

RESEARCH REPORT SERIES
(*Survey Methodology* #2013-01)

**Response Mode Choice and the
Hard-to-Interview in the American Community Survey**

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Report Issued: January 17, 2013

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Abstract: In 2011, the U.S. Census Bureau designed two experimental tests offering an Internet reporting option in addition to the traditional paper form for the American Community Survey (ACS). An Internet reporting option was offered as a way to maintain or improve self-response, while reducing costs. As part of the first test, a qualitative follow-up interview of both nonrespondents and respondents was conducted to determine what motivated a response and why some did not respond at all.

In this paper, we examine the groups of individuals who have been typically hard-to-interview in the self-response phase of the ACS. Joshipura (2008) found that renters, those with less than a high school education, non-White, and Hispanic respondents are more likely to need an interviewer-assisted interview to complete the ACS. We examine the data from the two tests to determine if those types of respondents were more likely to report using the Internet compared to mail-return response rates. We also examine the qualitative data from the follow-up study for these people to determine why they did not respond.

Key Words: Internet survey, paper form, CATI, CAPI

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Introduction

In every month since January 2005, the U.S. Census Bureau has mailed the American Community Survey (ACS) paper questionnaires to over 200,000 housing units across the United States (U.S. Census Bureau, 2009). We allow three months to collect data for each ACS monthly sample. In the first month, an ACS paper form is mailed to all sample addresses, with a replacement mailing about three weeks after the first mailing. Instructions in the mailings ask respondents to complete the form and mail it back to the Census Bureau. The Census Bureau looks up telephone numbers for all sample addresses. In the second month, we call the addresses that have a telephone number and have not returned an ACS form, and an interviewer administers the ACS questions via Computer-Assisted Telephone Interview (CATI). In the third month, the Census Bureau selects a subsample (about 1 in 3) of the remaining addresses with no ACS response to date. A field representative goes to the address and conducts a Computer-Assisted Personal Interview (CAPI).

In the 2011 ACS sample, more than half of the sample addresses respond in either the second or third month with interviewer assistance (U.S. Census Bureau, forthcoming). Not only do the interviewer-assisted phases cost more, the demographics of respondents in the interviewer-assisted phases are different from those in the self-administered phase (Griffin & Hughes, 2010; Joshipura, 2008).

In April and November 2011, the Census Bureau offered an Internet reporting option in addition to the paper form for selected test cases as a way to maintain or improve self-response and data quality while reducing costs (Tancreto, Zelenak, Davis, Ruiter, & Matthews, 2012; Matthews, Davis, Tancreto, Zelenak, & Ruiter, 2012). As part of the April test, the Census Bureau conducted a qualitative follow-up study of people who did not self-respond. This study attempted to determine whether the addition of the Internet response option was a reason for not responding.

Using the April Internet test data and the November Internet test data, we examine whether the addition of an Internet response option as part of ACS procedures encouraged some of the respondents who typically end up in the interviewer-assisted phases (i.e., the hard-to-interview) to self-report by either mail or Internet. We also examine whether any hard-to-interview groups were more likely to report via the Internet than by mail. The qualitative data provide an opportunity to determine why the traditionally hard-to-interview populations did not respond.

Background

Examining the first year of full ACS implementation (2005), Joshipura (2008) compared the demographic characteristics of ACS respondents who completed a mail form to those who were interviewed via CATI or CAPI. She found the following types of respondents/households were more likely to be interviewed in CATI or CAPI:

- those with less than a high school education;
- Black;
- Hispanic;
- those who lived in their home for less than a year;
- those living in multi-unit structures;
- non-spousal households;
- households without a phone;

- households receiving public assistance;
- young households (everyone younger than 30);
- households with a child under 5;
- households with at least one Spanish speaker; and
- Linguistically-isolated households¹.

Diffendal (2001) examined hard-to-interview cases in the mail, telephone and personal visit phases of the 1999 ACS². Instead of defining hard-to-interview cases as those interviewed by CATI or CAPI, Diffendal defined the hard-to-interview by the timing of the response. His hard-to-interview cases occurred in each mode – late responding mail cases; late responding telephone cases; and the last set of personal visit cases. Diffendal compared hard-to-interview cases in each mode to all other cases interviewed in that mode. Most of the household and respondent characteristics that Joshipura (2008) found to be over-represented in the interviewer-assisted modes in 2005 were also more likely to be hard to interview in the mail mode in 1999 using Diffendal’s definition. Those included Hispanics, people with less than a high school education, Blacks, renters, people in poverty, and people living in apartments with 2 to 9 units. Diffendal also found that persons aged 55+ were less likely to be late in the mail phase; similarly, Joshipura found that households with everyone older than age 65 were more likely to report by mail.

