Measuring the Impact of Questionnaire and Envelope Messages on Respondent Behavior

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This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress.

Key words: Questionnaire design, mail survey response, voluntary data collection, government surveys

1. INTRODUCTION

The American Community Survey (ACS) is one of three program components required to achieve the goals of the 2010 Census reengineering strategy. The ACS replaces the census long form, the once-a-decade collection of detailed demographic, housing, and socioeconomic data, that occurs as part of the decennial census, with an ongoing survey that produces annual and multi-year estimates of these same characteristics. Since the ACS replaces the mandatory decennial census long-form sample, data collection has been mandatory since its inception.

In Fall 2002, Congress requested that the Census Bureau conduct a test to assess the effects of a voluntary ACS on mail response rates and associated follow-up costs (Weldon and Miller, 2002). The Census Bureau revised and tested several sets of mail materials as well as modified telephone and personal visit interviewing procedures. All new materials were printed and released to implement this testing of voluntary methods in March through June of 2003. U.S. Census Bureau (2003) provides complete results from this test.

In this paper, we assess the impact of revised mailing materials that removed all references to mandatory and replaced those messages with motivational information. For example, on the outside of the questionnaire mailing package we replaced “Your response is required by law” with "Your response is important to your community." We also assess the effect of two different voluntary messages, one more direct than the other, on respondent behavior. Finally, this paper evaluates if newly designed mandatory materials resulted in higher levels of respondent cooperation to the mail portion of the survey than the mandatory materials used since 1996.

2. BACKGROUND

2.1 Design of the ACS

The Census Bureau conducts the ACS continuously on independent monthly samples of addresses. Since 2000, the ACS has selected a sample of about 70,000 addresses in 1,240 counties nationwide each month. In full implementation, this monthly sample size will increase to approximately 250,000 addresses spread across all 3,141 counties. The data for each sample address are collected over a three-month period. This will allow for annual estimates for any area with 65,000 or more people, as well as three-year and five-year averages for every geographic entity down to the tract level, as opposed to the once-a-decade nature of the decennial census long form.

The design of the ACS relies on optimizing three modes of data collection–mail, telephone follow-up, and personal visit follow-up. Costs vary significantly by mode; personal visit follow-up is by far the most expensive mode of data collection. The Census Bureau first attempts to collect ACS data using mailout/mailback techniques. To maximize mail response, several mailings are used including an advance letter, reminder card, and a targeted second mailing to nonrespondents. Call centers provide telephone assistance to help households complete the forms they receive in the mail. Mail returned forms are data captured by keying and reviewed for completeness. Telephone interviewers resolve incomplete mail forms in an edit follow-up operation.

ACS interviewers contact nonrespondents to the mailout through separate telephone and personal visit follow-up operations. For example, data collection for the March 2003 panel started when we mailed the survey questionnaires in late February. In April, interviewers conducted a telephone follow-up operation to collect data for nonresponding addresses for which a telephone number was available. At the end of April, a sample of 1-in-3 of the addresses that did not respond by mail or telephone was selected for a personal visit follow-up operation conducted in May. A 2-in-3 sample of addresses that could not be mailed (due to incomplete address information) was added to the personal visit follow-up workload.

This combination of data collection activities has been very successful. In 2001 and 2002, the weighted survey response rates were 96.7 percent and 97.7 percent, respectively, and more than half of the addresses had mailed back completed forms.

2.2 Mail Data Collection in the ACS

To make sure that at least 50 percent of the completed ACS interviews come from the mail data collection phase, the Census Bureau has used key elements of Dillman’s Tailored Design Method for government mail surveys (see Dillman, 2000) to achieve the highest mail cooperation rate possible. Every sample unit with a mailable address was mailed each of the following pieces of correspondence about the survey:

1. A *prenotice letter,* sent a few days before the questionnaire, to tell the household that the questionnaire for this important survey will arrive in a few days and that their response is greatly appreciated.
2. A *questionnaire* accompanied by a letter that explains why response is important;
3. A *reminder postcard*, sent a few days after the initial questionnaire was mailed, to thank the household for responding and remind those who have not yet responded that a prompt response is appreciated; and
4. A *replacement questionnaire*, sent only to nonresponding households about three weeks after the first questionnaire mailing, is accompanied by another letter that tells the household that we have not yet received their questionnaire and urges them to respond.

