

Managing Locating and Data Collection Interventions Through Adaptive Survey Design

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Abstract

Adaptive designs are increasingly being used for federal surveys to pursue survey goals in a cost-effective manner. These designs assign mid-data collection interventions to pursue such objectives as improving sample balance and increasing response within specific domains or overall. Particular challenges emerge for complex data collections that involve competing needs for locating cases and for obtaining responses from found cases. We describe the adaptive design strategies of the 2017 Survey of Doctorate Recipients, involving both differential locating and cooperation-gaining treatments at distinct phases over the field period. At each phase, high and low priority cases were separately identified for the locating and data collection activities where high priority cases would receive more intensive and costly treatment. We present the prioritization methods and describe the differential treatments for locating and data collection activities. Based on analysis of paradata and survey outcomes, we investigate the contribution of the adaptive design scheme toward improving the representativity of the sample and toward attaining targets numbers of completes for key analytic domains.

Key Words: Adaptive survey design, sample balance, representativity, data quality

1. Introduction

Adaptive survey design refers to using auxiliary data available during data collection in order to tailor survey protocols toward attaining survey data quality objectives (Groves and Heeringa 2006, Schouten et al. 2009, Schouten et al. 2017). Schouten et al. (2013) describes that adaptive design involves that, “people or households may receive different treatments. These treatments are defined before the survey starts, but may also be updated via data that are observed during data collection. In other words, allocation of treatments is based on data that are linked to the survey sample and on paradata.”

Adaptive designs are now widely applied across a range of federal government surveys in the U.S. and internationally. However, best practices for implementing adaptive designs are still emerging regarding challenging features common to federal surveys. We draw attention to two of these current challenges.

First, guidance is needed regarding how adaptive design should be used to manage interventions of different types. Often in the literature, adaptive designs are focused on tailoring strategies to gain cooperation from respondents, for example by determining survey modes offered to sample members or determining how to best leverage incentives.

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However, the quality of many surveys may depend on both cooperation outcomes and outcomes of other processes impacting data collection, such as locating sample members. Interventions of multiple types, such as for locating and gaining cooperation, may also occur simultaneously. The adaptive design literature is still emerging regarding recommendations for managing multiple intervention types. Note that in this article, we sometimes refer to these gaining cooperation interventions as data collection interventions.

Second, practices are emerging regarding pursuing multiple data quality objectives via adaptive design. Often, multiple data quality objectives are of interest for the survey, and adaptive design is a potent tool for pursuing such objectives. While the optimal adaptive design literature (e.g., Schouten et al. 2013) specifies how to develop adaptive designs to pursue a single data quality objective provided a fixed budget, there is less consensus regarding best practices for pursuing multiple data quality objectives.

In this article, we discuss these two aspects of conducting adaptive design in the context of the 2017 Survey of Doctorate Recipients (SDR). The SDR is conducted biannually by the National Center for Science and Engineering Statistics to provide demographic, education, and employment information about individuals who earned a research doctoral degree in a science, engineering, or health field from a U.S. academic institution. It is a longitudinal survey for which most sample members are selected to join the sample two to three years after earning their doctorate degrees and many remain in sample until they turn age 76. The 2017 SDR had a sample size of more than 120,000 doctorate degree holders. In addition, the SDR target population is highly mobile, and sample members must be located prior to being contacted to complete the survey each round.

The 2017 SDR utilized an adaptive design in order to target data collection interventions at fixed time points during data collection toward attaining survey data quality objectives.

Two primary objectives for the adaptive design were specified:

1. To improve *sample balance*, which we define as having a similar distribution of characteristics between the respondent set and the selected sample, in order to reduce the potential for nonresponse bias; and
2. To attain target numbers of completes for key analytic domains.

The adaptive design prioritized cases valuable for achieving these survey objectives over four data collection phases: (1) Starting, (2) Interim, (3) Late-Stage, and (4) Last Chance. This article focuses in particular on the Interim through Last Chance phases. At the beginning of each phase, cases were assigned different levels of locating effort and different data collection protocols, including the order of prompting calls, the use of a monetary incentive, additional questionnaire mailings, and the use of different mailing delivery services.

