Analysis of Self-Response Options and Respondent-Friendly Design from the 2005 National Census Test

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1. Introduction

In preparation for the 2010 Census, the Census Bureau conducted a series of tests. In late 2005, a mailout/mailback national test was conducted using variations of questionnaire content, and various methods to increase response to the Census, including replacement questionnaire methods. The test also included the Internet as an optional mode for completing the census short form. Census Day was September 15, 2005. This report focuses on two of the 2005 National Census Test (NCT) objectives, namely to improve the respondent-friendliness of the forms, and to improve the operational feasibility of the second questionnaire mailing.

The 2005 NCT tested several different self-response option (SRO) strategies to fulfill these objectives. This testing focused on various aspects of the self response process, including the use of the Internet as a response option, replacement questionnaires, multiple or duplicate returns, the use of respondent-friendly questionnaires, and different mailing package production methods. Refer to Section 2.3 for detailed information on each of the experimental treatments.

2. Methodology

2.1 Scope of the test

The 2005 NCT was a national mailout-only test that covered most regions of the U.S., not including Puerto Rico. The universe included all housing units in blocks defined as mailout and mailback areas. Residents of group quarters were not eligible for the test. Given that it was a mailout-only test (i.e., self-response only) there was no nonresponse followup component. All households were also given the option of responding by Internet, through invitations provided on the mailed letters and postcards (see Section 2.2), and also given on the top of the first page of the paper questionnaire.

2.2 Mailing strategy

The test used multiple mailings to contact sampled housing units. Every housing unit was sent an advance letter as a first contact (August 22, 2005). The advance letter informed households that they would soon receive a request to complete a questionnaire for the 2005 National Census Test. The second mailing was an initial questionnaire package (August 29, 2005). Housing units received a paper questionnaire and a first-class postage-paid return envelope. Also included in the mailing package was a letter from the Census Bureau's Director that encouraged households to respond and provided the option of responding by Internet. The third mailing was a reminder postcard (September 6, 2005). The reminder postcard included a statement reminding households to respond to the Census Test if they had not already done so. It also provided instructions so that households could use the Internet to respond.

The fourth and final mailing was a targeted replacement questionnaire. It looked identical to the initial questionnaire and was sent to all housing units for which a return (by Internet or by mail) had not been received by September 13, 2005. Note that, for one of the experimental panels (see Section 2.3.1), no replacement questionnaire was sent. Instead, the fourth mailing contained a letter reminding the households to either submit their original paper questionnaires, or to respond using the Internet.

2.3 Experimental treatments

2.3.1 Encourage Internet response at the replacement mailing

There was no replacement questionnaire in Census 2000, but with response rates generally declining in many censuses and surveys over the years (de Leeuw and de Heer, 2002), it has since been explored further. The 2003 National Census Test found that using a replacement questionnaire significantly increased the mail response rate over a single questionnaire mailout (Brady, Stapleton, and Bouffard, 2004). Using a second questionnaire has also been found to increase response in mail surveys (Dillman, 1991).

The Census Bureau was also interested in exploring ways to maintain response rates without the added costs or complexities of a second questionnaire. Heberlein and Baumgartner (1981) examined this issue by addressing whether a questionnaire was necessary in

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a second mailing. They found that sending only a letter in a followup mailing was almost as effective as sending a letter and a questionnaire. Moreover, Guarino (2001) found that sending a follow-up mailing with the option of responding by telephone or the Internet but not providing a second questionnaire resulted in a 13 percent response rate to the second mailing. With Internet penetration gradually increasing (Nielsen//Net Ratings, 2006), a similar concept was tested in the 2005 NCT, in which a letter was sent at a follow-up mailing to encourage people to respond by Internet or return their paper questionnaire.

This experimental treatment ("Internet at RQ") used a replacement mailing package that simply contained a letter with the 2005 NCT Internet uniform resource locator (URL) and census identification number (ID) needed to access the web questionnaire. The letter encouraged the household to either complete the paper questionnaire that they previously received, or to use the Internet to submit their response. This treatment was tested as a possible alternative method for implementing a second mailing.