The ACS mails the questionnaire and replacement questionnaire in an out-going envelope with the message "The American Community Survey Form Enclosed: Your Response is Required by Law". This design element alone in government mail surveys has improved response rates by nine to eleven percentage points compared to the same materials mailed in the same envelope lacking this message (Dillman et al., 1996).

3. METHODOLOGY

3.1 Experimental Treatments

We designed the sample for the ACS Voluntary Test to study four experimental mail treatments - two mandatory and two voluntary. The "Current Mandatory" treatment is the control and represents the mail pieces used in prior years on the ACS. The "Standard Mandatory" treatment reflects the revisions we made to the control with an eye towards increased user-friendliness. These revised materials were based on letters the Census Bureau recently developed for other demographic surveys, such as the Survey of Income and Program Participation, to battle the decline in survey response (Landreth, 2003). Both of these mandatory treatments used an out-going questionnaire envelope with a prominent message that the survey was required by law. The major difference between the two treatments involved moving much of the regulatory information from the letter into a brochure for the Standard Mandatory group, resulting in a much shorter letter for that group.

The Standard Mandatory materials were modified slightly to create the "Standard Voluntary" materials. The mandatory message (your response is required by law) was replaced with "your participation is important to your community" on the out-going questionnaire envelope and the letter text said that "your participation in the survey is important; however, you may decline to answer any or all questions" to inform respondents of the voluntary status of the survey. The Census Bureau uses this wording for the letters of many of its voluntary demographic surveys. The second voluntary treatment, called "Direct Voluntary" explained more directly that the survey was voluntary by stating, "Although your participation in this survey is voluntary, your response is critically important to your country and especially your community". In addition to using the word voluntary, the explanation that the survey was voluntary was placed earlier in the letters when compared with the Standard Voluntary treatment.

3.2 Sample Design

The ACS sample cases for March and April 2003, about 138,000 addresses, formed the universe for the ACS Voluntary Test, which was designed to study the four experimental mail treatments described above. Since this test primarily focused on the effect of voluntary methods on the ACS, we evenly distributed 75 percent of the combined 2003 March/April sample to the two voluntary mail treatments and the remaining 25 percent between the two mandatory mail treatments. Unlike the mail portion, the test used only voluntary methods in the telephone and personal visit follow-up operations. We concluded that assigning both voluntary and mandatory methods to a sample of cases or a sample of interviewers introduced potential implementation risks to the study that the use of one method could avoid during the test period.

The sample design divided the universe into two strata, high response areas (HRA) and low response areas (LRA). We created these strata using tract-level long form mail return rates from Census 2000. Based on data from the 2001 ACS, people in the LRA stratum are younger, more Hispanic and non-White, and have more other relative and non-relative household members than people in the HRA stratum. The LRA stratum also has fewer people with college educations, more renters, more households who speak a language other than English at home, and more households with lower incomes compared with the HRA stratum. Within strata, experimental treatments were designated in a systematic manner to ensure that as mentioned previously we assigned 75 percent of the sample evenly to the two voluntary treatments and 25 percent of the sample to the two mandatory treatments. (Asiala, 2003 and Tersine, 2003 include more details of the stratification and sample selection.) Table 1 documents the sample sizes for the four Voluntary Test mail treatments by stratum.

3.3 Outcome Measures

The primary outcome measures for this study are based on combined sample data from March and April 2003 and national and stratum-level comparisons are made across panels. All measures focus on the mail mode. The measures used are defined below:

- Mail Cooperation Rates - the proportion of cases interviewed by mail of all occupied units ever contacted by mail; a measure of respondent behavior in the mail data collection mode, (See American Association for Public Opinion Research, 2003, p. 38).

- Average Mail Check-in Rate - the proportion of cases that returned a questionnaire by mail of all cases mailed for both

mandatory treatments divided by 2; a measure of the progress for the mail operation.

- Mail Data Completeness Rates - for mail returned forms, the ratio of the total number of items with valid responses over the total number of items requiring a response on the questionnaire; a quality measure addressing the completeness of the entire questionnaire.