Differences in demographic characteristics have also been observed in the decennial census between self-reporters and others. In Census 2000, the demographic characteristics of respondents who reported via mail were different from those who reported via an enumerator during the nonresponse follow-up operation³. The Census 2000 results were similar to what Joshipura (2008) found. The census follow-up enumerated a higher percentage of households in multi-units and rented units compared to the percent in the self-report universe. The follow-up also enumerated a higher percentage of males, young people, Hispanics, and people of all races except Whites. For example, ten percent of Census 2000 mail respondents were Hispanic, compared to 17 percent of the respondents in the enumerator-administered follow-up (Moul, 2002; Stern, 2003).

For this study, we examine a subset of these populations to answer several questions. The main question this paper addresses is whether offering an Internet response mode in addition to a paper form converts some of the hard-to-interview populations into self-responders for the ACS. De Leeux (2005, p.240) mentions “that giving a sample member a response choice may reduce nonresponse, as some persons may express certain mode preferences (cf. Groves and Kahn 1979; De Leeuw 1992).” If some of the hard-to-interview groups use the Internet frequently, then perhaps they would be more willing to self-report to the ACS using the Internet.

The hard-to-interview cohort that appears best suited to online reporting are adults younger than 30. Data from the Internet & American Life Project’s August 2011 Tracking Survey (Pew Research Center, 2012) estimate that 94 percent of American adults aged 18-29 use the Internet. Internet usage is the highest among this cohort of adults compared to other age groups. For example, only 41 percent of adults 65 and older use the Internet. Data from the Current Population Survey (CPS) confirm this trend. While 74 percent of 18-34 year olds accessed the Internet at home in 2010, only 42 percent of those 65 and older used the Internet at home during the same time period (U.S. Census Bureau, 2012). Since young households (those under 30) were more likely to be interviewed in CATI or CAPI, we hypothesize this group might report using the Internet more so than older adults and that offering them a frequently-used application like the Internet will convert them to self-reporters.

¹ A linguistically isolated household was one where no one 14 or older reported speaking English “very well.”

² The 1999 ACS was conducted in 36 counties. It was a precursor to the full implementation of the ACS.

³ This type of analysis was not conducted using 2010 Census data.

Internet usage is not as high for other hard-to-interview groups. For example, the Pew data show that approximately 71 percent of Black non-Hispanic adults and 68 percent of Hispanic adults used the Internet in 2011. In contrast, 80 percent of White adults used the Internet in 2011. Thus, we hypothesize that offering an Internet mode is not an effective tool for increasing the self-response rate of Black adults or Hispanic adults because they do not use the Internet more than White adults do. However, because we included instructions in Spanish for accessing the Internet and the ACS was available on the Internet in Spanish, while the Spanish paper form had to be specifically requested, we hypothesize that we might find self-response improvement for the Spanish-speaking populations.

Finally, we hypothesize that adults with less than a high school education are not likely to report via the Internet or become self-reporters because an Internet reporting option is available. As of 2011, only 43 percent of them used the Internet compared to 71 percent of high school graduates and 88 percent of adults with more than a high school education.

Neither the Pew data nor the CPS data had access or usage data available for renters or households with a young child so we do not have a hypothesis regarding whether the self-reporting for these groups is affected by the availability of an Internet reporting option.

Method

April 2011 ACS Internet Test

The 2011 April ACS Internet Test occurred concurrently with the April 2011 production ACS. No Internet reporting option was available for production ACS, so the production sample served as the control. The April 2011 ACS Internet Test had four notification strategies (Tancreto, *et al.*, 2012). There were two “Choice” strategies and two “Push” strategies. The strategies varied by when the different reporting modes were offered and the emphasis placed on the Internet reporting option.

In the two “Choice” strategy conditions, the paper form and the Internet reporting option were offered concurrently. These treatments were called the Prominent Choice and the Not Prominent Choice strategies. The strategies differed in the emphasis on the Internet reporting option. The Prominent Choice strategy explicitly mentioned the Internet option in the text of the letters and mailing materials and the Not Prominent Choice strategy subtly mentioned the Internet option only on the paper form itself.

The two “Push” strategies offered the Internet mode first, before a paper form was mailed. For these treatments, access information for the Internet survey was contained in the initial mailing and a paper form was offered only in a later mailing for households that had not responded online. The two Push strategies differed in how much time had elapsed between the two mailings. The Push Accelerated strategy mailed the form approximately one week earlier than the Push Regular strategy.