2.3.2 Using a self-mailer package and address imaging on the replacement questionnaire

There are various concerns about implementing a full-scale replacement mailing in a census, such as possible mail security risks and the many operational difficulties (including a small time frame) that would be imposed. In order to assess some of these challenges, a number of different methods of replacement mailing were researched and presented. Traditionally, due to the unique nature of the replacement mailing process, the mailing address and census ID information are sprayed onto the pre-printed replacement mailing pieces through an open window. The results of past industry research concluded that the open window method is the most efficient and effective method for creating replacement mailing packages (Gunnison, 2005). In the 2005 NCT, three methods of producing the replacement questionnaire mailing packages were tested (the traditional method in most panels, and two alternative approaches) to see if the small changes in forms design required by these methods had an impact on response.

The "self-mailer" experimental treatment used a production method that created the complete questionnaire-mailing package (questionnaire, addressing, outgoing and return envelopes and letter) at a single machine. This treatment was designed to reduce the production printing time relative to other methods. This process created a flat-style mail questionnaire that was similar in style to the control panel form. Due to the nature of this special production method, the questionnaire was mailed flat, in a larger envelope than the traditional method and required the respondent to fold the completed questionnaire in half before mailing it back.

The "address imaging" experimental treatment was very similar to the control panel except for one difference. With address imaging, a further step was taken to seal the outgoing envelope window using a clear substance. This treatment was designed to address security concerns associated with the open window production method; for example, to prevent someone from putting anything into the envelope via the window.

2.3.3 Using messaging to distinguish the replacement from the initial questionnaire

During Census 2000, a number of different response options were used. In addition to the traditional mail questionnaire and personal visit interviews, both telephone and Internet responses were allowed (the latter on a very limited scale). Though this was done to increase cooperation, it also meant that multiple returns from a given household were a concern. In the census environment, the algorithm to select the primary return is a very complex process (Baumgardner, 2002). As a way of trying to reduce the number of multiple returns, one test panel in the 2005 NCT was designed with the addition of an easy-to-see flap on the replacement questionnaire with a message that distinguished it from the initial questionnaire.

Specifically, the "messaging" experimental treatment included a flap in a different color over part of the first page of the replacement questionnaire that stated "Reminder Mailing." The flap also stated: "A census form was sent to your address about two weeks ago. If it was completed and returned, there is no need to return this one. If the original form was not sent back, either this one or the Internet version at www.census.gov/census2005 needs to be completed and returned." There was no change to the content or layout other than the message. This treatment was tested in two experimental panels (once by itself, and once in the presence of the respondent-friendly design discussed in Section 2.3.5). For the purposes of evaluating the effectiveness of this treatment, we used the data from the panel where it was tested alone.

2.3.4 Postal tracking of initial questionnaire returns

Postal Tracking is a postal automation service of the United States Postal Service (USPS). It provides advanced notice of the delivery of incoming mail and

other mail tracking opportunities. Postal Tracking was used in the 2005 NCT to identify forthcoming mail returns from the initial questionnaire mailing. This test provided a preliminary study to determine if postal tracking was reliable in identifying mail return pieces, and whether it saved time or effort in creating the replacement mailing universe. Postal Tracking did not change the questionnaire; only a seemingly non-intrusive barcode was added to the return envelope.

2.3.5 Respondent-friendly questionnaire design

Some researchers have tested the use of more respondent-friendly questionnaires as ways of improving response or reducing errors in surveys, such as skip pattern compliance (Dillman, Redline, and Carley-Baxter, 1999). Other literature notes that "respondent-friendliness describes a form that is easy for respondents to complete, avoids confusion about what or how to answer it, and results in respondents feeling neutral or positive, as opposed to negative, about the form itself" (Dillman, Redline, and Carley-Baxter, 1993). Dillman *et al.* (1993) also noted that many people found the 1990 census form to be confusing. While improvements were made to the 2000 form, there is still criticism and room for improvement (Dillman, Parsons, and Mahon-Haft, 2004). As such, a new and presumably more respondent-friendly questionnaire design was tested in the 2005 NCT to improve the "respondent-friendliness" of the form.