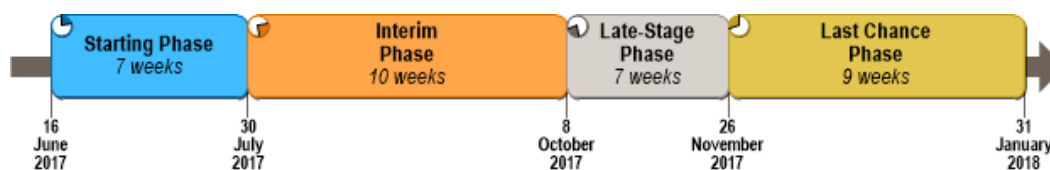
This article describes the 2017 SDR adaptive design strategy for managing locating and gaining cooperation interventions toward the aforementioned objectives. Section 2 describes the details of the adaptive design strategy. Section 3 presents analyses regarding the impact of the adaptive design strategy toward improving the representativity of the sample and toward attaining completion targets for key domains, while Section 4 discusses the conclusions and recommends areas for further research regarding implementing adaptive survey designs.

2. Adaptive Design Approach

2.1 Data Collection Procedures

The 2017 SDR data collection was implemented in four primary phases to support adaptive design: Starting, Interim, Late-Stage, and Last Chance. We focus on the methods for the Interim through Last Chance phases here. Prior to the start of each phase, pending eligible cases were prioritized to assign the processing order and differential locating and data collection treatments. The four data collection phases and their start dates are shown in Figure 2.1.

Exhibit 1: Data Collection Phases



For locating, the differential treatments assigned the locating minutes allowed per case, level of locator expertise, and the inclusion of authorized search resources in the locating protocol. For data collection, the differential treatments consist of a combination of a few elements: contact mode and frequency, gaining cooperation message language, use of a monetary incentive, additional questionnaire mailings, and the use of Priority Mail versus USPS mail.

2.2 Adaptive Design Phases

The differential locating and gaining cooperation treatments for nonrespondents for each adaptive design phase are summarized in Table 1. For the Interim through Last Chance phases, 29 sets of Primary Analysis Domains (PADs) were tracked during data collection in order to help attain a final target number of completes for key analytic domains. The target numbers of completes were determined in order to attain precision goals for estimates. Further detail on the PAD definitions is provided in Table 2. Some PADs consisted of categories of single variables, and some resulted from crossing two to three variables. The details for prioritizing cases and the differential treatment for each 2017 SDR phase are provided in Subsections 2.2.1 through 2.2.3.

Table 1: Summary of Prioritization Approach and Interventions for Interim Through Last Chance Phases

| <i>Phase and Duration</i> | <i>Primary Case Prioritization Approach</i> | <i>Locating Treatment by Prioritization</i> | <i>Data Collection Treatment by Prioritization</i> |
|---------------------------|---|---|---|
| Interim (10 weeks) | Prioritized cases based on the number of key analytic domains they were in out of 29 that were both (a) below the target number of completes and (b) below-average response rates. | High: Assigned to expert locators, additional 45-60 minutes per case, county and city property searches and other expert steps. Low: Standard protocol, 30 minutes regardless of prefield status | Start mode based on prior preferences, available contacting information, and cohort. Priority order determined the order in which prompting calls were made. |
| Late-Stage (7 weeks) | Same as Interim phase, but with second sort variable for number of cells a case is in meeting either criterion (a) or (b) above. | Same as Interim phase, except limits were put on the number of locating trips a case could make: High: Maximum of 6 trips. Low: Maximum of 4 trips. | High: Monetary incentive for U.S. cases who did not receive early incentive; Questionnaire mailing for non-U.S. cases. Low: No monetary incentive; Non-U.S. cases received a letter mailing without a questionnaire. |
| Last-Chance (9 weeks) | Similar to Interim and Late-Stage phases, but sorting cases first by number of cells a case is in meeting criterion (a) above then by number of cells a case is in meeting criterion (b) above. | Same as Late-Stage, including the limits on return trips. | High: CIO letter sent via Priority Mail envelope, protocol included additional prompting call and final request email. Low: CIO letter sent via First Class Mail. |

Note: CIO = Critical Item Only survey version.