The sample was stratified by tract into two strata: “Targeted” and “Not Targeted.” Tracts in the Targeted stratum were characterized as either having a large proportion of people who were highly educated, married homeowners living in single-unit houses or single, mobile renters with higher than average education living in urban multi-units⁴. These households had the highest levels of Internet subscriptions, usage and preference (U.S. Census Bureau, 2008) and were considered the group of households most likely to use the Internet. The remaining tracts were in the Not Targeted stratum.

⁴ The Targeted stratum was created based on results from the Census Barriers, Attitudes, and Motivators Survey (CBAMS) (Johnson, 2009).

The four notification strategies were crossed by the two strata to create eight experimental treatments of 15,000 addresses each. In the control, there were 71,585 addresses in the Targeted group and 161,683 addresses in the Not Targeted group.

Tancreto, *et al.* (2012) found that in the Targeted stratum, at the end of the first month of data collection the Push Accelerated treatment produced the highest self-response rate (combining responses from both mail and Internet) among the notification strategies, and achieved a significant 1.5 percentage point increase over the Control. At the end of the first month, no treatment achieved a significantly higher self-response rate compared to the Control in the Not Targeted stratum.

April 2011 ACS Internet Test Follow-up Study

Within approximately three weeks of the April Internet Test, the Census Bureau conducted a study called the Attitudes and Behavior Study (ABS) via a centralized CATI operation (Nichols, 2012). As part of this study, we selected 2,900 ACS Internet Test addresses that did not submit a response by Internet or mail (these are ACS nonrespondents)⁵. Of the 2,900, we obtained 795 ABS interviews. We collected qualitative data to determine why these households decided not to self-report using either the paper form or the Internet to the ACS. Additionally, we collected data on their Internet usage and demographics.

November 2011 ACS Internet Test

In November 2011, the Census Bureau conducted a second ACS Internet test. The goal of this test was the same as the first test: to find the best strategy for notifying sampled addresses about the Internet option (Matthews *et al.*, 2012). In the second test, the Census Bureau experimented with enhancements to the top-performing notification strategies from the first test to promote both self-response and Internet response. While the Push Accelerated strategy performed well for selected measures in the first test, the Census Bureau also wanted to keep open the possibility of using a concurrent choice design, like the Prominent Choice from the first test.

This test included three treatments that provided a concurrent response mode choice and two sequential treatments that requested an Internet response before a paper questionnaire was mailed. Among the three concurrent mode choice treatments was the same Prominent Choice treatment from the first test, which served as a baseline. The two remaining mode choice strategies included variations on the Prominent Choice design. Specifically, one treatment (dubbed Choice with Icons) displayed icons (computer and pencil) next to each respective mode choice on the questionnaire to draw attention to the web option. The other treatment was the same as Choice with Icons, except that the second paper questionnaire was mailed to nonrespondents one week sooner, using the same accelerated mailing schedule as the Push Accelerated treatment from the first test.

Given its success in the April test, the second test replicated the Push Accelerated treatment for baseline measurement. This test also included a related Push treatment that differed only in that it provided a new reminder postcard three days after the paper questionnaire was mailed to nonrespondents. The intent of the new postcard was to remind nonrespondents to complete their response online or respond by mail.

The sample for each of the five treatments was equally allocated to the same two strata (Targeted, Not Targeted) used in the first test. The sample size for each treatment in each stratum was 10,000 addresses. The control panel for the November test again was the corresponding ACS production sample for the test month (n=87,897 in the Targeted stratum, and n=197,841 in the Not Targeted Stratum). Only the paper form was available in the control.

⁵ CATI and CAPI nonresponse follow-up occurred in the control, but not in the treatment groups.

Results from the second test suggested that adding the new postcard in the Push Accelerated treatment successfully increased overall self-response compared with the other treatments and the control in the Targeted stratum (Matthews *et al.*, 2012). In the Not Targeted stratum, there was no significant difference between the Push Accelerated with postcard treatment and either the Control or the highest performing Choice treatment. Furthermore, the Push Accelerated treatment with postcard was successful in directing 51 to 61 percent of the response to the Internet, depending on strata. The various Choice treatments also produced similar response rates, but the proportion of Internet response was much lower for these treatments.

Analysis Plan

In our first analysis of the April and November tests, we modeled whether particular hard-to-interview groups had a greater propensity to respond via the Internet compared to paper. We examined a two-month window of returns for each test and combined data from the multi-mode treatments. That means, for the April test, we examined April and May paper returns and Internet submissions from the four treatments. For the November test, we examined November and December returns and submissions from the five treatments. We included in our analysis self-reports that met the Census Bureau definition for fully complete or partially complete cases with sufficient information.