Changes were implemented on paper questionnaires for both the initial and replacement mailings in one experimental panel. The components of the respondent friendly-design were tested as a complete package, as opposed to being tested as individual treatments. The list below denotes the changes from the control form to the respondent-friendly design form:

- New instruction on top of the form telling people what to do if they make a mistake;
- Boxes are placed consistently around all answer fields;
- Lightly embedded "X"s in all response fields with check boxes;
- Lightly embedded "MMDDYYYY" in date of birth field.

These changes were tested in combination with the use of messaging to distinguish the replacement questionnaire from the initial questionnaire in one experimental panel (see Section 2.3.3). So that the respondent-friendly design can be cleanly analyzed, it was compared to the messaging panel.

2.4 Sample design

Two strata were created to reflect differences in the racial and ethnic composition of geographic areas and, hence, the response propensity (Stackhouse and Brady, 2003) of the mailout/mailback universe. The strata were defined at the census block level, as blocks with "High Non-White or Hispanic Concentration" (High) and those with "Low Non-White or Hispanic Concentration" (Low). The High stratum encompassed about 32 percent of all housing units in the sample universe, and the Low stratum made up the remaining 68 percent. The mailout sample size was equally allocated between the strata, and the sampling weights were computed accordingly. The initial sample sizes were 30,000 housing units for the control panel and 10,000 for the SRO and respondent-friendly panels.

2.5 Significance testing

The standard errors for the estimates in this report were computed using a stratified jackknife replication procedure with random groups. This computation method accounts for the stratification in the sample, which we expect to lower the standard errors compared to a simple random sample. The housing units were sorted (by unique identification number) in the same order that they were selected and clusters of housing units (or housing units selected at each hit) were then assigned sequentially to one of 250 replicates. Using this approach, we accounted for the clustering of people within a household in computing errors for person level estimates, since people within households were clustered together in the same replicate.

Pairwise comparisons were made to test for differences in the analytical variables for the different treatment groups. Computed differences were compared to critical values using two-sided tests. If the computed difference was greater than or equal to the critical value, then the difference was deemed to be statistically significant. Critical values were adjusted to account for the multiple comparisons being made, where appropriate, using Dunn's procedure. Dunn's procedure maintained the familywise error rate at α=0.10 by dividing the α level by two times the number of comparisons. The comparisons were driven by the relevant hypotheses and test objectives, and not all possible comparisons were made.

3. Limitations

3.1 Questionnaire design changes

We cannot separate the effects of each of the respondent-friendly questionnaire design changes, as they are tested together and not individually.

3.2 Postal tracking

Mailing pieces subjected to postal tracking may be scanned multiple times, but only the first occurrence of a given return is used in this analysis. Also, the postal tracking function was not usable if the USPS barcode was not visible to the tracking technology. In the majority of these cases, respondents did not insert their questionnaires into the return envelopes properly, such as by putting it in backwards. In some other cases, the barcodes were simply unreadable. Overall, about 22 percent of the initial questionnaire returns could not be tracked due to this limitation.

3.3 Sample loss due to Hurricanes Katrina and Rita

A portion of the 2005 NCT was impacted by the catastrophic events of Hurricane Katrina in late August and Hurricane Rita in mid-September 2005. The Katrina storm affected numerous residents of Louisiana, Mississippi, Alabama, and other areas along the Gulf of Mexico and caused a major disruption in mail service to and from these areas. We removed 613 sampled cases from the replacement mailing so as not to overload the mail facilities in these areas. After a preliminary review of the data we decided to treat these as undeliverable as addressed (UAAs), including the small number of returns that were received. Sample loss was distributed nearly evenly across the experimental panels.

Hurricane Rita made landfall in eastern Texas on the same day that the replacement mailing was delivered to the USPS for mailing. Response was somewhat lower than expected for these areas, but was not cause for alarm, and no additional remedies were taken.

4. Results

4.1 Encourage Internet response at the replacement mailing

In an effort to evaluate the effect of the Internet at the replacement mailing treatment, we first compared the self-response rates between the control panel and the Internet at RQ panel to test for any differences in unit response. As we can see in Table 1, the total self-response rate is significantly higher in the Control panel (61.2 percent) than in the Internet at RQ panel (57.5 percent). Also, as noted in Table 1, 10.2 percent of the sample for the Internet at RQ panel completed a questionnaire using the Internet (with 47 percent mailing a paper return and the remainder being nonrespondents). Similarly, 7.3 percent of the sample for the control panel submitted an Internet return. As expected, this difference of 2.9 percentage points is statistically significant.

