.
PN (C&T3): **Prenotice**; Reminder Postcard No PN (T2&T5): **No Prenotice**; Reminder Postcard

[11] This is mostly made up of Internet returns, but does not match the Internet return rates because of TQA returns, which are counted as mail returns.

Returns for the group without the prenotice (T2&T5) initially started coming in before returns from the prenotice group (C&T3). This was because the no prenotice group received the initial package with instructions for completing the Internet survey earlier. This pattern quickly changed as the prenotice group began receiving their initial mailing providing them access to the Internet survey. As shown in Table 2, before the paper questionnaire package was mailed (and after both groups had received the initial mailing), response from the group receiving the prenotice (C&T3) was higher than response for the group not getting the prenotice (T2&T5) by 1.4 percentage points. This suggests that receiving the prenotice initially increased return rates. However, after receiving the paper questionnaire package, the total self-response return rates leveled out between treatments. Just before the start of CATI, the total self-response return rate was not statistically different between treatments (46.7 and 46.3 percent, respectively). While there was no difference in total self-response prior to CATI, the individual return rates broken out by mode were significantly different between groups. Also, the pattern of the difference in treatments was opposite between modes. Internet return rates were higher for the group with the prenotice (C&T3), while mail return rates were higher for the group without the prenotice (T2&T5). It appears that the prenotice may not necessarily increase total self-response, but it may result in a mode-switch – leading some would-be mail responders to switch modes and respond over the Internet.

3.2 In the absence of a prenotice letter, does changing the first reminder contact from a postcard to a letter (with a mandatory message and highlighting the User ID) impact the self-response return rates?

To answer this question, we compared return rates between the no prenotice treatments with the reminder letter (Treatments 1 and 4) and the no prenotice treatments using the traditional reminder postcard (Treatments 2 and 5) to see which type of reminder contact produced the higher return rates. The letter and postcard reminders are displayed in Appendix B and Appendix C, respectively.

Table 3 shows self-response, Internet, and mail return rates for the reminder letter group (Letter (T1&T4)) and reminder postcard group (Postcard (T2&T5)) at different points in the data collection cycle. Both groups eliminated the prenotice and had the same timing for the mailing of the initial package. Thus, we were able to cleanly measure the impact of the reminder letter with a mandatory message and a prominent display of the User ID versus the reminder postcard.

Table 3. Return Rates by Data Collection Mode – Letter (T1&T4) versus Postcard (T2&T5)

Total Self-Response (Internet & Mail combined)

Point in Data Collection Cycle	Letter (T1&T4)	Postcard (T2&T5)	Difference	Significant*
Before Paper Questionnaire Mailing[11]	26.7 (0.7)	21.6 (0.6)	5.1 (0.8)	Yes
Before CATI	50.1 (0.7)	46.3 (0.7)	3.8 (1.1)	Yes

Internet

Point in Data Collection Cycle	Letter (T1&T4)	Postcard (T2&T5)	Difference	Significant*
Before Paper Questionnaire Mailing	26.1 (0.7)	21.3 (0.6)	4.8 (0.8)	Yes
Before CATI	32.8 (0.7)	27.7 (0.6)	5.1 (0.9)	Yes

Mail

Point in Data Collection Cycle	Letter (T1&T4)	Postcard (T2&T5)	Difference	Significant*
Before CATI	17.4 (0.5)	18.6 (0.5)	-1.2 (0.7)	Yes

Source: U.S. Census Bureau, American Community Survey, 2015 Mail Contact Strategy Test
Margins of error are shown in parenthesis.
*Significant at α=0.1 level, adjusting for multiple comparisons.
Letter (T1&T4): No Prenotice; **Reminder Letter**
Postcard (T2&T5): No Prenotice; **Reminder Postcard**

Before the paper questionnaire package was mailed, the total self-response return rate for the group with the reminder letter (T1&T4) was significantly higher (by 5.1 percentage points) than the return rate for the group with the reminder postcard (T2&T5). Despite significantly lower return rates for the mail mode (1.2 percentage points lower), the reminder letter group (T1&T4) had higher self-response return rates than the reminder postcard group (T2&T5) before CATI (50.1 percent compared to 46.3 percent). We analyzed daily return rates and found that the difference in return rates was evident almost immediately after respondents began receiving the reminder mailing. The test showed that replacing the reminder postcard with a reminder letter emphasizing that participation is required by law and including information on how to complete the survey online can improve Internet self-response return rates.

3.3 Does the use of a letter reminder along with the earlier mailing of the initial package overcome the loss of self-response from the removal of the prenotice? What is the impact on self-response of removing the prenotice and using a reminder letter with mandatory messaging in lieu of a reminder postcard?