We defined the hard-to-interview at the household level using characteristics of the entire household or of the respondent, assuming the respondent was Person 1. Renters, households with a Hispanic respondent; households with a respondent with less than a high school education; households with a Black respondent; households where everyone was under 30; households with a child younger than 5; or households with at least one Spanish-speaker were defined as hard-to-interview. These groups mapped to the characteristics that Joshipura (2008) had found to be hard-to-interview by mail and they were available for analysis within the datasets. We made each of these variables into a dichotomous variable (1=hard-to-interview characteristic/0=otherwise) and excluded the households with any missing values⁶.

Using the SAS® software (SAS Institute, 2012) *proc surveylogistic*, we developed a model to predict response mode (Internet/paper), specifically the likelihood of a household responding via the Internet. We included all hard-to-interview groups in the model while controlling for treatment to determine whether any of the hard-to-interview groups had a greater propensity to respond via the Internet. We ran separate models for April and November. In each of the models, we applied the baseweights and used Fay's Balanced Repeated Replication to adjust for the strata and treatment (SAS Institute, 2012).

In our second analysis, we examined whether providing an additional mode encouraged more of the hard-to-interview to self-report. To accomplish this analysis, we compared the proportion of self-responders from each of the different hard-to-interview groups in the Push Accelerated treatment in the April test to the corresponding proportion in the April test's control (mail only) group. We did the same for the Prominent Choice treatment and the control. Then we did the same comparisons using November test data. These two treatments were repeated in both tests. We calculated the percent of the self-response universe that fell into each of the hard-to-interview groups based on responses received over a two-month window. The goal of these comparisons was to see whether offering an Internet mode in addition to a paper form encouraged more self-reports from the hard-to-interview groups than just offering a paper form alone.

In our third analysis, we examined the qualitative data from the ACS April follow-up study. This study contained the reported reasons why some ACS nonresponders did not respond either by mail or Internet. We ran a series of Wald Chi-Square tests to determine if the reasons the hard-to-interview groups did not respond to the ACS were different from the reasons the not hard-to-interview provided. For this analysis,

⁶ Approximately 12 percent of the cases were dropped from each of the models because of at least one missing value.

we defined the hard-to-interview as renters; households with a Hispanic respondent; households with a respondent with less than a high school education; households with a Black respondent; households with a respondent under 30; or households living in a multi-unit structure.

Limitations

The large sample sizes in the April and November tests often drive the significant differences found in this paper. We will point out when those differences do not indicate substantive findings.

In our analysis, we treat the April and November tests separately and only comment on trends replicated in both tests. We advise against the reader making direct comparisons between the two tests, as there were operational differences between them. For example, the number of days for self-response differed between the tests. Additionally, there were some changes made in the check-in of paper forms and the mailing operation between the two tests, which led to overall higher response rates in the November test (Tancreto, et al., 2012; Matthews, et al., 2012).

In the control, the interviewer-assisted CATI phase began in the second month. We have observed that CATI contacts appear to motivate some ACS households to self-respond. For that reason, there is a limitation in comparing the control to the experimental treatments after the first month of data collection. The differences in Table 2 are confounded in the sense that some self-responders in the control panel needed the motivation of an interviewer's call to respond.

For the second analysis, given that the treatments did not include CATI and CAPI follow-ups for nonrespondents, we could not calculate the proportion of the population interviewed by mail or Internet, only the prevalence of these groups within the self-response universe.

In forming the hard-to-interview groups, we assume that Person 1 is the respondent. For the paper form, this is not always the case (DeMaio & Bates, 1990; Hill, Lestina, Machowski, Rothhaas, & Roye, 2008). Additionally, we used the demographics from the ACS responses in the first two analyses, but used the demographics from the ABS responses in the third analysis. The ABS demographic questions were slightly modified from the CBAMS questions (Johnson, 2009). The CBAMS questions were not always identical to the ACS demographic questions. The CBAMS response categories were abbreviated for tenure, race, Hispanic origin and education questions.

Results

Propensity to respond using the Internet versus mail for hard-to-interview populations

In the April 2011 Internet Test, 44,313 ACS households responded by paper or Internet across both strata and the four treatments available for analysis. Approximately 65 percent of those households responded by paper and the remainder responded via the Internet. In the November test, 38,856 ACS households responded by paper or Internet across both strata and the five treatments available for analysis.

Approximately 60 percent of those households responded by paper and the difference responded via the Internet. Table 1 presents the model estimates, standard errors, and odds ratios associated with each of the hard-to-interview characteristics predicting an Internet response.

