

## First Impression: An Advance Contact Experiment to Locate and Engage Potential Respondents

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### Abstract

Locating sampled individuals is an important first step for surveys with a young, mobile target population like the National Survey of Recent College Graduates (NSRCG). The NSRCG is one of three surveys sponsored by the National Science Foundation that combine to form the Scientists and Engineers Statistical Data System (SESTAT). The other two surveys are the National Survey of College Graduates (NSCG) and the Survey of Doctorate Recipients (SDR). SESTAT is a comprehensive and integrated system of information about employment, educational, and demographic characteristics of the science and engineering population in the United States.

In previous survey cycles, locating was done by mailing a Telephone and Address Verification Form (TAVF) to the graduate's last known address. After locating the graduates, another important step is to engage these potential respondents by describing the importance of the survey. The 2006 NSRCG compared the effect of mailing a TAVF to that of mailing a colorful brochure requesting the same information but also highlighting results from previous NSRCG survey cycles. Three brochures were developed: one targeted graduates of degree fields with high nonresponse; a second catered to previously low responding racial minorities; a third provided information relevant to all graduates. This paper will evaluate the impact of the four mailings on obtaining updated addresses and overall survey response.

**KEY WORDS:** Nonresponse, Locating Mobile Populations, Advance Contact Mailings

### 1. Background

Locating members of a sample as mobile as the National Survey of Recent College Graduates (NSRCG) is a challenging task. The target population consists of individuals who earned a bachelor's or master's degree in a science and engineering degree field in the past three years. The educational institutions granting these degrees helped the locating effort by providing telephone numbers and addresses for the target population. However, this information may quickly become out of date. The sample is primarily young (mostly under age 30) and prone to relocating after graduation. In past survey cycles, intensive efforts were launched to locate the sample. The

plan for the 2006 NSRCG was to utilize what locating efforts worked well previously and to test the impact of improving upon an advance mailing to sample members.

Locating efforts may be divided into three parts: batch locating, intensive locating, and sample person updates. Batch locating involves checking frame information against a database to see if other contact information is available. Intensive locating is a case-by-case effort in which trained researchers use searchable databases and other resources to locate contact information for individual graduates. Sample person updates are responses to prenotification materials that provide updated telephone and address information.

In 2003, Mathematica Policy Research, Inc. (MPR), the contractor for the 2003 NSRCG, mailed a Telephone and Address Verification Form (TAVF) to the sample. This form listed the contact information on file and asked the recipient to update it if necessary. In addition, the form solicited day and evening telephone numbers and an email address. Of the over 17,000 TAVFs mailed in September 2003 with an advance letter, only 1,500 were returned confirming the information on file or providing updated information. An additional 750 were returned by the post office with a forwarding address and 500 more were returned as undeliverable as addressed (UAA). The result of this TAVF was updated contact information for 13% of the sample. While the 2003 NSRCG advance mailing was somewhat successful, improvements could have a positive impact on reducing noncontact and increasing survey response rates.

In the 2006 survey cycle of the NSRCG, the U.S. Census Bureau served as the data collection contractor. In an attempt to improve upon the advance mailing used by MPR, we developed a color brochure and tested its effectiveness against that of the TAVF in a January 2006 advance mailing. The brochure highlighted data of interest from the 2003 NSRCG and included a tear-off postcard that served the same purpose as the TAVF.

### 2. Literature Review

Many other mail surveys make use of advance contact methods in order to introduce the survey topic to the recipient and to attempt to elicit response to the upcoming survey. These surveys have experienced a range of results from their advance contact methods.

\*This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed on statistical, methodological, technical, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau.

One meta-analysis evaluating the impact of advance contact letters (among other methods) on response rates revealed that prenotification had a range of effects (Fox, Crask, and Kim, 1988). Its impact on response rate ranged from a 9% decrease to a 47% increase. In 19 of the 22 advance contact treatments, the impact of prenotification was positive. On average, the impact of these 22 advance contact treatments was a 7.7% increase in response rate.