2.2.1 Interim Phase Prioritization and Differential Treatments

During the Interim phase, cases were prioritized to either a high or low level of locating effort. The sample was assessed and an Interim priority score was assigned to pending nonrespondents based on the most current locating and response patterns. Two sets of priority assignments were developed, one for locating and one for data collection, to account for differences needed to meet adaptive design objectives.

Interim Prioritization Method

For locating, cases were prioritized by the number of PAD cells containing a case out of 29 that were underperforming by meeting two criteria, (a) the cell having not yet met its target number of completes and (b) the cell response rate being less than the overall response rate as of the beginning of the phase. This combination of criteria aimed to both help achieve targets in the PADs and improve sample balance by targeting cells that were underperforming. Note that these targets were set before the Interim Phase and maintained throughout data collection. Some domains reached their targets early in the data collection period.

Within the count of underperforming PAD cells (referred to hereafter as “cell count”), cases were sorted by a cooperation propensity for responding to the survey once they were located. The logistic regression propensity model was estimated among located cases as of the beginning of the phase and then calculated for all pending cases. Cases with higher estimated propensities were assigned to higher locating priority so that greater locating effort was devoted to cases more likely to complete the survey once located. However, for data collection priority assignments, cases with lower estimated propensities were assigned to higher data collection priority to assure that the cases that were believed to need more data collection effort would be worked first. In general for protocols determined by the adaptive design, cutoffs were set regarding who received “High” or “Low” priority protocols based on the level of resources available.

Table 2: 2017 SDR PADs for Adaptive Design and Cell Complete Targets

| <i>Description</i> | <i>Number of Cells in PAD</i> | <i>Cell Complete Target</i> |
|---|-----------------------------------|---------------------------------|
| FOD-223 | 223 | 119 |
| Race/Ethnicity | 4 | 652 |
| Gender | 2 | 16,100 |
| Citizenship | 4 | 4598 |
| Years Since PhD | 6 | 18,400 |
| Age | 8 | 10,533 |
| Disability | 2 | 5247 |
| Place of Birth | 9 | 640 |
| Race/Ethnicity by Gender | 8 | 310 |
| Race/Ethnicity by Citizenship | 16 | 168 |
| Gender by Citizenship | 8 | 1,867 |
| Race/Ethnicity by Gender by Age | 64 | 176 |
| Race/Ethnicity by Gender by Years Since PhD | 48 | 184 |
| FOD-8 | 8 | 2,781 |
| FOD-8 by Race/Ethnicity | 32 | 186 |
| FOD-8 by Gender | 16 | 800 |
| FOD-8 by Citizenship | 32 | 189 |
| FOD-8 by Years Since PhD | 48 | 325 |
| FOD-8 by Age | 64 | 256 |
| FOD-8 by Race/Ethnicity by Gender | 64 | 186 |
| FOD-8 by Gender by Years Since PhD | 96 | 229 |
| FOD-26 | 26 | 1,063 |
| FOD-26 by Race/Ethnicity | 104 | 244 |
| FOD-26 by Gender | 52 | 258 |
| FOD-26 by Citizenship | 104 | 243 |
| FOD-26 by Years Since PhD | 156 | 407 |
| FOD-26 by Age | 208 | 246 |
| FOD-26 by Disability | .52 | 205 |
| FOD-26 by Race/Ethnicity by Gender | 208 | 247 |

Note: FOD = Field of degree. There are three different field of degree variables used for the PADs with either 8, 26, or 223 levels.