Research question 3.1 showed that removing the prenotice and moving up the initial mailing decreased Internet self-response before the paper questionnaire package was mailed and before CATI follow-up. This question addresses whether we can make up the response loss by sending a reminder letter with mandatory messaging instead of a reminder postcard. To answer this question, we compared self-response return rates overall and by mode between the prenotice/postcard reminder treatments (Control and Treatment 3) and the no prenotice/reminder letter treatments (Treatments 1 and 4).

The Control and Treatment 3 received the prenotice and the reminder postcard. Cases in Treatments 1 and 4 did not receive the prenotice or the reminder postcard; instead, they received the initial mailing early (the same day the other group received the prenotice) and they received the letter reminder with the User ID and mandatory message.

Table 4 shows self-response, Internet, and mail return rates for the prenotice, postcard group (PN, PC (C&T3)) and the no prenotice, letter group (No PN, L (T1&T4)) at different points in the data collection cycle.

Table 4. Return Rates by Data Collection Mode – Prenotice, Postcard (C&T3) versus No Prenotice, Letter (T1&T4)

Total Self-Response (Internet and Mail combined)

Point in Data Collection Cycle	PN, PC (C&T3)	No PN, L (T1&T4)	Difference	Significant*
Before Paper Questionnaire Mailing[11]	23.0 (0.2)	26.7 (0.7)	-3.7 (0.7)	Yes
Before CATI	46.7 (0.2)	50.1 (0.7)	-3.5 (0.7)	Yes

Internet

Point in Data Collection Cycle	PN, PC (C&T3)	No PN, L (T1&T4)	Difference	Significant*
Before Paper Questionnaire Mailing	22.7 (0.2)	26.1 (0.7)	-3.5 (0.7)	Yes
Before CATI	29.3 (0.2)	32.8 (0.7)	-3.5 (0.7)	Yes

Mail

Point in Data Collection Cycle	PN, PC (C&T3)	No PN, L (T1&T4)	Difference	Significant*
Before CATI	17.4 (0.2)	17.4 (0.5)	0.0 (0.5)	No

Source: U.S. Census Bureau, American Community Survey, 2015 Mail Contact Strategy Test
Margins of error are shown in parenthesis.
*Significant at α=0.1 level, adjusting for multiple comparisons.
PN, PC (C&T3): **Prenotice; Reminder Postcard**
No PN, L (T1&T4): **No Prenotice; Reminder Letter**

The total self-response and Internet return rates shown in Table 4 are all lower for the prenotice/reminder postcard group (C&T3). Before mailing the paper questionnaire package, the total self-response return rate for this group was 3.7 percentage points lower than the rate for the no prenotice/reminder letter group (T1&T4). In addition, the rate for the prenotice/reminder postcard group (C&T3) is 3.5 percentage points lower before the CATI operation begins. The return rates for the mail mode were not significantly different between treatments.

3.4 What is the impact on self-response and CATI return rates of sending an additional postcard to all nonresponding addresses compared to sending only to nonresponding addresses ineligible for CATI?

Sample addresses that do not respond during the self-response phase may be eligible for follow-up operations. During CATI follow-up, we contact nonresponding addresses for which we

have a phone number. Then, during CAPI follow-up, we visit a sample of addresses that did not self-respond and/or we were unable to reach in CATI. Just prior to the beginning of our CATI operation, we send an additional reminder postcard to nonresponding address that are ineligible for CATI. Dillman suggested that we send the additional reminder postcard to all nonresponding addresses, rather than just those ineligible for CATI.

To study Dillman's suggestion, we designed three extra treatments to see whether the additional postcard reminder mailing prompted additional self-response and/or more cooperation towards CATI follow-up. For each of the treatments mentioned earlier – Control (prenotice, postcard), Treatment 1 (no prenotice, letter), and Treatment 2 (no prenotice, postcard) – we had a corresponding treatment (Treatments 3, 4, and 5, respectively) that used the same contact strategy but included a third reminder postcard sent to all nonresponding addresses, including CATI eligible addresses. The control, Treatment 1, and Treatment 2 only sent this reminder postcard to addresses for which we had no phone number to use for CATI.

We compared the return rates for each of the three mailing strategies (Control, Treatment 1, and Treatment 2) to their corresponding treatment with the additional reminder postcard mailings: Control vs. Treatment 3; Treatment 1 vs. Treatment 4; and Treatment 2 vs. Treatment 5. This allowed us to see if mailing the additional postcard to CATI eligible addresses differed depending on the mail contact strategy used.