In the 2003 NSRCG, a brochure was also used to promote response. However, these brochures were incorporated as part of a larger cover letter experiment. Brochures were included within the first mail package sent to cases selected to receive a new experimental cover letter highlighting the importance of science and engineering. Due to the last minute inclusion of the brochures in the first mail package, their effect was inadvertently confounded with another treatment. As a result, any effect associated specifically with the brochures is difficult to determine. However, when considered together with the experimental cover letter the brochures offered no advantage, in terms of increased response rate, over the traditional cover letter with no brochure (Fecso, Broach, and Grigorian, 2005).

### 3. Data

Like past survey cycles, the 2006 NSRCG sampling consisted of two stages. In the first stage, 300 colleges and universities in the United States were selected into sample. The 295 responding institutions provided lists of graduates who had earned a bachelor's or master's degree in a science or engineering field between July 1, 2002 and June 30, 2005. In the second stage, this sampling frame was used to select 27,000 recent college graduates for the survey (9,000 per academic year). Approximately 16,000 sampled individuals from the first two academic years with domestic mailing addresses were included in the advance contact experiment described in this paper. Cases from the third academic year were not included as their address information was not available when this experiment was conducted. The advance contact mailing commenced January 26, 2006. Approximately eight weeks later, the survey questionnaire was delivered by mail. Postcard reminders and a second mailing followed for nonrespondents. Computer-assisted telephone interviewing (CATI) began June 7, 2006 for those remaining nonrespondents. Mail and e-mail reminders followed until data collection ended in November 2006.

### 4. Brochure Development

The NSRCG is conducted every two to three years in order to continually monitor the career paths and graduate school plans of college graduates in science and engineering degree fields. The survey began in the 1970s

and nonresponse has been increasing over the past decade, much like other government-sponsored surveys (Atrostic et al., 2001). In 1997, data collection from sampled graduates achieved an 81% unweighted response rate (Collins et al., 1999). By 2003, only 66% of sampled graduates responded (Wilson et al., 2005).

Nonresponse becomes a problem for analysis when those who do not respond differ substantively from those who do respond. The goal in developing the experimental design for this study was to target those individuals who were least likely to participate. By designing brochures that appealed to those with characteristics most highly correlated with nonresponse, we hoped to obtain comparable survey response rates across all population subgroups.

Based on response rates from the 2003 NSRCG, two low responding groups were selected for the study: minority graduates and health/social science majors. For each of these groups a targeted brochure was developed. For minorities, including Black, Hispanic, American Indian, and Native Hawaiian degree recipients, the brochure highlights facts pertaining to degree attainment by minorities and features pictures of minority students. For health and social science majors, the brochure has data broken out by field of study and an introduction that names these fields of study as relevant to the data collection. In addition to these targeted brochures, a general interest brochure was created to serve as a control in this experiment.

The brochures include a tear-off postcard that requests the same information as the TAVF used in 2003: updated mailing address, telephone number, e-mail address, and a contact person. However, the first three panels of the brochure display colorful charts and images of students and scientists at work. The introduction section of the brochure explains the importance of the survey. The goal of the brochure was two-fold: first, to introduce selected individuals to the survey and to leave a favorable impression on brochure recipients; and second, to collect updated telephone and address information that could be used to contact each person eight weeks later during survey data collection. Both parts of the goal of the brochure should result in higher survey response. Success of the brochures was measured by evaluating return rates of the brochures compared to the TAVF and by comparing survey response rates across brochure group.

### 5. Breakdown of Sample

Due to the timing of this research, only cases from the 2003 and 2004 graduating classes of the 2006 NSRCG were included in this experiment. Address information for cases from the 2005 graduating class was not available until after the initial mailout of the brochures. Originally,

the sample contained 17,439 cases selected from the 2003 and 2004 graduating classes. However, 15 cases were removed because there was no name on the record, and 48 cases were removed because one school requested that we not contact their students directly. From the remaining 17,376 cases, 1,500 were removed because they were included in another study that also evaluated advance contact methods. This left 15,876 available cases for this research. As a result, the findings from this study may not be generalized to the entire target population because certain groups were considered ineligible for the study.