Table 1: Logistic regression model predicting likelihood of submitting an Internet response compared to a mail form

Independent variable	April 2011 ACS Internet Test			November 2011 ACS Internet Test		
	Estimate	Standard Error	Odds ratio	Estimate	Standard Error	Odds ratio
Renter	-0.11	0.03	0.90	-0.04	0.05	0.96
Hispanic respondent	0.19*	0.08	1.21	0.40**	0.05	1.49
Respondent with less than a High School (HS) education	-1.57**	0.07	0.21	-1.49**	0.09	0.23
Black respondent	-0.26**	0.06	0.77	-0.22**	0.05	0.80
Household with child <5 years old	0.50**	0.04	1.66	0.53**	0.09	1.71
Household with Spanish speaker	-0.003	0.08	1.00	-0.01	0.07	0.99
Household with everyone <30 years old	0.57**	0.05	1.76	0.61**	0.05	1.84

Source: U.S. Census Bureau, 2011 ACS Internet Test, April to May 2011

Source: U.S. Census Bureau, 2011 ACS Follow-up Internet Test, November to December 2011

*p<.05 **p<.01

As expected, the April and November tests found very similar results. After two months of data collection, Hispanic respondents, households with at least one child under 5 and households with everyone under 30 were more likely to report via the Internet than non-Hispanic respondents, households without a young child, or households with at least one person older than 30, respectively. In the April test, the odds of young households reporting by the Internet were 1.76 times the odds of households with at least one person over 30 reporting by Internet; the odds of households with a young child reporting by the Internet were 1.66 times the odds of households without a young child reporting by Internet; and the odds of households with a Hispanic respondent reporting by the Internet were 1.21 times the odds of households without a Hispanic respondent reporting by the Internet. The trend for November is similar.

In both tests, respondents with less than a high school education and Black respondents were more likely to report by paper than respondents with more education or non-Black respondents. Perhaps the most striking finding is that the odds of a respondent with higher education reporting by Internet are four to five times⁷ the odds of respondents with less than a high school education reporting by Internet.

Renters and households with a Spanish speaker, however, were no more likely to report by one mode over the other. Not shown in the table are the intercept and the treatment control variables.

Effect of Internet option on percent of self-responders with hard-to-interview characteristics

Table 2 presents the weighted percent of self-responders who had hard-to-interview characteristics. We present these percents for the control, Prominent Choice, and Push Accelerated treatments in both the April and November tests. Comparing the percents of self-responders who have particular hard-to-interview characteristics across treatments allows us to examine whether offering an Internet mode in addition to the paper form provides incentive for these hard-to-interview groups to self-report.

Please keep in mind that the control contains some cases where a self-response was motivated by a CATI call, so the comparison between the Prominent Choice and the Push Accelerated treatments to the control is not clean. Significant differences between percents (control compared to Prominent Choice and control compared to Push Accelerated) are identified with an asterisk. Because the control panel was the ACS

⁷ Taking 1/.21 and 1/.23 results in the odds of 4.76 and 4.34 of a “success” associated with the not-hard-to-interview group reporting by Internet.

production sample, the sample size is very large, making even small differences significant in this table. For that reason, we focus our discussion on differences that are larger than one percentage point in both tests.

Table 2: Weighted percent of self-responders in the control (paper only) and multi-mode conditions for different hard-to-interview groups

	April 2011 ACS Internet Test			November 2011 ACS Internet Test		
	N	Weighted Percent (%)	Standard Error	N	Weighted Percent %	Standard Error
Renter						
Control	68,581	22.95	0.15	112,356	22.90	0.12
Prominent Choice	13,013	24.33**	0.42	8,403	24.66**	0.50
Push Accelerated	12,390	22.80	0.43	8,216	23.27	0.47
Hispanic respondent						
Control	67,112	6.54	0.10	110,271	6.52	0.10
Prominent Choice	12,803	6.69	0.25	8,290	6.05	0.30
Push Accelerated	12,282	5.77**	0.24	8,128	6.45	0.24
Respondent with less than a High School education						
Control	66,912	9.50	0.12	109,878	9.56	0.11
Prominent Choice	12,741	9.73	0.34	8,244	8.63*	0.36
Push Accelerated	12,112	8.41**	0.26	8,058	7.23**	0.30
Black respondent						
Control	70,059	7.22	0.09	114,953	7.09	0.10
Prominent Choice	13,294	6.94	0.25	8,559	6.74	0.27
Push Accelerated	12,538	6.49**	0.34	8,312	6.38*	0.28
Household with child <5 years old						
Control	70,107	9.42	0.11	115,253	9.28	0.11
Prominent Choice	13,322	9.91	0.26	8,569	10.12*	0.29
Push Accelerated	12,568	9.45	0.29	8,327	10.14**	0.31
Household with Spanish speaker						
Control	67,352	6.19	0.09	110,926	6.05	0.09
Prominent Choice	12,826	6.02	0.22	8,300	5.80	0.31
Push Accelerated	12,181	5.21**	0.21	8,104	5.85	0.28
Household with everyone <30 years old						
Control	70,013	6.78	0.10	155,079	6.49	0.07
Prominent Choice	13,312	7.05	0.26	8,555	7.22*	0.27
Push Accelerated	12,558	6.79	0.26	8,315	6.98	0.30