Interim Locating Differential Treatment

The priority groups described above were used to determine the order in which cases were worked in locating, with high priority cases being worked first. The locating treatments differed based upon whether a case was worked in a prefield period, during which locating was conducted before the start of data collection. For cases that received prefield locating, high priority cases could receive up to an additional 45 minutes of work while low priority cases could receive up to 30 minutes of work. For cases that did not receive prefield locating, high priority cases could receive up to an additional 60 minutes of locating work, while low priority cases could receive up to 30 minutes. High priority cases were eligible to be worked by expert locators, or more senior locating staff who are permitted to do more in depth, targeted searches and use the search service, while low priority cases were not.

Interim Data Collection Differential Treatment

For data collection, the priority order determined the order in which cases were contacted and prompted by telephone.

2.2.2 Late-Stage Phase Prioritization and Differential Treatments

The Late-Stage phase reoffered the survey and included a monetary incentive for high priority nonresponding cases (if residing in the U.S.) and continued follow-up prompts for lower priority cases. Out-of-U.S. cases were eligible to be mailed the questionnaire, and cases were reprioritized for locating interventions. A limit on the amount of locating work a case could receive was implemented in this phase, with the limit determined based on the priority level.

Late-Stage Prioritization Method

A prioritization scheme based on meeting targets in the 29 PADs was continued in the Late-Stage phase, but with some modifications from the Interim phase. The same variable was used as the first sorting variable in both phases to determine the priority order. In addition, in the Late-Stage phase, the SDR team aimed to also give priority to cases in a cell that met at least one of the two criteria for underperformance: (a) the cell having not yet met its target number of completes or (b) the cell response rate being less than the overall response rate. So, within the first cell count measure, cases were sorted by the number of PAD cells containing a case out of 29 that met at least one of the criteria for underperformance.

Then, within the cross-tabulation of these two cell count measures, different variables were used as the third sort variable for data collection and locating prioritization to help achieve survey goals. For locating prioritization, as for the Interim phase, cases were sorted by a cooperation propensity estimated with logistic regression as of the beginning of the phase, so that cases estimated to be more cooperative with the survey received more locating effort. For data collection prioritization, cases were sorted by the number of contacts as of the beginning of the phase, defined as the sum of the number of CATI dials and the number of mailings. Cases were sorted so that those who had received less data collection effort would receive higher prioritization.

Late-Stage Locating Differential Treatment

The differential Interim phase locating treatments were continued in the Late-Stage phase. In addition, limits were placed on the number of times a cases could receive locating treatment to prevent excessive effort on difficult-to-locate cases. High priority cases were eligible for up to six returns to locating work, while low priority cases were limited to four returns to locating.

Late-Stage Data Collection Differential Treatment

Among pending U.S.-residing cases that had not refused the survey, the highest priority in the sort order were assigned to receive a \$30 personalized check along with a questionnaire mailing. Low priority U.S. cases were assigned to receive a questionnaire without a check. Among eligible cases not residing in the U.S., the highest priority were assigned a questionnaire mailing while low priority cases were assigned a letter mailing without the questionnaire.

2.2.3 Last Chance Phase Prioritization and Differential Treatments

The final phase, the Last Chance phase, offered a shortened version of the survey referred to as the Critical Item Only (CIO) version and informed nonresponding sample members the field period was ending. Cases were reprioritized for locating interventions, and for data collection where high priority cases were eligible for Priority Mail.

Last Chance Prioritization Method

As for the Interim and Late-Stage phases, the Last Chance phase also used measures based on being in underperforming PADs to prioritize cases. For the Last Chance phase, the SDR team chose as its primary goal to achieve target numbers of completes in key analytic domains. Therefore, cases were first sorted for prioritization based on the number of cells out of 29 a case was in that had not achieved their target number of completes as of the beginning of the phase. In order to help attain sample balance, cases were then sorted within the previous measure by the number of PAD cells a case was in that had a below average response rate.

Once again, the third sort variable differed for the data collection and locating prioritizations to help achieve different goals. For locating priority, cases were sorted by a cooperation propensity estimated via logistic regression as of the beginning of the phase, such that cases with higher cooperation propensities would receive higher priority for locating. For data collection priority, cases were sorted within the two PAD cell count measures by a measure of data collection effort to date: the sum of the number of emails, the number of CATI dials, and the number of mailings all over one plus the number of locating trips. Cases with a smaller measure received higher data collection priority, so that cases who either had not received enough contacts or had only been located after much locating effort would receive higher priority.