For this part of the analysis, we limited the denominator of the return rates to only those cases that were eligible for CATI (as described in Section 2.3.2). In addition to calculating self-response return rates, we calculated CATI return rates, since CATI response could also have been affected by the additional postcard mailings. The return rates for this section were calculated at the end of the CATI follow-up operation, since this is the period of time we would expect to see an impact from mailing the additional postcards.

First, we looked at the impact on return rates from sending postcards to CATI eligible addresses who received the control version of mailing materials, which included the prenotice and a postcard for the first reminder contact. Table 5 shows self-response, Internet, mail, and CATI return rates for Control (C (PN, PC)) and Treatment 3 (T3 (PN, PC, Add. PC)) at the end of the CATI follow-up operation.

Table 5. Return Rates for CATI Eligible Cases by Data Collection Mode at CATI Closeout – Control (C) versus Treatment 3 (T3)

	T3 (PN,PC,Add. PC)	C (PN, PC)	Difference	Significant*
Total Self-Response and CATI	**28.3 (1.6)**	**23.7 (0.3)**	**4.6 (1.7)**	Yes
Total Self-Response	**17.0 (1.3)**	**12.3 (0.2)**	**4.6 (1.3)**	Yes
Internet	5.7 (0.8)	3.4 (0.2)	2.3 (0.8)	Yes
Mail	11.3 (1.0)	9.0 (0.2)	2.3 (1.0)	Yes
CATI	**11.3 (1.0)**	**11.3 (0.2)**	**0.0 (1.1)**	No

Source: U.S. Census Bureau, American Community Survey, 2015 Mail Contact Strategy Test
Margins of error are shown in parenthesis.
*Significant at α=0.1 level, adjusting for multiple comparisons.
Treatment C (C): Prenotice; Reminder Postcard; **No Additional Postcard**
Treatment 3 (T3): Prenotice; Reminder Postcard; **Additional Postcard**

The self-response return rates for the CATI eligible addresses receiving the additional reminder postcard (T3) were significantly higher than the rates for the group not receiving the additional reminder postcard (C) -- overall and by mode. The total self-response return rate for CATI eligible addresses receiving the reminder postcard (T3) was 17.0 percent, compared to 12.3 percent for the group not receiving the postcard (C). The Internet and mail return rates were both higher for this group (T3) and the differences were similar. The CATI return rate was not statistically different between treatments, at 11.3 percent. The combined total self-response and CATI return rate was significantly higher for the group receiving the additional postcards.

Next, we look at the impact on return rates from sending postcards to CATI eligible addresses who received the Treatment 1 version, which did not include the prenotice and used a letter for the first reminder contact. Table 6 shows self-response, Internet, mail, and CATI return rates for Treatment 1 (T1 (No PN, L)) and Treatment 4 (T4 (No PN, L, Add. PC)) at the end of the CATI follow-up operation.

Table 6. Return Rates for CATI Eligible Cases by Data Collection Mode at CATI Closeout – Treatment 1 (T1) versus Treatment 4 (T4)

	T4 (No PN, L, Add. PC)	T1 (No PN, L)	Difference	Significant*
Total Self-Response and CATI	**26.8 (1.4)**	**23.7 (1.4)**	**3.1 (1.8)**	Yes
Total Self-Response	**15.6 (1.1)**	**12.0 (1.1)**	**3.6 (1.5)**	Yes
Internet	4.4 (0.7)	3.5 (0.6)	0.9 (0.9)	No
Mail	11.2 (0.9)	8.5 (1.0)	2.7 (1.2)	Yes
CATI	**11.2 (1.0)**	**11.7 (1.0)**	**-0.5 (1.4)**	No

Source: U.S. Census Bureau, American Community Survey, 2015 Mail Contact Strategy Test
Margins of error are shown in parenthesis.
*Significant at α=0.1 level, adjusting for multiple comparisons.
Treatment 1 (T1): No Prenotice; Reminder Letter; **No Additional Postcard**
Treatment 4 (T4): No Prenotice; Reminder Letter; **Additional Postcard**

The total self-response return rate for CATI eligible addresses getting the additional reminder postcard (T4) was higher than the rate for the CATI eligible addresses not getting the additional reminder postcard (T1) (15.6 percent versus 12.0 percent). Unlike the previous comparison, the difference between treatments was not similar by mode. While the mail return rates followed a similar pattern (with higher rates for the group receiving the postcards (T4)), the Internet return rates were not statistically different between treatments. We believe this is because the letter used for the first reminder contact for these treatments had already prompted an increase in Internet response during the self-response phase of the data collection cycle (as shown in Tables 2 and 4 above). The CATI return rates were not statistically different between T4 and T1. The combined total self-response and CATI return rate was significantly higher for the group receiving the additional postcards.