Originally, the 15,876 eligible cases were to be stratified into three sample groups: minority graduates, health and social science majors (who were not in the minority sample group), and all others. The two experimental groups (minorities and health/social science majors) would have received one of four mailings: the TAVF, the general brochure, or one of the targeted brochures. Since it was predicted that the targeted brochures would yield the highest brochure return rates, the majority of the cases received these brochures. The sample sizes for the TAVF and general brochure groups were calculated using the following formula with a desired detection level of a 10% or more difference in return rates.

$$n \geq (Z_{\alpha/2} + Z_{\beta})^2 \frac{p_1(1-p_1) + p_2(1-p_2)}{\delta^2}$$

Where:

- n = sample size
- $Z_{\alpha/2}$  = critical value for set alpha level
- $Z_{\beta}$  = critical value for set beta level
- $p_1$  = return rate for the TAVF group
- $p_2$  = return rate for the general brochure group
- $\delta$  = minimum detectible difference

A return was defined as a returned address update. This included returns confirming the address information, but excluded refusals because we were attempting to gauge the positive impact of the mailing. Since we did not have a reliable way to predict each brochure's return rate for the sample size calculation, we wanted to use estimates that would result in the largest possible sample size. Therefore, we used estimates of 0.50 for the expected

return rates of the two sample groups being compared. This conservative approach ensured that enough cases were present for reliable statistical tests at the predetermined detection level. The final values we needed for the sample size calculation were the alpha and beta levels. The alpha level was set at the Census Bureau standard of 0.10. This value reflects the probability of committing a type I error, or finding a difference in return rates when one does not exist. The beta value was included in the formula to inflate the sample size in order to decrease the probability of committing a type II error, or claiming that there is no difference in the return rates of different brochure types when in fact a difference is present. This type of error would be detrimental to the purpose of this study. As a result, this variable was included into the sample size formula and the beta level set at 0.90. The calculation of the sample size with the above values follows:

$$n \geq (1.645 + 1.282)^2 \frac{(0.50(1-0.50) + 0.50(1-0.50))}{(0.10)^2} = 428.36645$$

This number was then rounded up to the nearest interval of 50, resulting in 450 sample cases to be selected for the TAVF and general brochure groups. Table 1 shows the breakdown of the sample cases into the four mailings. After further inspection of the sample breakdown, a fourth sample group was added to the stratification: health and social science majors who were also in the minority sample group. This, of course, slightly changed the definition of the major and minority sample groups, making them mutually exclusive. The major sample group contained health and social science majors who were not in the minority sample group, while the minority sample group contained minority graduates who were not health or social science majors. This was done to test which of the two targeted brochures would be best to send to minority graduates who are health or social science degree holders. In order to investigate this issue, the fourth sample group received one of four mailings: the TAVF, a general brochure, the health and social science targeted brochure, or the minority targeted brochure.

Table 1. Breakdown of Sample Cases by Mailing Type and Sample Group

|              |          | Mailing Type   |                   |                  |       | Total  |
|--------------|----------|----------------|-------------------|------------------|-------|--------|
|              |          | Major Brochure | Minority Brochure | General Brochure | TAVF  |        |
| Sample Group | General  | 0              | 0                 | 5,559            | 450   | 6,009  |
|              | Major    | 2,774          | 0                 | 450              | 450   | 3,674  |
|              | Minority | 0              | 5,293             | 450              | 450   | 6,193  |
| Total        |          | 2,774          | 5,293             | 6,459            | 1,350 | 15,876 |

Table 2. Breakdown of Sample Cases after Initial Locating and PostalSoft Address Check

|              |          | Mailing Type   |                   |                  |       | Total  |
|--------------|----------|----------------|-------------------|------------------|-------|--------|
|              |          | Major Brochure | Minority Brochure | General Brochure | TAVF  |        |
| Sample Group | General  | 0              | 0                 | 5,497            | 448   | 5,945  |
|              | Combo    | 791            | 795               | 447              | 449   | 2,482  |
|              | Major    | 2,737          | 0                 | 445              | 446   | 3,628  |
|              | Minority | 0              | 2,790             | 449              | 445   | 3,684  |
| Total        |          | 3,528          | 3,585             | 6,838            | 1,788 | 15,739 |