The tables in the results section compare different combinations of these measures for the two 2003 Voluntary and two 2003 Mandatory treatments. In this report, we refer to the four treatments using the following notation:

Current Mandatory	=	CM
Standard Mandatory	=	SM
Standard Voluntary	=	SV
Direct Voluntary	=	DV

Percentage point differences between the two measures are shown and the rates and differences were rounded to one decimal place. Due to rounding, the difference column may not always reflect the exact difference between the two displayed estimates.

3.4 Determining Statistical Significance

The tables include the margins of error of each difference, indicating the 90 percent confidence interval, the Census Bureau standard, around the difference. The 90 percent confidence interval tells us that if all possible samples under the sample design were selected independently and surveyed under the same conditions, approximately 90 percent would fall within the range of the estimates provided. Direct estimates of the standard errors were calculated for all estimates in this report using standard ACS variance estimation methods.

4. RESULTS

The results address five specific methodological questions and are presented separately for each question. For the first three methodological questions, we provide additional information pertinent to the treatment groups included in the comparisons. This additional information provides context helpful to a meaningful interpretation of the results.

4.1 What effect did the combination of envelope and letter messages included in the mailing packages have on mail cooperation rates?

4.1.1 Differences in Envelope and Letter Messages

There were three major differences in the wording of the Standard Voluntary materials when compared with the Standard Mandatory materials–wording of the message on the outgoing envelope, wording of the message in the letters, and the answer to "Do I have to answer the questions on the ACS?" in the brochure. See Table 2 for a comparison. The prenotice letter and reminder postcards were identical. Neither mentioned the mandatory or voluntary status of the survey.

4.1.2 Cooperation Rate Comparisons

To estimate the effect of the wording of the envelope and letter messages, we compared the mail cooperation rates for the Standard Voluntary treatment with the Standard Mandatory treatment. Cooperation rates provide the best indication of respondent behavior because they measure the rate of response for only those persons or households who are contacted. The observed differences between these two treatments could be the result of the three differences noted in Table 2. This test did not isolate the envelope message effects. As the data in Table 3 show, the Standard Voluntary mail cooperation rate was more than 20 percentage points lower nationally when compared with the Standard Mandatory treatment. The rate was more than 16 percentage points lower in the LRA stratum and more than 21 percentage points lower in the HRA stratum. These differences are roughly proportional by stratum.

While we can't say for certain that these differences are exclusively the result of the wording of the out-going envelope message, we can be certain, based on previous research (Tulp et al, 1991, and Dillman et al, 1996), that the mandatory message on the outgoing envelope significantly contributed to differential cooperation rates.

4.2 In a mandatory design, what is the effect on mail cooperation of more respondent-friendly letters?

4.2.1 Differences in the Two Mandatory Treatments

Both mandatory treatments used the same out-going envelope message "Your response is required by law." As part of this test, Standard Mandatory mail treatment letters were modified with an eye toward increased user-friendliness. The specific improvements made include:

- The prenotice letter text was lengthened to make the most important information more prominent earlier in the letter. The redesigned letters resemble the design used to increase response to the Survey of Income and Program Participation (Landreth, 2003).

- The questionnaire letters were shortened and regulatory information was moved from the letters and into a redesigned brochure included as part of the mailing package.

- The reminder postcard was shortened by dropping text indicating that completing the form by mail reduces costs, as well as dropping text informing the household that they may be visited by a census worker if they don't return the mail form.

4.2.2 Cooperation Rate Comparisons

Mail cooperation rates for the Standard Mandatory treatment were compared with mail cooperation rates with the Current Mandatory treatment and as the data in Table 4 show, mail cooperation rates were slightly higher for the redesigned materials, nationally and for the HRA Stratum; there was no difference for the LRA Stratum. Based on these results, we concluded that more respondent friendly letters did have a positive impact on mail cooperation. When we returned to mandatory mail data collection in May 2003, we replaced the Current Mandatory materials with the Standard Mandatory materials.