Finally, we look at the impact on return rates from sending postcards to CATI eligible addresses with the no prenotice/reminder postcard mail contact strategy. Table 7 shows self-response, Internet, mail, and CATI return rates for Treatment 2 (T2 (No PN, PC)) and Treatment 5 (T5 (No PN, PC, Add. PC)) at the end of the CATI follow-up operation.

Table 7. Return Rates for CATI Eligible Cases by Data Collection Mode at CATI Closeout – Treatment 2 (T2) versus Treatment 5 (T5)

	T5 (No PN, PC , Add. PC)	T2 (No PN, PC)	Difference	Significant*
Total Self-Response and CATI	**29.3(1.3)**	**24.6(1.4)**	**4.8 (1.7)**	Yes
Total Self-Response	**17.4 (1.3)**	**12.4 (1.0)**	**5.0 (1.5)**	Yes
Internet	5.9 (0.8)	2.9 (0.5)	3.0 (1.0)	Yes
Mail	11.5 (1.1)	9.6 (1.0)	1.9 (1.4)	Yes
CATI	**11.9 (1.0)**	**12.1 (1.0)**	**-0.2 (1.3)**	No

Source: U.S. Census Bureau, American Community Survey, 2015 Mail Contact Strategy Test
Margins of error are shown in parenthesis.
*Significant at α=0.1 level, adjusting for multiple comparisons.
Treatment 2 (T2): No Prenotice; Reminder Postcard; **No Additional Postcard**
Treatment 5 (T5): No Prenotice; Reminder Postcard; **Additional Postcard**

The results shown in Table 7 are similar to those shown in Table 5. The self-response return rates for the CATI eligible addresses receiving the additional reminder postcard (T5) were significantly higher than the rates for those not receiving the additional reminder postcard (T2). The total self-response return rate for CATI eligible addresses in T5 was 17.4 percent, compared to 12.4 percent for T2. Both the Internet and mail return rates were higher for T5 (3.0 percentage points higher for Internet and 1.9 percentage points higher for mail). The CATI return rate was not statistically different between treatments. The combined total self-response and CATI return rate was significantly higher for the group receiving the additional postcards.

The test showed that sending the additional reminder postcard to CATI eligible addresses increased the self-response return rates for these addresses – regardless of which mail contact strategy was used. The additional postcard did not impact CATI return rates.

3.5 What would be the impact on the cost of data collection if the new mail contact strategies were implemented into ACS production operations?

Although a treatment strategy may boost response, depending on the type of response and the amount of increased response, the strategy might not be the most cost effective. Therefore, we compared appropriate treatments in order to isolate each of the new mail strategies to determine if any would result in meaningful cost savings for the ACS program. We specifically looked at the costs for both the mail operation, which includes postage, printing, assembly and data capture, and the non-response follow up operations, which include CATI and CAPI operations. Given the relative cost differences between each mode of collection, the cost model methodology depends heavily on the actual CAPI workloads for each treatment. We found during our test that identical treatments, prior to nonresponse follow up operations, resulted in slightly different CAPI workloads. We believe these differences are a consequence of differences between the observed CAPI subsampling rates for treatments, which is an artifact of the small sample sizes in this test. Although these differences were small, they caused significant differences in the cost of the CAPI operation. Therefore, we used the same standard subsampling rate for each treatment to more accurately estimate and compare the cost impacts.

The cost analysis methodology used check-in rates from the field test, which are subject to sampling variability. We estimated variances for the check-in rates using a 90 percent confidence level and used them to calculate upper and lower bounds for our cost estimates. Therefore, most of the cost savings in this analysis are reflected as a range of these two estimates. The upper and lower bounds do not reflect margins of error for the cost savings point estimates. The lower bound savings is calculated based on differences in the lowest check-in rates (after accounting for variability), while the upper bound savings is calculated based on differences in the highest check-in rates (after accounting for variability). In some cases, the lower bound estimate is higher than the upper bound estimate for the mailing costs. This is because higher check-in rates in the upper bound can lead to higher return postage costs and data capture costs, therefore, resulting in less cost savings. Due to limitations in our standard cost analysis methodology, we had to adjust our method to calculate cost savings from sending the additional postcards to CATI eligible addresses. We did not have variances to use in our modified method, therefore for this portion of the analysis we only show point estimates (as shown in Table 11).