Last Chance Locating Differential Treatment

The same high and low locating treatments were used for the Last Chance phase as were used for the Interim and Late-Stage phases. In addition, the locating trip limits of six for high priority cases and four for low priority cases were retained, although the limit was determined based on the newly assigned locating priority level.

Last Chance Data Collection Differential Treatment

The adaptive design was used to assign whether a letter offering the CIO version of the survey was sent either by the faster (and more noticeable) USPS Priority Mail or by USPS First Class postage. Note that separate from the adaptive design, non-refusing cases would receive the CIO offer with their second mailing of the Last Chance phase while soft-refusing cases receive the CIO offer as their first mailing.

3. Results of 2017 Adaptive Design

3.1 Analysis of Representativity of Respondent Set

To assess changes in the representativity of the respondent set, we examine locating and response outcomes over the course of the data collection period. In particular, we focus on certain sets of domains which tended to have greater variation and imbalance in survey outcomes: citizenship status, race/ethnicity, field of degree, and years since degree.

For the analysis, we define three quantities. For a given characteristic available for the entire sample frame, we define k_S as the proportion with that characteristic among the selected sample (excluding known ineligible cases), weighted by base weight. We further define k_R as the corresponding weighted proportion with that characteristic, but among the respondent set at a given time and k_L as the corresponding proportion among the set of located cases at a given time.

We then treat k_S as a benchmark, so that if k_R is much larger or smaller than k_S , that indicates over- or underrepresentation of the respondent set by that characteristic. Thus we monitor the quantity $k_R - k_S$, where $k_R - k_S$ close to 0 indicates that the respondent set is well-represented for that characteristic and $k_R - k_S$ much greater or much less than 0 indicates over- or underrepresentation.

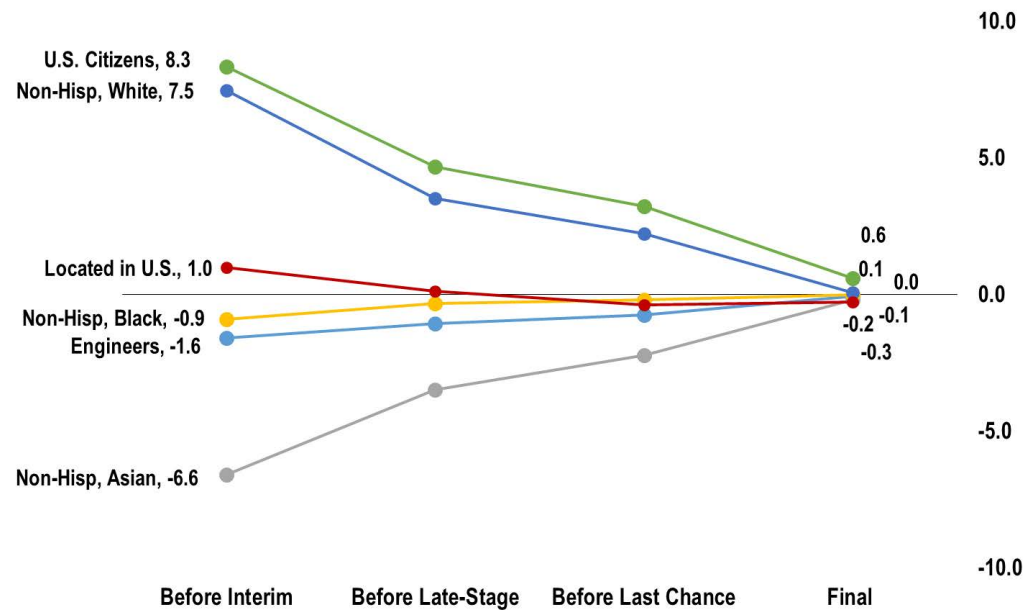
Because we are interested in separating differences in outcomes due to locating activities from that due to activities to gain cooperation among located cases, we examine the quantity $k_R - k_L$. This difference measures over- and underrepresentation due to differences in cooperation outcomes alone, fixing on locating outcomes, while $k_R - k_S$ measures over- and underrepresentation due to differences in both locating and cooperation outcomes.