4.3 In a voluntary ACS, what effect does the wording and placement of the voluntary message have on mail cooperation?

4.3.1 Differences in the Two Voluntary Treatments

In this question we attempt to understand if the more direct voluntary message had an effect on respondent cooperation to the mail survey. The key methodological differences between the Standard Voluntary and Direct Voluntary treatment letters were the wording and placement of the voluntary message in the body of the letters that accompanied the questionnaires. Additional differences were made in the wording of the prenotice letters and the reminder postcards. The word "voluntary," never used in the Standard Voluntary treatment materials, was prominent in the Direct Voluntary treatment materials; for example, the first paragraph of the Direct Voluntary prenotice letter tells the sample household "Although your participation in this survey is voluntary, your response is critically important to your country and especially your community." In addition, the placement of the message was more prominent for the Direct Voluntary treatment; the message appears in the first or second paragraph of each mailing piece as compared to the third paragraph or no mention in the Standard Voluntary treatment. For both voluntary treatments, the out-going mail questionnaire envelopes included the motivational message "Your participation is important to your community," and the brochures that accompanied the questionnaires were identical.

4.3.2 Cooperation Rate Comparisons

As the data in Table 5 show, mail cooperation was significantly adversely affected by the use and placement of a more direct voluntary message in the letters. While the HRA stratum shows a greater percentage point drop than LRA stratum, the relative drop was about 10 percentage points for both. This suggests that of the people who responded to the Standard Voluntary mail materials, about 10 percent did not respond to the Direct Voluntary materials.

4.4 What effect does voluntary participation have on the timing of ACS mail responses?

Figure 1 shows the daily mail check-in rate for the voluntary treatments compared with the mandatory treatments. We use mail check-in rates to evaluate the status of the mail operation. As the data in the graphic show, the mail check-in rate was lower for the voluntary treatments than the mandatory treatments. This split first became noticeable (about 3 percentage points different) about ten days after the first questionnaires were mailed. The patterns of response for the two mandatory treatments are very consistent, and the gap between the Standard Voluntary and Direct Voluntary treatments widens starting about day 18. We hypothesize that the wording of the Direct Voluntary reminder postcard, which noted that response was voluntary, may have contributed to this gap. After this point in time the pattern of responses is very consistent between the mandatory and voluntary treatments; that is, the gap of about 20 percentage points is constant. The second "blip" in response at about 36 days after mailout is likely due to the second questionnaire mailing which occurred on day 24.

4.5 What was the effect of the wording of the voluntary message on the completeness of ACS mail returns?

It is important to assess the completeness of data of the returned questionnaires since missing data impact allocation and thus quality. We calculated data completeness rates for all occupied housing units at the national and stratum levels. Data completeness rates are a measure of the proportion of total required responses on the forms that were completed. Therefore a rate of 90 percent means that 90 percent of the items that should have been provided were provided; or about 10 percent were left blank or refused. These rates reflect the completeness of the returned questionnaires and interviews, which may differ slightly from the completeness of the final data.

Analysis showed that there was no statistically significant difference in data completeness nationally or at the stratum level for mail returned questionnaires completed by respondents who were told that the survey was voluntary versus mandatory when comparing the Standard Voluntary with the Standard Mandatory treatments. (Bureau of Census, 2003). This suggested that the households choosing to respond by mail, despite the change to voluntary, were equally likely to complete items on the form. As the data in Table 6 show, more direct wording of the voluntary message resulted in a small, but significant decrease in the data completeness of mail returns, nationally and at the stratum level.

5. DISCUSSION

Heberlein and Baumgartner (1978) first provided evidence that government-sponsored self-administered surveys tend to achieve higher response rates than other surveys and methodologists Cialdini (1984) and Groves et al (1992) provided the "appeal to authority" as a possible explanation for this phenomenon. The ACS Voluntary Test confirms this finding that mandatory status makes a substantive difference in cooperation to a mail government survey and including the mandatory message on the out-going questionnaire envelope has no negative effect on cooperation. In addition, this study shows the benefit of pretesting letters and taking the respondents' perspective into

account. The newly designed mail letters (Standard Mandatory treatment), written with an eye towards being more respondent friendly, significantly increased mail cooperation nationally and for the HRA stratum while cooperation remained unchanged in the LRA stratum. Based on these results, the ACS now uses these more respondent-friendly letters to collect data each month.