After the cases had been allocated to the different brochure types, but before the initial mailing, the contact addresses were reviewed and run through PostalSoft. PostalSoft is a software package that verifies whether a U.S. address is mailable. After this process, an additional 137 cases were removed: 109 for lack of U.S. address after initial locating and 28 for which the addresses were either absent or determined to be unmailable by PostalSoft. Table 2 displays the final number of brochures and TAVFs mailed by sample group. The brochures and TAVFs were mailed on January 26, 2006.

## 6. Results

In order to effectively evaluate the brochure, its impact was examined in two ways: by return rate of the brochure and by response rate of the survey. All analysis conducted in this study used unweighted data.

First, the brochure return rates inform us about the immediate goal: Did we obtain updated mailing addresses for recipients? Within this analysis, did the targeted brochures perform better than the other mailings?

Second, the survey response rate may indicate the general impression that the brochure left on its recipients. If those who received the brochure had higher survey response rates than those receiving the TAVF, then the additional content, such as summary of past results, targeted text, and images, may be a useful tool.

### 6.1 Brochure and TAVF Return Rates

The following section documents findings about the brochure return rates as of May 1, 2006. The number of returned address updates and TAVFs had slowed by this date (more than 13 weeks after the mailing) and the processing center had stopped checking in the returns.

There were several outcomes to consider in order to fully evaluate the brochure returns. Because we knew that a good number of the addresses were out of date, we expected a high rate of mail undeliverable as addressed (UAA). There are two types of UAAs: those with address corrections and those without address corrections. The UAAs with address corrections are mail returned with a forwarding address included. The UAAs without address corrections are mail returned because it simply cannot be delivered or a forwarding address is no longer available. When comparing these rates across subgroups, we expected them to be similar.

Table 3 shows the return and UAA rates for each sample group broken out by advance mailing type. For example, those within the minority sample group received either a brochure targeted to minorities, a general interest brochure, or a plain TAVF form. While those in the major sample group received either a brochure highlighting facts about their traditionally low responding major, a general interest brochure, or a TAVF form. Those who were in the combo sample group could have received the major brochure, the minority brochure, the general interest brochure, or the TAVF.

For each of the sample groups included in the study, the traditional TAVF resulted in statistically higher return rates than any of the brochures. Also for each of the sample groups, there were no significant differences in the return rate across brochure types. Finally, aside from the major sample group, there were no significant differences in UAA rates across mailing types for the other three sample groups. For the major sample group, the general brochure had a significantly lower UAA without correction rate than both the major brochure and the TAVF. There were no significant differences in the UAA with correction rate for the major sample group.