We start by presenting results on $k_R - k_L$, tracking over- and underrepresentation specifically due to differences in cooperation outcomes. In Exhibit 2, we present series for six key categories among the domains of citizenship status, race/ethnicity and field of degree. The categories presented in the exhibit were selected because these are groups with particularly high over- or underrepresentation early in the survey period. For citizenship status, we present a series corresponding to the percentage with U.S. citizenship, a group that tends to be overrepresented. Implicit in this graph is that the remainder in this domain, non-U.S. citizens, will tend to be underrepresented. For race/ethnicity, we present series corresponding to non-Hispanic white sample members who tend to be overrepresented among respondents, non-Hispanic blacks who tend to be underrepresented among respondents, and non-Hispanic Asians who also tend to be underrepresented. For field of degree, we present a series for engineers, who tend to be underrepresented. In each of the series, we present the quantity $k_R - k_L$ as a difference in percentage points at four specific time points based on the adaptive design: the beginning of the Interim phase, the beginning of the Late-Stage phase, the beginning of the Last Chance phase, and the end of data collection.

These six series all exhibit improving representativity over the course of data collection. By the start of the Interim phase, there is substantial sample imbalance by cooperation outcomes, with U.S. citizens ($k_R - k_L$ of 8.3 percentage points) and whites (7.5 percentage points) having high overrepresentation and Asians (-6.6 percentage points) having substantial underrepresentation. However, the sample balance by cooperation outcomes tends to improve with each adaptive design phase to the point where by the end of data collection none of the six series has $|k_R - k_L|$ greater than 1.0 percentage points.

Exhibit 3 also examines series of $k_R - k_L$ at fixed time points corresponding to the adaptive design phases, but focusing on six groupings of years since degree. Groups that are either early career (0 to 5 years since degree) or late career (26 or more years since degree) tend to be overrepresented among respondents, while mid-career doctorates (categories within the 6 to 25 years since degree range) tend to be underrepresented among respondents. Similar to Exhibit 2, the series show substantial sample imbalance at the start of the Interim phase with overrepresentation among the early career ($k_R - k_L$ of 2.8 percentage points) and late career (4.4 percentage points) and underrepresentation among the mid-career (-1.1 to -2.5 percentage points). With the exception of an increase in overrepresentation among the early career during the Interim phase, the series otherwise reflect improvements in sample balance with each adaptive design phase. Once again, by the end of data collection, none of these series has $|k_R - k_L|$ greater than 1.0 percentage points. Overall, Exhibits 2 and 3 show that based on cooperation outcomes alone, the representativity of the respondent set steadily improves over the course of data collection, suggesting a potential role of the adaptive design.

Exhibit 2: $k_R - k_L$ by Adaptive Design Phase for Citizenship Status, Race/Ethnicity, and Field of Degree



We next move to analyzing representativity according to both locating and cooperation outcomes by examining differences in distributions between all sample members and the respondent set by examining the quantity $k_R - k_S$. Exhibit 4 presents these quantities corresponding to the same series as presented in Exhibit 2. The overall pattern is similar with substantial sample imbalance at the start of the Interim phase, as U.S. citizens ($k_R - k_S$ of 11.1 percentage points) and whites (9.0 percentage points) have high overrepresentation and Asians (-8.1 percentage points) have substantial underrepresentation. Representativity steadily improves over the course of data collection, again suggesting a possible role of the adaptive design. However, when accounting for sample imbalance due to both locating and cooperation differences, there is some remaining sample imbalance at the end of data collection. For example, U.S. citizens and whites remain overrepresented (5.2 and 2.6 percentage points respectively), while Asians remain underrepresented (-3.1 percentage points).