3.5.1 Cost impact of removing the prenotice and sending the initial mailing earlier

First, we compared cost savings between the Control and Treatment 2 to determine the impact of removing the prenotice letter and sending the initial mailing earlier. Research question 3.1 compared return rates between the prenotice group and no prenotice/early initial mailing group and found higher total self-response return rates for the group receiving the prenotice before the paper questionnaire package was mailed. However, at the end of the self-response

phase of data collection, the total self-response return rates were not significantly different between groups. Because there was no measurable difference in rates between these groups at the end of the self-response phase, any cost savings in the nonresponse follow-up operations cannot be attributed to the presence/exclusion of the prenotice or considered significant. Therefore, for this question we chose to only estimate savings in mail collection costs. Table 8 shows that removing the prenotice letter (Treatment 2) would result in cost savings of approximately $2.1 million for mail collection operations.

Table 8. Approximate Annual Cost Savings when removing the prenotice and moving the initial mailing earlier- Difference (Control – T2)

	Lower Bound	Upper Bound
Mail	$2,117,000	$2,091

Source: DiFiglia (2015)

3.5.2 Cost impact of changing the first reminder contact from a postcard to a letter

We also compared cost impacts between Treatment 1 and Treatment 2 to see which type of reminder contact, letter or postcard, produced the higher cost savings. The reminder letter costs more to print and requires more postage than the reminder postcard. However, self-response rates were significantly higher when mailing the reminder letter (Treatment 1). An increase in self-response caused lower costs for printing, postage, and assembly of the replacement mail package. Table 9 shows that mailing a letter instead of a postcard resulted in extra costs of approximately $0.5 million for the mail collection operation. Additionally, an increase in self-response in Treatment 1 decreased workloads in the CATI and CAPI operations. The costs savings using Treatment 1 are illustrated in Table 9. The significant increase in response from mailing a letter (Treatment 1) instead of a postcard (Treatment 2) would result in approximate cost savings between $6,565,000 and $6,567,000 annually. Therefore, the savings from higher self-response rates are able to make up for the increased mailing cost of a letter. We believe using a reminder letter instead of a reminder postcard would not only improve self-response rates, but would also result in substantial cost savings for the ACS program annually.

Table 9. Approximate Annual Cost Savings by replacing the reminder postcard with a reminder letter - Difference (T2 – T1)

	Lower Bound	Upper Bound
Mail	($47,000)	($500,000)
CATI/CAPI	$7,038,000	$7,067,000
Total	$6,565,000	$6,567,000

Source: DiFiglia (2015)

3.5.3 Cost impact of the use of a reminder letter along with the earlier mailing of the initial package

After concluding that it is more cost effective to use a letter for reminder contact and also to remove the prenotice letter and send the initial mailing earlier, we then wanted to evaluate the

cost impact of using a combination of both mail strategies. Therefore, we compared cost savings between Control (Prenotice, Postcard) and Treatment 1 (No Prenotice, Letter). Since the cost of sending a reminder letter is equivalent to sending a prenotice letter, the cost savings of removing the prenotice are offset by the addition of the letter for Treatment 1. The savings in the mail operation for Treatment 1 would be due to eliminating the cost of printing and mailing a reminder postcard. An increase in self-response for Treatment 1 also caused a decrease in the cost of printing, postage, and assembly of the paper questionnaire and reminder postcards. The total of these costs savings can be found in Table 10. Since the mail operation does not make up the majority of the annual budget, there are minimal cost savings for the mail operation with this new strategy. However, the test found that the reminder letter in combination with the removal of the prenotice and earlier mailing of the initial package (Treatment 1) was able to cause the largest increase in self-response rates before the CATI operation began. This resulted in substantial cost savings for the nonresponse follow up operations. Overall, if the mail strategy of removing the prenotice letter, sending the initial mailing earlier, and using a reminder letter in lieu of a reminder postcard were to be implemented, we would expect approximate cost savings between $5,663,000 and $9,070,000 for the ACS program annually.