Source: U.S. Census Bureau, 2011 ACS Internet Test, April to May 2011

Source: U.S. Census Bureau, 2011 ACS Follow-up Internet Test, November to December 2011

*p<.05 **p<.01

After two months of data collection in both the April and November tests, we find very few substantial differences between the percent of self-respondents who are hard-to-interview when presented with two modes (Internet and paper) versus only being offered the paper form. The percent of self-respondents with less than a high school education in a Push multi-mode design is lower than the percent in the paper-only control panel in both the April and November tests. Recall that the Push design sends the response modes sequentially, first with the Internet offer, and then the paper form to those who had not responded via the Internet.

The percent of the self-respondents who were renters was larger for the Prominent Choice design in both April and November than for the control in those months. In the Prominent Choice design, both Internet and paper forms were sent concurrently to the sample. There were a few other significant differences, but none that were meaningful or repeated in both tests. Given these results, we found little evidence that offering an Internet mode in addition to the paper form provides an additional incentive for these hard-to-interview groups to self-report. Instead, we observe that the sequential methodology might negatively affect self-response from some groups with low Internet access rates.

Reasons for nonresponse reported by the hard-to-interview cohorts

There were 795 completed follow-up interviews of nonrespondents to the self-response phase of the April 2011 ACS Internet Test. Of those, 37 percent or 296 respondents were hard-to-interview as defined by one or more of the following characteristics: renters (n=113); living in a building with two or more units (n=68); under age 30 (n=36), Black (n=81), Hispanic (n=85), or less than high school education (n=89).

In the nonresponse followup interview, we asked a series of open-ended questions to determine why these 795 households did not respond to the ACS (Nichols, 2012). Overall, about 75 percent of ACS nonrespondents in the study provided one of five reasons for not responding to the ACS. Approximately 34 percent reported that they “did not receive the envelope.” Approximately 18 percent reported that they “did not open the envelope.” Approximately 7 percent reported that they “did not know about the mode choice.” Approximately 10 percent reported that they “were too busy” and approximately 7 percent reporting completing the ACS, but we found no record of a completed survey. Approximately 5 percent of the ACS nonrespondents in the study reported one of these reasons: “need data from another person,” “ACS data were sensitive,” and “computer issues.” Other reasons were given, but not by more than 5 percent of the nonrespondents. The mode choice between Internet and paper was not reported to be a reason for nonresponse.

Based on the Wald Chi-Square test, we found no differences between the reasons provided by renters and non-renters or by young people (those less than 30) and those who were 30 or older. For the other groups, generally, the reasons for not responding to the ACS were not very different, but there were a few exceptions.

- *Non-Blacks* were more likely to report that they “did not receive the envelope” compared to *Blacks* (F=14.9; p<.0001).
- *Non-Hispanics* and *people with a high school education or more* were more likely to report that they did not respond to the ACS because “the data items were sensitive” compared to the proportion of *Hispanics* and *people with less than a high school education* (F=6.7; p<.01 and F=6.1; p<.01, respectively). (Hispanic origin and level of schooling were correlated in our sample. About 40 percent of Hispanics had less than a high school education compared with only 8 percent of non-Hispanics.)
- *People who lived in single-family units or mobile homes* were more likely to report that they did not open the envelope compared to *people in buildings with two or more apartments* (F=3.6; p<.06).

We also combined all the groups to create one designation of hard-to-interview or not hard-to-interview. With that classification, we found that the 296 hard-to-interview cases were:

- marginally more likely to report that they were “too busy to respond” to the ACS than the 499 not hard-to-interview cases (F=3.6, p<.06); and
- less likely to report that the “ACS data requested were too sensitive” compared with the not hard-to-interview cases (F=13.0, p<.0003).

In addition, although the total numbers are small, the hard-to-interview were:

- less likely to report that they “had already complied with the request” or that the “survey was redundant” compared to the not-hard-to-interview ($F=3.3$, $p<.07$); and
- less likely to have mailed in a blank form ($F=6.1$, $p<.01$) compared to the not hard-to-interview.

None of the 296 hard-to-interview cases reported one of the following reasons for nonresponse: Internet security; the legitimacy of the ACS; or they never received the form. Of the 795 total ABS cases, two reported that they prefer the telephone; two reported having language issues and one reported being confused by the survey request. These five were all hard-to-interview cases.