Exhibit 3: $k_R - k_L$ by Adaptive Design Phase for Years Since Degree

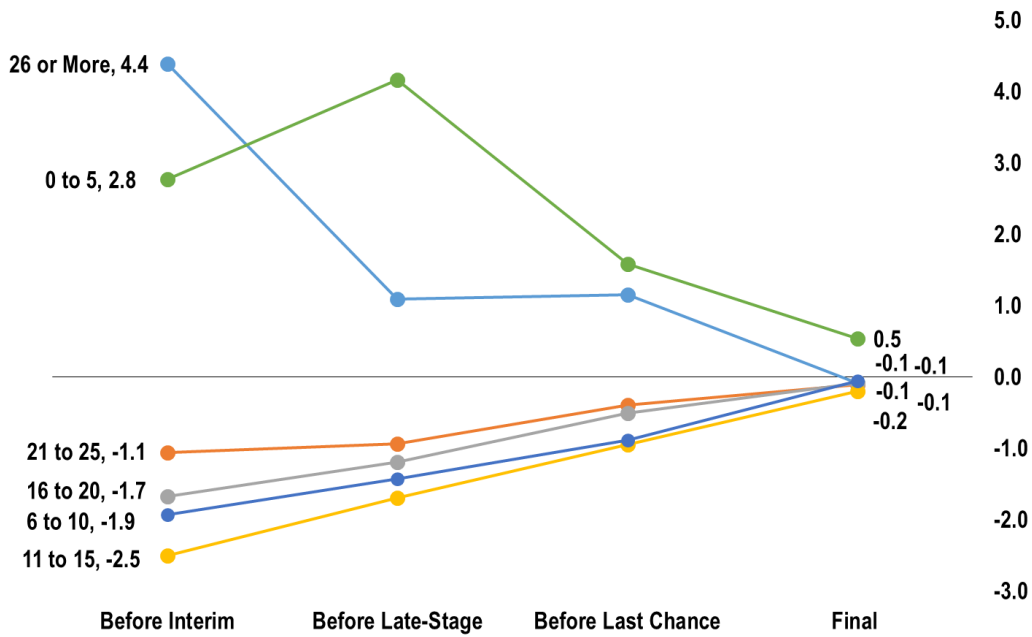


Exhibit 4: $k_R - k_S$ by Adaptive Design Phase for Citizenship Status, Race/Ethnicity, and Field of Degree