This study presents useful findings for most survey firms who conduct only voluntary surveys. In this study we find that mail cooperation improves when using a softer voluntary message to explain that the survey is voluntary. Using the word "voluntary" and including that voluntary message prominently in the mail letters had a significant negative effect on mail cooperation (4.0 percentage points nationally, 4.4 percentage points in the HRA, and 2.8 percentage points in the LRA). In addition, the more direct wording resulted in slightly less complete mail questionnaires returned by respondents, nationally and at the stratum level. The one comforting finding was that the voluntary status did not alter the timing for receiving mail returns. However, the data seem to indicate (see Figure 1) that the direct wording of the reminder postcard used in the Direct Voluntary treatment may have increased the gap between the Mandatory and Voluntary treatment returns.

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Table 1. Distribution of Sample Across Mail Treatment and Strata

Stratum	Total Voluntary Test Sample	Current Mandatory Treatment	Standard Mandatory Treatment	Standard Voluntary Treatment	Direct Voluntary Treatment
Overall	137,899	17,237	17,236	51,712	51,714
High Response Areas	103,307	12,913	12,913	38,740	38,741
Low Response Areas	34,592	4,324	4,323	12,972	12,973

Table 2. Major Differences in the Wording of Standard Mandatory and Voluntary Treatment Materials

Wording of Mail Materials	Standard Mandatory	Standard Voluntary
Message on out-going questionnaire envelope	Your Response is Required by Law	Your Response is Important to Your Community
Wording of message in the letters included in the mailing packages	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.	The Census Bureau is required by U.S. law to keep your answers confidential. Your participation in this survey is important; however, you may decline to answer any or all questions.
Answer to "Do I have to answer the questions on the ACS?" in the brochure included in the mailing packages	Yes, your response to this survey is required by law (Title 13, United States Code, Sections 141 and 193).	Your participation in this voluntary survey is very important to your country and to your community. You may decline to answer any or all questions. The Census Bureau is conducting the ACS under the authority of Title 13, United States Code, Section 182.

Table 3. Mail Cooperation Rates (Standard Mandatory compared with Standard Voluntary)

Stratum	Standard Mandatory (in percent)	Standard Voluntary (in percent)	Difference (SV-SM) (in percentage points)	Margin of Error of Difference (in percentage points)	Is the Difference Statistically Significant?
Overall	59.3	38.9	-20.4	± 1.1	Yes
High Response Areas	64.0	42.5	-21.5	± 1.3	Yes
Low Response Areas	44.1	27.7	-16.5	± 2.4	Yes

KEY: SV=Standard Voluntary; DV= Direct Voluntary

Table 4. Mail Cooperation Rates (Standard Mandatory compared with Current Mandatory)

Stratum	Current Mandatory (in percent)	Standard Mandatory (in percent)	Difference (SM - CM) (in percentage points)	Margin of Error of Difference (in percentage points)	Is the Difference Statistically Significant?
Overall	57.3	59.2	1.9	± 1.3	Yes
High Response Areas	61.5	63.9	2.5	± 1.5	Yes
Low Response Areas	43.9	44.1	0.2	± 2.7	No

KEY: SM=Standard Mandatory; CM=Current Mandatory

Table 5. Mail Cooperation Rates (Direct Voluntary compared with Standard Voluntary)

Stratum	Standard Voluntary (in percent)	Direct Voluntary (in percent)	Difference (DV - SV) (in percentage points)	Margin of Error of Difference (in percentage points)	Is the Difference Statistically Significant?
Overall	38.8	34.8	-4.0	± 0.8	Yes
High Response Areas	42.4	38.0	-4.4	± 0.9	Yes
Low Response Areas	27.7	24.8	-2.8	± 1.4	Yes

KEY: DV=Direct Voluntary; SV=Standard Voluntary

Table 6. Data Completeness Rates (Direct Voluntary compared with Standard Voluntary)

Stratum	Standard Voluntary (in percent)	Direct Voluntary (in percent)	Difference (DV-SV) (in percentage points)	Margin of Error of Difference (in percentage points)	Is the Difference Statistically Significant?
Overall	94.2	93.6	-0.5	± 0.2	Yes
High Response Areas	94.5	93.9	-0.6	± 0.2	Yes
Low Response Areas	92.8	92.3	-0.5	± 0.5	Yes

KEY: DV=Direct Voluntary; SV=Standard Voluntary

Figure 1. Day-By-Day Mail Check-In Rate, March/April 2003