Table 10. Approximate Annual Cost Savings when removing the prenotice, moving the initial mailing earlier, and sending a reminder letter - Difference (Control – T1)

	Lower Bound	Upper Bound
Mail	$1,381,000	$1,357,000
CATI/CAPI	$4,282,000	$7,713,000
Total	$5,663,000	$9,070,000

Source: DiFiglia (2015)

3.5.4 Cost impact of sending an additional postcard to all nonresponding addresses

Finally, we evaluated the cost savings for each of the three treatments for which the additional reminder postcard was mailed to all nonresponding addresses (T3, T4, T5). We compared each of these treatments to the corresponding treatments that used the same contact strategy, but that mailed the additional postcard to only those ineligible for CATI. The cost of the postcard varied for each treatment because the volume that is sent out is dependent on the self-response rates before the CATI operation begins. In order to estimate a base rate cost of the postcard, we compared costs between the Control and Treatment 3, which both used the production mail strategy (Prenotice, Postcard). The volume of the postcards doubled in size when sending them to all nonresponding addresses (Treatment 3) and resulted in an increase in printing and postage costs of approximately $500,000 annually for this postcard only.

We then evaluated whether the increase in return rates from sending postcards to CATI eligible addresses was able to make up for the increase in cost resulting from mailing the postcards. Across all three comparisons, the total self-response return rate for CATI eligible addresses getting the additional reminder postcard was significantly higher. Increases in self-response reduce nonresponse follow-up workloads; therefore, we expected lower costs for the three

treatments that sent additional reminder postcards to CATI eligible addresses. While our cost model estimated savings for Treatment 3 compared to Control and for Treatment 5 compared to Treatment 2, the model estimated higher costs for Treatment 4 compared to Treatment 1. However, the methodology for this cost analysis used costs per case to evaluate CATI costs. Because we suspect that the introduction of the postcard makes CATI calls more efficient — either by removing cases from the workload through late mail returns or lowering the number of calls needed to secure a complete interview —the complete cost impact of sending the postcard to households in the CATI workload is difficult to evaluate. In addition, our cost method used each treatment's actual CAPI subsampling factors, which we found to be different from the standard CAPI subsampling factor (due to the small sample sizes of the test treatments).

Therefore, we decided to modify our cost model to account for these limitations. First, we estimated the total number of cases that respond by Internet, mail, and telephone during the CATI month for each treatment using the actual return rate for CATI eligible cases from each treatment. Then, using the standard CAPI subsampling rate, we estimated the total number of nonresponding CATI cases subsampled into CAPI across all treatments. Next, we found the difference in CAPI workloads between the three comparisons and estimated CAPI cost savings by multiplying the difference by the average cost per CAPI interview. Finally, we subtracted the estimated $500,000 printing and postage costs from the CAPI cost savings to estimate total savings. Table 11 shows that Treatment 3 would save approximately $1,890,000 annually when compared to Control, Treatment 4 would save approximately $1,060,000 when compared to Treatment 1, and Treatment 5 would save approximately $2,138,000 annually when compared to Treatment 2. Using this methodology, we found that the postcard would save money using any of the three mailing strategies that sent the additional postcard to all nonresponding addresses. We have already concluded that removing the prenotice letter, sending the initial mailing earlier, and sending a reminder letter (Treatment 1) results in the highest cost savings of between $5,663,000 and $9,070,000 annually. Assuming that CAPI subsampling rates remain constant across all mailing strategies, sending an additional reminder postcard to all nonresponding addresses could save an additional $1,060,000 annually.

Table 11. Annual Cost Savings (Point Estimates) of CAPI Operation for Treatments Sending the Additional Postcard to all Nonresponding Addresses

	C (PN, PC) vs T3 (Add. PC)	T1 (No PN, PL) vs T4 (Add. PC)	T2 (No PN, PC) vs T5 (Add. PC)
Estimated Annual Cost Savings	$1,890,000	$1,060,000	$2,138,000

Source: DiFiglia (2015)

We used two approaches to estimate cost savings and found conflicting results. We believe our modified cost model may more accurately reflect potential cost savings from sending the additional postcard to CATI eligible addresses. However, this model assumes standard CATI subsampling rates, and any changes in CATI subsampling rates would have significant impacts on cost estimates. Another test using a larger sample size would be useful in order to better

estimate the cost impact of the additional postcards. We also plan to conduct further research in order to see if receiving a reminder postcard improves the efficiency of the CATI operation.

Overall, when assuming a standard CAPI sampling rate, removing the prenotice letter, sending the initial mailing earlier, sending a reminder letter in lieu of a reminder postcard and only sending additional reminder postcards to ineligible CATI addresses may potentially result in the most substantial cost savings for the ACS program annually.