Older adults (aged 65 and over)

In addition to the hard-to-interview groups, we examined how offering an Internet mode affected the percent of self-reporters who were 65 years old and older. That group is of interest since it generally has a relatively high self-response rate to the ACS, yet it also has a low penetration of Internet usage according to the Pew and CPS data. Because we observed some possible effect of the Push Accelerated design with other low Internet use groups, we wanted to see what effect the multi-mode conditions had on older adults. Table 3 presents the weighted percent of self-responders who were aged 65 or older.

Table 3: Weighted percent of self-responders in the control (paper only) and multi-mode conditions for older adults

	April 2011 ACS Internet Test			November 2011 ACS Internet Test		
	N	Weighted Percent (%)	Standard Error	N	Weighted Percent %	Standard Error
<u>Respondents >= 65 years old</u>						
Control	71,342	28.85	0.18	117,493	30.23	0.20
Prominent Choice	13,566	29.26	0.39	8,705	29.05	0.54
Push Accelerated	12,854	27.87*	0.43	8,425	26.49**	0.52

Source: U.S. Census Bureau, 2011 ACS Internet Test, April to May 2011

Source: U.S. Census Bureau, 2011 ACS Follow-up Internet Test, November to December 2011

* $p<.05$ ** $p<.01$

Similar to the finding for lower-educated adults, we find that the percent of self-respondents who were older is also slightly lower in a Push multi-mode design than with the paper-only design and there is no difference between the Prominent Choice design and the paper-only design.

In the follow-up study, 226 of the 795 ACS nonrespondents were 65 years old or older. Even though only 36 percent (standard error 3.2) of them reported having Internet access at home, at work or somewhere else, they did *not* report that computer issues (which included lack of Internet access) was the reason for nonresponse any more than younger ACS nonrespondents did. Instead, older nonrespondents were more likely to report that they did not respond because they were dealing with an illness or death ($F=4.5$; $p<.03$); or because the ACS data items were too sensitive ($F=3.2$; $p<.07$). Additionally, older nonrespondents were more likely to report opening the ACS envelope ($F=5.7$; $p<.02$) and they were less likely to say that the survey was too long ($F=4.5$; $p<.03$) compared to younger nonrespondents.

Discussion

This paper provides an examination of how the addition of an Internet reporting option affects the self-response of ACS hard-to-interview groups. We hypothesized that the addition of an Internet reporting option might improve or increase the self-reporting by young households (where everyone was under 30) since young households had high Internet usage rates. Examining the self-reporters, we found that young households were more likely to report by the Internet than older households. However, this finding did

not translate into an increased rate of self-reporters being in young households compared to when only a paper form was offered. We observed the same phenomena for households with a young child. That is, they were more likely to report by the Internet than households without a young child, but there was no substantive difference between the percent of self-reporters that were in households with a young child in the multi-mode treatments compared to the paper-only control.

We had hypothesized that with their lower Internet usage rates, the addition of an Internet option would not improve the self-response of Hispanic respondents. However, Hispanic respondents followed the same trend as young households. That is, they were more likely to use the Internet to report than non-Hispanic respondents, but again, this did not translate into a greater percent of self-responders being Hispanic compared to the paper-only control. Contrary to our hypothesis, we did not find any effect of an Internet option on the reporting behavior of households with a Spanish speaker.

We did not have a hypothesis with regard to renters. We found that although they were no more likely to report by Internet than owners were, the percent of self-responders who were renters was larger with the Prominent Choice (concurrent) design than with the paper-only control.

We found that lower-educated respondents and Black respondents were more likely to report by paper than more highly educated and non-Black respondents were. This finding makes sense given the lower Internet usage rates we observed with the Pew and Census Bureau data for these groups. Consistent with our hypothesis, we did not find that the addition of the Internet improved the self-reporting by these respondents. We found some evidence that self-reporting might be dampened for respondents with lower education (and for older respondents) when using a sequential design, where the Internet is offered first and a paper form follows in a subsequent mailing. It is important for the reader to note that these results pertain to the one person in each household deemed as the respondent. When Tancreto et al. (2012) and Matthews et al. (2012) looked at the demographics of everyone within responding households by treatment, many of these trends did not appear. The finding that lower Internet use rates dampen self-response for these respondent groups is not supported in these tests with the concurrent design.

The qualitative follow-up survey did not show many differences in reported reasons for not responding between the hard-to-interview and the not hard-to-interview. Mode choice was not a reason reported by the hard-to-interview for not responding and neither was ACS data sensitivity. The follow-up survey data suggest that generally the hard-to-interview were aware of the survey request, as they recalled receiving the envelope and opening it. Additionally, they did not find it an unreasonable request or even intrusive. As a whole, the hard-to-interview reported being busy and had not taken the time to respond.