Table 3. Outcome Category Percentages by Brochure Type and Sample Group

| Sample Group | Mailing Type      | Return            | UAA with Correction | UAA without Correction | No Updated Information | Return Rate Results  |
|--------------|-------------------|-------------------|---------------------|------------------------|------------------------|--|
| General      | General Brochure  | 6.73%<br>(0.34%)  | 6.77%<br>(0.34%)    | 14.90%<br>(0.48%)      | 71.60%<br>(0.61%)      | The TAVF had a significantly higher return rate than the general brochure.   |
|              | TAVF              | 18.75%<br>(1.84%) | 5.58%<br>(1.08%)    | 14.06%<br>(1.64%)      | 61.61%<br>(2.30%)      |  |
| Combo        | General Brochure  | 4.70%<br>(1.00%)  | 4.70%<br>(1.00%)    | 13.42%<br>(1.61%)      | 77.18%<br>(1.98%)      | The TAVF had a significantly higher return rate than all three brochures. There were no significant differences in return rates among the three brochure types |
|              | Major Brochure    | 3.16%<br>(0.62%)  | 6.19%<br>(0.86%)    | 11.88%<br>(1.15%)      | 78.76%<br>(1.45%)      |  |
|              | Minority Brochure | 4.78%<br>(0.76%)  | 6.04%<br>(0.84%)    | 14.72%<br>(1.26%)      | 74.47%<br>(1.55%)      |  |
|              | TAVF              | 13.59%<br>(1.62%) | 5.57%<br>(1.08%)    | 14.25%<br>(1.65%)      | 66.59%<br>(2.23%)      |  |
| Major        | General Brochure  | 6.07%<br>(1.13%)  | 6.97%<br>(1.21%)    | 10.11%<br>(1.43%)      | 76.85%<br>(2.00%)      | The TAVF had a significantly higher return rate than both brochures. There was no significant difference in the return rates of the two brochure types.        |
|              | Major Brochure    | 5.96%<br>(0.45%)  | 6.83%<br>(0.48%)    | 13.52%<br>(0.65%)      | 73.69%<br>(0.84%)      |  |
|              | TAVF              | 16.37%<br>(1.75%) | 6.50%<br>(1.17%)    | 15.02%<br>(1.69%)      | 62.11%<br>(2.30%)      |  |
| Minority     | General Brochure  | 4.23%<br>(0.95%)  | 4.68%<br>(1.00%)    | 13.14%<br>(1.59%)      | 77.95%<br>(1.96%)      | The TAVF had a significantly higher return rate than both brochures. There was no significant difference in the return rates of the two brochure types.        |
|              | Minority Brochure | 4.44%<br>(0.39%)  | 4.95%<br>(0.41%)    | 13.55%<br>(0.65%)      | 77.06%<br>(0.80%)      |  |
|              | TAVF              | 15.06%<br>(1.70%) | 7.19%<br>(1.22%)    | 13.03%<br>(1.60%)      | 64.72%<br>(2.27%)      |  |

Notes: (1) Testing was completed with an alpha=0.10.

(2) Within a sample group, each rate was tested against other rates located in the same column.

(3) Standard errors are included in parentheses.

## 6.2 Survey Response Rates as of April 28, 2006

While the brochure did not perform as expected in its return rates, we were still able to evaluate its performance by determining its impact on the survey response rate. The results in Table 4 were based on survey response rates as of April 28, 2006. This date was chosen as it marks the point halfway between the first and second mailouts, or the halfway point of the first mailout data collection.

The tables are presented in a manner that allows analysis of the sample groups included in the experimental design. As displayed in the tables, the brochures had very little effect on survey response as of three weeks after the initial mailout. The only significant finding was that the minority brochure resulted in a significantly higher survey response rate than the major brochure for the combo sample group. All other comparisons of survey response rates across mailing types within sample groups were not statistically significant.

Table 4. Response Rates by Brochure Type and Sample Group as of April 28, 2006

| Sample Group | Mailing Type      | Response Rate   | Results   |
|--------------|-------------------|-----------------|---|
| General      | General Brochure  | 18.36 % (0.52%) | There were no significant differences in survey response rates.   |
|              | TAVF              | 20.98 % (1.92%) |   |
| Combo        | General Brochure  | 14.09 % (1.65%) | The minority brochure had a significantly higher survey response rate than the major brochure. There were no other significant differences in response rates among mailing types. |
|              | Major Brochure    | 12.52 % (1.18%) |   |
|              | Minority Brochure | 17.48 % (1.35%) |   |
|              | TAVF              | 15.81 % (1.72%) |   |
| Major        | General Brochure  | 22.02 % (1.96%) | There were no significant differences in survey response rates.   |
|              | Major Brochure    | 21.37 % (0.78%) |   |
|              | TAVF              | 22.87 % (1.99%) |   |
| Minority     | General Brochure  | 12.69 % (1.57%) | There were no significant differences in survey response rates.   |
|              | Minority Brochure | 12.19 % (0.62%) |   |
|              | TAVF              | 14.16 % (1.65%) |   |

Notes: (1) Testing was completed with an  $\alpha=0.10$ .  
(2) Survey response rates should not be compared across sample groups, as the experimental design assumed the sample groups were different in their response behaviors.  
(3) Standard errors are included in parentheses.