4. Conclusions

The purpose of the 2015 Mail Contact Strategy Modification Test was to study the impact on respondent behavior when removing the prenotice letter and moving the initial mailing earlier, changing the first reminder postcard to an actionable letter emphasizing the mandatory nature of the survey, and expanding the universe for the third reminder postcard mailing. Of the three items/strategies tested, the one with the most promising results was the reminder letter prominently displaying the URL to the Internet survey and User ID, and including the mandatory messaging. In the absence of a prenotice, the treatments with the new reminder letter (T1&T4) significantly outperformed the treatments with the reminder postcard (T2&T5). At the end of the self-response phase of data collection (before CATI follow-up), 50.1 percent of addresses receiving the reminder letter had self-responded compared to 46.3 percent of addresses receiving the reminder postcard. When comparing the treatment's return rates by mode, we learned that the treatment with the reminder letter had higher Internet return rates, but lower mail return rates. This suggests that the reminder letter may not only result in more self-response, but also may cause a mode shift, leading to more Internet response and less mail response. Including the User ID and mandatory message on the reminder letter may increase earlier response causing respondents to respond online before they receive the mail questionnaire. An increase in return rates, like the increase found in this test, could yield savings in mailing and follow-up costs.

In addition to comparing the reminder postcard and the reminder letter, we studied the impact on self-response return rates of removing the prenotice and sending the initial mailing at the time when the prenotice would normally be sent (four days sooner). We found significant differences between treatments when looking at the Internet and mail return rates separately, however the pattern was not the same between modes and therefore the difference in total self-response was not statistically different between treatments at the end of the self-response phase. However, the return rate for the treatment with the prenotice (C&T3) was 1.4 percentage points higher than the treatment without the prenotice (T2&T5) prior to us mailing the paper questionnaire package. Despite this increase in response, we found that removing the prenotice resulted in higher cost savings for the mail activities.

We also compared the C&T3 group to T1&T4 group to see the impact on self-response of removing the prenotice and using a reminder letter in lieu of a reminder postcard. We found that there was no effect on mail return rates (as the difference between treatments was not statistically significant), however the total self-response and Internet return rates for the no

prenotice, reminder letter group (T1&T4) were significantly higher than the prenotice, reminder postcard group (C&T3) rates for all the reference points included in the study.

We then compared each test treatment to the control to determine if any treatment would result in meaningful cost savings. We found that differences in self-response rates for the treatments had the most significant impact on the cost savings in the nonresponse follow-up operations. The new strategy of removing the prenotice and using a reminder letter in lieu of the reminder postcard resulted in the highest increase in self-response rates. We compared Control to Treatment 1 in order to see the cost impact of this new strategy. The test found that the reminder letter was able to make up for the loss of self-response due to omitting the prenotice letter, resulting in the highest estimated cost savings for the ACS program.

Finally, we tested modifications to our additional reminder postcard mailing. This reminder postcard is mailed at the end of the self-response phase of the production cycle and currently is sent to addresses that have not responded and are not eligible for our CATI follow-up operation. We found that sending this postcard to CATI eligible addresses increased total self-response return rates among CATI eligible addresses for all three contact strategies tested. At the end of the CATI operation, the total self-response return rates for CATI eligible addresses receiving the additional postcard reminder were higher than the total self-response return rates for CATI eligible addresses NOT receiving the additional postcard reminder. This was true for all contact strategies tested. The total self-response return rate was 4.6 percentage points higher for the strategy with the prenotice and postcard reminder (Control); 3.6 percentage points higher for the strategy with no prenotice and letter reminder (Treatment 1); and 5.0 percentage points higher for the strategy with no prenotice and reminder postcard (Treatment 2). The analysis conducted to assess the cost associated with mailing the additional postcards found conflicting results. However, it is possible that mailing additional reminder postcards to CATI eligible addresses could result in some cost savings. We also plan to conduct further research to see if this strategy could improve the efficiency of our CATI operation.

In conclusion, the results for Treatment 1 were so favorable that we decided to implement the new mail strategy beginning with mailings sent to addresses included in the August 2015 ACS sample panel. Beginning with this panel, we no longer send a prenotice letter nor use a postcard for the initial reminder. Instead, we send the initial mail package asking for Internet participation four days earlier, and we follow-up with our first reminder in the form of a letter (with mandatory messaging and highlighting the Internet User ID). The test also found that we could increase self-response return rates by sending the third reminder postcard to CATI eligible addresses. We know that this option would increase mailing costs, but due to conflicting findings, we are not sure if we can recoup the costs through savings in our follow-up operations.

5. References

DiFiglia, L. (2015) "2015 Mail Contact Strategy Modification Test," American Community Survey Research and Evaluation Program, Washington, DC: U.S. Census Bureau.

Dillman, D. (2014) "Review of Proposed Materials for Improving response rates and Survey awareness of the American Community Survey," memo from Dillman to U.S. Census Bureau, August 13.