Future Research

The Census Bureau plans to implement the Push Accelerated with the new postcard methodology in ACS production starting January 2013. Once that occurs, it will be possible to examine the self-response rates for different hard-to-interview populations and compare those rates to the rates in a previous ACS month (such as December) where there was no multi-mode response offering.

Acknowledgments

We thank our editors and reviewers including Brenna Matthews, Debbie Griffin, Tony Tersine, Kathy Ashenfelter, Terry DeMaio, Ryan King, and Karen King.

References

- DeMaio, T.J. and Bates, N.A. (1990), "Who Fills Out the Census Form?" Proceedings of the Survey Research Methods Section of the American Statistical Association.
- De Leeux, E. (2005). To mix or not to mix data collection modes in surveys. *Journal of Official Statistics*, 21(2), 233–255.

- Diffendal, G. (2001). "The Hard-To-Interview in the American Community Survey," Proceedings of the Annual meeting of the American Statistical Association, August 5-9, 2001.
- Griffin, D. and Hughes, T. (2010) "Mixed Mode Data Collection in the American Community Survey", Poster presented at the annual meeting of the American Association for Public Opinion Research, Chicago, IL, May 2010.
- Hill, J., Lestina, F., Machowski, J., Rothhaas, C., and Roye, K. (2008), "Study of Respondents Who List Themselves as Person 1," Decennial Statistical Studies Division 2008 Memorandum Series # G-09, September 28.
- Johnson, K. (2009). "Census Barriers, Attitudes, and Motivators Survey Methodology Report," C2PO 2010 Census Integrated Communications Research Memoranda Series No.8, January 6, 2009.
- Joshipura, M. (2008). "2005 ACS Respondent Characteristics Evaluation," U.S. Census Bureau: Decennial Statistical Studies Division. #ACS-RE-2. September 15, 2008.
- Matthews, B., Davis, M., Tancreto, J., Zelenak, M.F., and Ruiter, M. (2012) "2011 American Community Survey Internet Tests: Results from Second Test in November 2011", American Community Survey Research and Evaluation Program. #ACS12-RER-21, May 14, 2012.
- Moul, Darlene. 2002. "Nonresponse Followup for Census 2000" Census 2000 Evaluation H-5. Washington, DC, U.S. Census Bureau. last accessed 3/21/2012
www.census.gov/pred/www/rpts/H.5.pdf
- Nichols, E. (2012). "The April 2011 American Community Survey Internet Test: Attitudes and Behavior Study Follow up," American Community Survey Research and Evaluation Report Memorandum Series, #ACS12-RER-16, March 7, 2012.
- Pew Research Center (2012). Demographics of internet users. *Internet & American Life Project's August Tracking Survey* [Data file]. Retrieved from <http://pewinternet.org/Trend-Data/Whos-Online.aspx>
- SAS Institute Inc. (2012), SAS Version [9.2]. Cary, NC, USA.
- Stern, Sharon. 2003. "Counting People With Disabilities: A Comparison of Disability Measurement in Census 2000 and the American Community Survey". Paper presented to the annual meeting of the American Statistical Association, San Francisco
- Tancreto, J., Zelenak, M. F., Davis, M., Ruiter, M., and Matthews, B. (2012). "2011 American Community Survey Internet Tests: Results from First Test in April 2011" U.S. Census Bureau: Decennial Statistical Studies Division. #ACS12-RER-13. February 21, 2012.
- U.S. Census Bureau (forthcoming), "Results from the American Community Survey and Puerto Rico Community Survey 2011 Unweighted Sample Disposition Counts" U.S. Census Bureau: Decennial Statistical Studies Division. #ACS11-S-48, Draft July 9, 2012.
- U.S. Census Bureau (2012). Computer and Internet Use in the United States: 2010. *Current Population Survey Computer and Internet Use Supplement* [Data file Table 2]. Retrieved October 10, 2012 from <http://www.census.gov/hhes/computer/publications/2010.html>
- U.S. Census Bureau (2009), *Design and Methodology*. American Community Survey. U.S. Government Printing Office, Washington, DC.
- U.S. Census Bureau (2008), "2010 Census Integrated Communications Campaign Plan," August 2008. http://2010.census.gov/partners/pdf/2010_ICC_Plan_Final_Edited.pdf
- Zelenak, M.F., Ruiter, M., Davis, M., Horwitz, R., & Tancreto J. (2010). "Project Plan for The 2011 American Community Survey (ACS) Internet Test" U.S. Census Bureau: Decennial Statistical Studies Division. October 21, 2010