Table 1. National self-response rates for Internet at RQ and control panels.

Panel	Total	% Internet Returns
Control	61.2	7.3
Internet at RQ	57.5	10.2
Difference	**3.7** ***	**-2.9** ***

Source: 2005 NCT housing unit analysis file.
*** Significant at alpha = 0.01.

We also compared the response rates for the replacement mailing, as shown in Table 2. Thus, these figures can be interpreted as the percentage of households that submitted a return out of all housing units that were sent a replacement mailing (less UAAs). Note that due to the potential time period overlap between when a respondent submits a return and when the replacement universe cutoff is defined, some cases that were sent a replacement mailing may already have completed a paper or Internet return. Like the results in Table 1, which showed the total self-response rates, the control panel had a significantly higher replacement universe self-response rate (44.3 percent) than the Internet at RQ panel (39.1 percent).

Table 2. National replacement universe self-response rates for Internet at RQ and control panels.

Panel	Total	% Internet Returns
Control	44.3	4.6
Internet at RQ	39.1	8.7
Difference	**5.2** ***	**-4.2** ***

Source: 2005 NCT housing unit-level analysis file.
*** Significant at alpha = 0.01.

Clearly, the results suggest that sending a paper replacement questionnaire gives us the biggest increase in response. However, given the operational difficulties involved in a second questionnaire mailing, it may not be feasible to implement a replacement questionnaire mailing in 2010. Therefore, we wanted to see if the Internet at RQ treatment could improve response compared to not having any replacement mailing. Hence, we compared the self-response rate of the Internet at RQ panel against the control panel, after

limiting the control panel to responses from the initial questionnaire or reminder postcard. This was an ad-hoc way of assessing the effectiveness of using the Internet at RQ strategy compared to doing nothing for a replacement mailing. The national self-response rate for the control panel, excluding replacement questionnaire returns, was 50.8 percent. This figure is significantly less than the total of 57.5 percent for all returns in the Internet at RQ panel. Note though that this result may be a slight overstatement, since some people who returned replacement questionnaires may have ended up returning their original questionnaires if they had not received the replacement. Further, this analysis does not substitute for a well-designed experimental test. The difference of 6.7 percentage points was statistically significant at the 0.01 alpha level.

4.2 Using a self-mailer package and address imaging on the replacement questionnaire

Neither the self-mailer nor the address imaging panels were found to have any negative effects on self-response rates, item nonresponse rates, or total form completeness. Both panels showed one difference compared to the control panel, where the Hispanic origin item nonresponse rate was significantly lower. Due to space limitations, the results of this analysis are not discussed further. Since the results for the address imaging and self-mailer production methods showed no negative effects on response compared to the traditional method, we deem that we could use either method without harming the results. However, we caution that these methods should also be considered in the context of other factors such as production results, quality assurance measures, and industry capabilities.

4.3 Using messaging to distinguish the replacement from the initial questionnaire

In analyzing the effectiveness of using messaging to distinguish the replacement from the initial questionnaire, we first compared the percentage of multiple returns between the control panel and the messaging panel. The results are shown in Table 3. As we can see, the panel with the message effectively reduced the rate of multiple returns from 4.3 percent in the control panel to 2.9 percent.

Table 3. Percentage of multiple returns and self-response rates for distinguished messaging and control panels, nationally.

Panel	Multiple Returns	Total Self-response Rate
Control	4.3	61.2
Messaging	2.9	60.0
Difference	**1.4 *****	**1.2 ****

Source: 2005 NCT housing unit analysis file.
*** Significant at alpha = 0.01; ** significant at 0.05.

We also compared the self-response rates between the control panel and the messaging panel to assess whether the use of messaging on the replacement questionnaires affected overall cooperation. Table 3 also shows that there was a significant decrease of 1.2 percentage points in the total self-response rate for the messaging panel. This result may not be entirely surprising. Perhaps some people read the message wording on the flap and were prompted not to return the replacement questionnaire ("…there is no need to return this one."), thinking that they had already sent back the first one.