Dillman, D., Smyth, J., Christian, L. (2014) "Internet, Phone, Mail and Mixed-Mode Surveys: The Tailored Design Method, (4th edition)," New York: John Wiley.

Hageldorn, S., Green, R., and Rosenblatt, A. (2014) "ACS Messaging Research: Benchmark Survey." Washington, DC: U.S. Census Bureau. https://www.census.gov/library/working-papers/2014/acs/2014_Hagedorn_01.html?cssp=SERP

Holm, S. (1979). "A Simple Sequentially Rejective Multiple Test Procedure," Scandinavian Journal of Statistics, Vol. 6, No. 2: 65-70. https://www.jstor.org/stable/4615733?seq=1#page_scan_tab_contents

Joshipura, M. (2010) "Evaluating the Effects of a Multi-Lingual Brochure in the American Community Survey," Washington, DC: U.S. Census Bureau. https://www.census.gov/library/working-papers/2010/acs/2010_Joshipura_01.html

Murphy, P. and Roberts, A. (forthcoming) "2014 Pre-Notice Test," American Community Survey Research and Evaluation Program. Washington, DC: U.S. Census Bureau.

Zelenak, M.F., and Davis, M. (2013) "Impact of Multiple Contacts by Computer-Assisted Telephone Interview and Computer-Assisted Personal Interview on Final Interview Outcome in the American Community Survey," Washington, DC: U.S. Census Bureau. https://www.census.gov/library/working-papers/2013/acs/2013_Zelenak_01.html?cssp=SERP

U.S. Census Bureau (2014), "(ACS) Design and Methodology," available at: https://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html. Last accessed in November 2015.

Appendix A. Prenotice Letter

ACS-12(L)S (2013)
(6-2012)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

A message from the Director, U.S. Census Bureau ...

In a few days your household will receive instructions in the mail on how to complete a very important national survey, the American Community Survey. Please follow the instructions to complete the survey promptly. The U.S. Census Bureau is conducting this survey and chose your address, not you personally, as part of a randomly selected sample.

The American Community Survey collects information about various topics like education, housing, and jobs. Information from this survey is used by federal, state, local, and tribal governments to meet the needs of communities across America. For example, community leaders use this information to decide where schools, highways, hospitals, and other services are needed. The survey also is used to develop programs to reduce traffic congestion, provide job training, and plan for the health care needs of the elderly.

If you have access to the Internet and want to learn more about the American Community Survey, please visit the Census Bureau's Web site: www.census.gov/acs/www.

Thank you in advance for your help.

Appendix B. Reminder Letter

A message from the Director, U.S. Census Bureau…

A few days ago, you should have received instructions for completing the **American Community Survey** online. Local communities depend on information from this survey to decide where schools, highways, hospitals, and other important services are needed. If you have not already responded, please do so now.

Respond now at **https://respond.census.gov/acs**
Log in using this user ID:

If we do not receive your response online, we will mail a paper questionnaire to your address.

Your response to this survey is required by law.

Your response is critically important to your local community and your country. Responding promptly will prevent your receiving additional reminder mailings, phone calls, or personal visits from Census Bureau interviewers.

If you need help completing the survey or have questions, please call 1-800-354-7271.

Thank you in advance for your prompt response.

Sincerely,
Signature

John H. Thompson
Director, U.S. Census Bureau

Appendix C. Reminder Postcard

ACS-20S(2013) (5-2012)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

A message from the Director, U.S. Census Bureau ...

A few days ago, you should have received instructions for completing the American Community Survey online. If you have already responded, thank you. If you have not, please do so as soon as possible at **https://respond.census.gov/acs**. If we do not receive your response, we will mail you a paper questionnaire in a few weeks.

Local and national leaders use the information from this survey for planning schools, hospitals, roads, and other community needs.

If you need help completing the survey or have questions, please call our toll-free number (1–800–354–7271).

Thank you.

Appendix D. Additional Reminder Postcard

ACS-23(2013) (5-2012)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

A message from the Director, U.S. Census Bureau . . .

Within the last few weeks, the U.S. Census Bureau mailed an American Community Survey questionnaire package to your address. **You are required by U.S. law to respond to this survey.** The Census Bureau is required by U.S. law to keep your answers confidential. If you have already responded, thank you. If you have not, please complete the questionnaire and send it now, or complete the survey online now at https://respond.census.gov/acs.

Your response is critically important to your local community and to your country. If you do not respond, a Census Bureau interviewer may contact you by personal visit to complete the survey.

If you would like to complete the survey by telephone or need assistance, please call our toll-free number (1–800–354–7271).

Thank you.