### 6.3 Survey Response Rates After April 28, 2006

In addition to looking at the results at the halfway point of the first mailout, we also decided to look at the response rates at the conclusion of the second mailout (June 7, 2006). The analysis of survey response rates at the end of

the second mailout provided no significant results across all mailing types. In other words, the brochures had neither a positive nor a negative effect on survey response at the end of the first mailout and second mailout data collection period.

Table 5. Response Rates by Brochure Type and Sample Group as of June 7, 2006

| Sample Group | Mailing Type      | Response Rate   | Results   |
|--------------|-------------------|-----------------|---|
| General      | General Brochure  | 42.75 % (0.67%) | There were no significant differences in survey response rates. |
|              | TAVF              | 41.29 % (2.33%) |   |
| Combo        | General Brochure  | 32.66 % (2.22%) | There were no significant differences in survey response rates. |
|              | Major Brochure    | 33.25 % (1.68%) |   |
|              | Minority Brochure | 35.35 % (1.70%) |   |
|              | TAVF              | 31.63 % (2.19%) |   |
| Major        | General Brochure  | 45.84 % (2.36%) | There were no significant differences in survey response rates. |
|              | Major Brochure    | 43.51 % (0.95%) |   |
|              | TAVF              | 45.96 % (2.36%) |   |
| Minority     | General Brochure  | 32.74 % (2.21%) | There were no significant differences in survey response rates. |
|              | Minority Brochure | 32.58 % (0.89%) |   |
|              | TAVF              | 33.26 % (2.23%) |   |

Notes: (1) Testing was completed with an  $\alpha=0.10$ .  
(2) Survey response rates should not be compared across sample groups, as the experimental design assumed the sample groups were different in their response behaviors.  
(3) Standard errors are included in parentheses.

## 7. Conclusions

The targeted brochures were designed to appeal to groups with historically low response rates. By using inclusive language, images, and relevant survey results, we hoped to increase the return rate of an advance mailing requesting updated address information and to also increase response to the 2006 NSRCG. However, the analysis of address updates indicates that the brochures did not perform as well as the traditional one-page TAVF, like the one used in the 2003 NSRCG.

In 2003, the TAVF was mailed with a cover letter which served both to inform the sample person of their inclusion in the NSRCG sample and to request that he or she “please complete the enclosed Telephone and Address Verification Form and return it within the next two weeks using the postage-paid envelope.” While the form did not have as much information about the survey as the brochures, it did have a clear purpose: complete and return in the enclosed envelope. With the brochures used in 2006, the address correction form was on the final panel, so the intent of the mailing was not obvious. As a result, the sample person may not have been aware we were attempting to collect updated address information from them prior to the mailing of the survey questionnaire. This hypothesis is supported by the higher return rate of the TAVF across all sample groups included in the study.

While the brochures had an adverse effect on return rates, they did not positively or negatively affect response rates compared to the TAVF. A possible explanation is the timing of the brochure mailing. The brochure mailing occurred eight weeks prior to the mailout of the survey questionnaire. As a result, any positive impact related to information included in the brochure may have worn off by the time the survey questionnaire arrived. Please note that the results presented in this section may not be generalized to the entire target population since certain groups were considered ineligible for this study. Instead, the results apply to the sample selected for this study.

## 9. Future Research

In analyzing the effectiveness of the various mailing types, we identified the following areas for future research:

- The analysis conducted for this study concluded that brochure recipients were possibly not aware that the brochure was designed to encourage the recipient to provide updated address information. Since the TAVF was effective in encouraging recipients to provide updated address information, it may be beneficial to evaluate the feasibility of creating a new document for use in future survey cycles. This new document would include features of the TAVF that make its purpose clear to the recipient. However, rather than a simple, plain document, the new document should include some of the features of the color brochure such as data highlights from the previous NSRCG and eye-catching graphics or photographs. This new document could be included in a future survey cycle to test its effect on return and response rates.
- As noted in the section describing the breakdown of the sample for this study, certain portions of the target population were considered ineligible for the study. As a result, the findings from this study may not be generalizable to the total NSRCG target population. With this issue in mind, any future versions of this study should make an effort for the experimental design to cover the entire NSRCG target population.

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