To further illustrate this finding, we also computed the self-response rates for housing units that were sent a replacement questionnaire. For the replacement universe, the control panel had a self-response rate of 44.3 percent, which was 1.9 percentage points higher than in the messaging panel. This suggests that the overall differences in the self-response rates were due to the replacement questionnaire treatment in the messaging panel. Some people think they already sent in the form when they see the message, and so they don't return the new one. This may be a variation on the social desirability concept, that is the idea that people will behave or act in a manner that they believe will be viewed favorably by other people.

4.4 Postal tracking of initial questionnaire returns

In order to assess the accuracy of postal tracking of the initial questionnaire returns, we compared the USPS tracking status for each housing unit with the Census check-in status. The analysis only included mail returns for the initial questionnaire - thus Internet returns and replacement questionnaire responses are both excluded. Overall, about 78 percent of returns were checked-in at both points. However, approximately 22 percent of the Census returns could not be tracked by the USPS, mostly due to respondents putting their questionnaires in the return envelopes incorrectly. Note that almost all returns that were tracked by the USPS though, were also checked in by

Census (99.1 percent), which indicates that the service was very reliable. Of course, if the service were to be fully implemented, any returns that were not tracked would be treated as usual except that we would not have the added benefit of the tracking. And returns that are tracked by the USPS, but never checked in by the Census Bureau would eventually be routed to the next phase of operations after a certain amount of time, such as nonresponse followup.

For the cases that were checked-in by both the USPS and the Census Bureau, we compared the dates when the USPS and Census Bureau indicated that they received initial questionnaire returns. Then, we studied the distribution in the lag time between the two dates. For instance, if the USPS tracking indicated that a return was received on September 20 and the Census Bureau received the form on September 24, then the lag time is 4 days. This can be used to evaluate the usefulness of Postal Tracking. Note that this is not artificially inflated by slow check-in, as there was a requirement that all mail returns had to be checked in by the Census Bureau within 24 hours of receipt.

In general, there was about a 3 day lag time between when the USPS received a mail return and when it was checked-in by the Census Bureau. In fact, using the replacement mailing cutoff date of September 13, 2005, we found that 29 percent of all initial questionnaire returns that were tracked by the USPS were still in the mail system (and not yet received by Census) by that date. This means that the replacement mailing workload could have been substantially reduced if the postal tracking had been fully implemented and used to its full advantage. Further, this result is supported by some of the results that we saw in the analysis of the Internet at RQ panel. There we learned that 27.6 percent of respondents in the control panel who were sent a replacement mailing had actually returned their initial questionnaire (data not shown).

4.5 Respondent-friendly questionnaire design

The respondent-friendly design treatment was also combined with the distinguished messaging SRO treatment, as well as Postal Tracking. In order to separate any confounding effects between the respondent-friendly design and the replacement questionnaire messaging, we compared the results from this multi-treatment panel against the panel where messaging was the only treatment to assess the main effects of the respondent-friendly questionnaire design.

We first addressed the self-response rates. There was no statistically significant difference between the panel with the respondent-friendly design (60.2 percent) and the messaging panel (60.0 percent). This indicates that the respondent-friendly design did not have an adverse effect (or a positive effect) on self-response.

In order to understand the effect of the respondent-friendly questionnaire design on data quality, we also looked at item nonresponse rates compared to the traditional-style format. One statistical difference we found for the person-level data was that the sex nonresponse rate was significantly higher in the respondent-friendly design panel (1.7 percent) compared to the messaging panel (1.3 percent) at alpha = 0.01. There is no apparent explanation for this result, as the only difference was the use of embedded "X"s in the response boxes of the respondent-friendly questionnaire.

Next, we examined the item nonresponse rates for the three household items. There were no statistical differences for the tenure or population count items. But, as with the sex person-level question, we found that those in the respondent-friendly design panel were significantly more likely to not answer the coverage undercount question compared to the messaging panel. The coverage undercount nonresponse rate for the respondent-friendly panel was 9.1 percent, which was 2.3 percentage points higher than messaging panel (significant at alpha = 0.01). Again, there is no plausible explanation for the higher figure, as the only difference is the use of embedded "X"s.

Given that we did not find any improvement with the item nonresponse rates for the respondent-friendly design, we explored the data further. We wondered if the embedded "MMDDYYYY" in the date of birth fields might have had any effect in improving the quality of the data with regards to invalid responses in the date of birth or age fields. For instance, if someone entered "20" in the month of birth box (intending that to mean the day), then that would be considered "invalid." Another example would be if they entered a year of birth outside of the range 1879 to 2005. In addition, we wondered if there would be any differences in the rates of age matches between a person's reported age and their calculated age from the date of birth.

We learned that there *is* some improvement with the respondent-friendly design. Just 0.8 percent of the non-missing responses for the year of birth field with the respondent-friendly panel were invalid responses. A t-test found this to be significantly less (at alpha = 0.05) than the 1.2 percent of invalid responses from the messaging panel. Further, we found that the respondent-friendly panel had improved agreement

between a person's reported age and their exact age. In the respondent-friendly design, about 91.5 percent of people had an exact match for age, which was significantly greater (at alpha = 0.01) than the rate for the messaging panel (90.0 percent). These results show that, while the rates of missing data are not improving, the experimental respondent-friendly design is improving the underlying data for the date of birth fields.

5. Conclusions

The results of this research provide useful information to consider for future planning. This section contains a recap of the main findings, and presents some recommendations for future census planning.

We began the analysis by studying the treatment that offered a letter in lieu of a questionnaire at the replacement mailing, known as the Internet at RQ treatment. We found that unit response rates were lower for this panel compared to the control panel. The differences were also evident when looking at the replacement universe, as the control panel had a larger response rate by 5 percentage points compared to the Internet at RQ treatment. However, the Internet at RQ treatment did manage to increase Internet usage by 3 percentage points compared to the control panel. We should also note that the Internet at RQ treatment did increase response when compared to an ad-hoc simulation of no replacement mailing.

Recommendation: We strongly support the use of a replacement questionnaire in the 2010 Census. However, we understand that there may be several inhibitors to this reality, including the massive operational undertaking of preparing large quantities of questionnaires in a short period of time. That said, if a second questionnaire cannot be implemented, then we believe that the data have shown the Internet at RQ panel to be a reasonable alternative when an Internet response option is available. Note, though, that a decision was made, based on a number of factors, to eliminate the Internet option from the Decennial Response Integration System (DRIS) contract, which provides response functionality for the 2010 Census (Waite, 2006).

Next, we analyzed the use of a message on a flap to distinguish the initial questionnaire from the replacement questionnaire. This treatment showed mixed results. First, as hypothesized, the number of multiple or duplicate returns were decreased by about 1.4 percentage points. This is a positive finding given the costs associated with mailing and processing multiple returns. However, we also found that the message might have inadvertently decreased response, as recipients might have thought that they already sent their form back. This may have contributed to the decline in the response rate of 1.2 percentage points.

Recommendation: Given the decrease in the response rate for the messaging panel, we do not recommend adopting this approach. However, there are clearly positive benefits of trying to reduce the number of multiple returns so it would be rash to completely abandon all hope. We recommend more testing in this area. It is possible that some minor improvements and adjustments to the wording of the message might diminish any negative response rate effects.

We then focused our attention on the results of Postal Tracking. We found that the USPS's Postal Tracking system showed encouraging results when used to track initial questionnaire returns. On the whole, we found that postal tracking was very accurate as about 99.1 percent of all returns that were tracked by the USPS were later received and checked-in by the Census Bureau. Further, the typical time delay between USPS check-in and Census check-in was about 3 days. However, about 22 percent of the mail returns could not be tracked, primarily due to the questionnaires being placed in the return envelopes incorrectly.

Recommendation: The test results for postal tracking were very promising. With a tracking system in place, we could lessen the replacement questionnaire workload by removing cases that are in the mail stream but have not reached the Census Bureau. In order to decrease the number of returns that cannot be tracked, it might be beneficial to put an explicit instruction on the return envelope about how to insert the questionnaires correctly.

Finally, we analyzed the redesigned respondent-friendly questionnaire against our traditional-style questionnaire. We found that this treatment also had somewhat mixed results. There were no differences in the self-response rates, but we anticipated that improving "respondent friendliness" by making minor changes to the census questionnaire would improve the item response rates. Our hypothesis did not come to fruition, as there was no noticeable improvement on any questions. In fact, two items actually showed an increase in missing data with the respondent-friendly form. We have no likely explanation for this finding. However, the new design did show an improvement on the quality of age and date of birth reporting.

Recommendation: We do not recommend moving forward with the new features tested in the

"respondent-friendly" design due to the increases in item nonresponse. There do not appear to be any added benefits of switching from the traditional-style questionnaire. However, we do believe that it is beneficial to attempt to continue to improve the census questionnaire in future testing, especially in light of the growing concern about the limited space on the form. Making the form more respondent-friendly should be an ongoing process. In addition, we recommend using "MMDDYYYY" in the date of birth fields.

6. References

Baumgardner, S., (2002), "Results of the Census 2000 Primary Selection Algorithm," *Proceedings of the Section on Government Statistics of the American Statistical Association*, Joint Statistical Meetings, New York City.

Brady, S., Stapleton, C.N., and Bouffard, J., (2004), "2003 National Census Test: Response Mode Analysis," 2003 National Census Test Analysis, U.S. Census Bureau, February 26, 2004.

de Leeuw, E., and de Heer, W. (2002), "Trends in Household Survey Nonresponse: A Longitudinal and International Comparison," in *Survey Nonresponse*, eds. R. M. Groves, D. A. Dillman, J. L. Eltinge, and R. J. A. Little, New York: John Wiley & Sons, pp. 41–54.

Dillman, D.A., (1991), "The Design and Administration of Mail Surveys," *Annual Review of Sociology*, Vol. 17, p. 225-249.

Dillman, D.A., Parsons, N.L., and Mahon-Haft, T., (2004), "Cognitive Interview Comparisons of the Census 2000 Form and New Alternatives," Prepared for U.S. Census Bureau, Technical Report 04-030, Social and Economic Sciences Research Center, Washington State University.

Dillman, D.A., Redline, C.D., and Carley-Baxter, L.R., (1999), "Influence of Type of Question on Skip Pattern Compliance in Self-Administered Questionnaires," *Proceedings of the Section on Survey Research Methods of the American Statistical Association*, Joint Statistical Meetings, Baltimore, MD.

Dillman, D.A., Sinclair, M.D., and Clark, J.R., (1993), "Effects of Questionnaire Length, Respondent-Friendly Design, and a Difficult Question on Response Rates to Occupant-Addressed Census Mail Surveys," *Public Opinion Quarterly*, Vol. 57, p. 289-304.

Dillman, D.A., West, Kirsten, K., and Clark, J.R., (1994), "Influence of an Invitation to Answer by Telephone on Response to Census Questionnaires," *Public Opinion Quarterly*, Vol. 58, p. 557-568.

Guarino, J., (2001), "Assessing the Impact of Differential Incentives and Alternative Data Collection Modes on Census Response," Census 2000 Testing, Experimentation, and Evaluation Program, U.S. Census Bureau, July 10, 2001.

Gunnison Consulting Group Inc., (2005) "Technical Tradeoff and Risk Analysis of Replacement Mailing Alternatives, Preliminary," Report prepared for U.S. Census Bureau, Decennial Systems and Contracts Management Office.

Heberlein, T.A., and Baumgartner, R., (1981), "Is a Questionnaire Necessary in a Second Mailing?" *Public Opinion Quarterly*, Vol. 45, p. 102-108.

Nielsen//NetRatings (2006), "Two-Thirds of Active U.S. Web Population Using Broadband, Up 28 Percent Year-Over-Year to an All-Time High, According to Nielsen//NetRatings," Press Release, March 2006, available at: http://www.nielsen-netratings.com/pr/pr_060314.pdf.

Stackhouse, H.F., and Brady, S., (2003), "Census 2000 Mail Return Rates," Census 2000 Evaluation A.7.b, U.S. Census Bureau.

Waite, P.J. (2006), "Rationale for the Decision to Eliminate the Internet Option from the DRIS Contract," 2010 Decennial Census Program Decision Memorandum Series No. 14, U.S. Census Bureau, July 19, 2006.