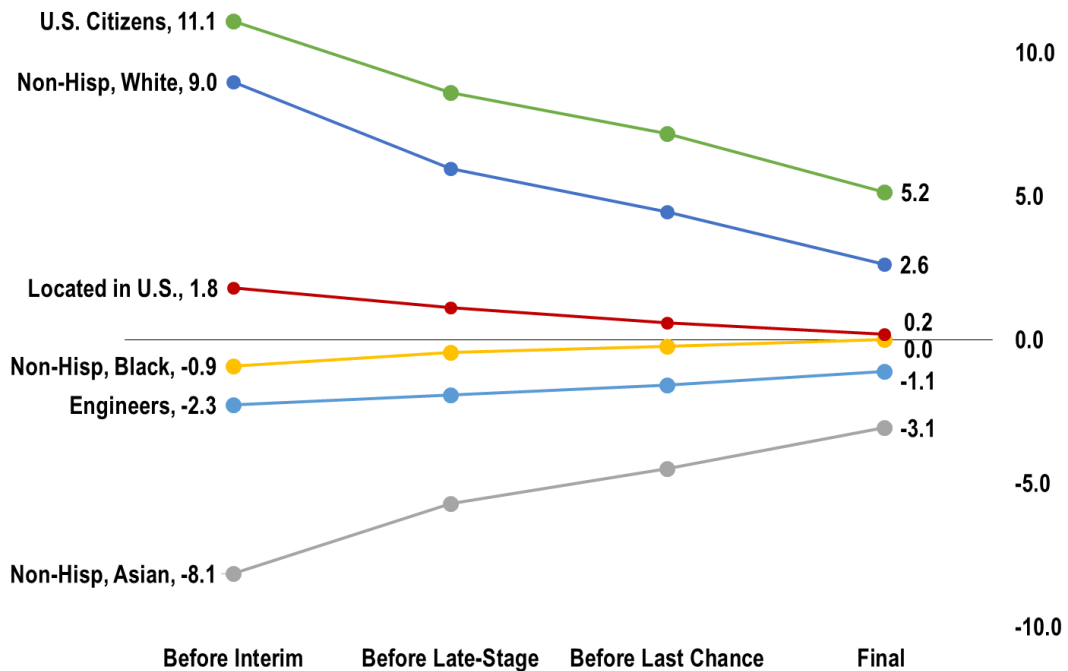
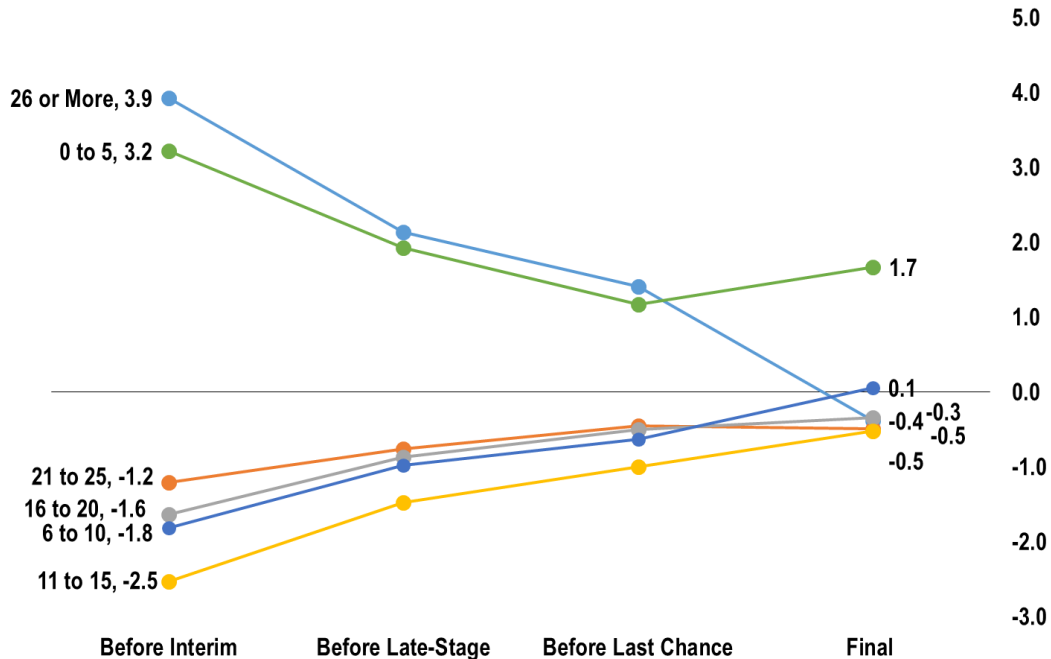


Exhibit 5 further examines series of $k_R - k_S$ examining the six groupings of years since degree. When accounting for differences to both locating and cooperation, there is substantial imbalance at the start of the Interim phase with overrepresentation among the

early career ($k_R - k_S$ of 3.2 percentage points) and late career doctorates (3.9 percentage points) and underrepresentation among mid-career doctorates (-1.2 to -2.5 percentage points). Most of the series exhibit improvements in representation over the course of data collection with the exception of the early career, who improve in representation over the Interim and Late-Stage phases but become more overrepresented during the Last Chance phase. At the end of data collection, $|k_R - k_S|$ is small for most years since degree categories with the exception of the early career (1.7 percentage points).

Exhibit 5: $k_R - k_S$ by Adaptive Design Phase for Years Since Degree



Overall, this analysis indicates that the representativity of the respondent set steadily improves between the start of the Interim phase and the end of data collection. There is some remaining over- and underrepresentation at the end of data collection, and this appears to be due to differences in locating outcomes rather than cooperation outcomes, as reflected by our examinations of $k_L - k_S$. This descriptive analysis suggests a potential role of the adaptive design in yielding the improvements in representativity observed in these analyses.

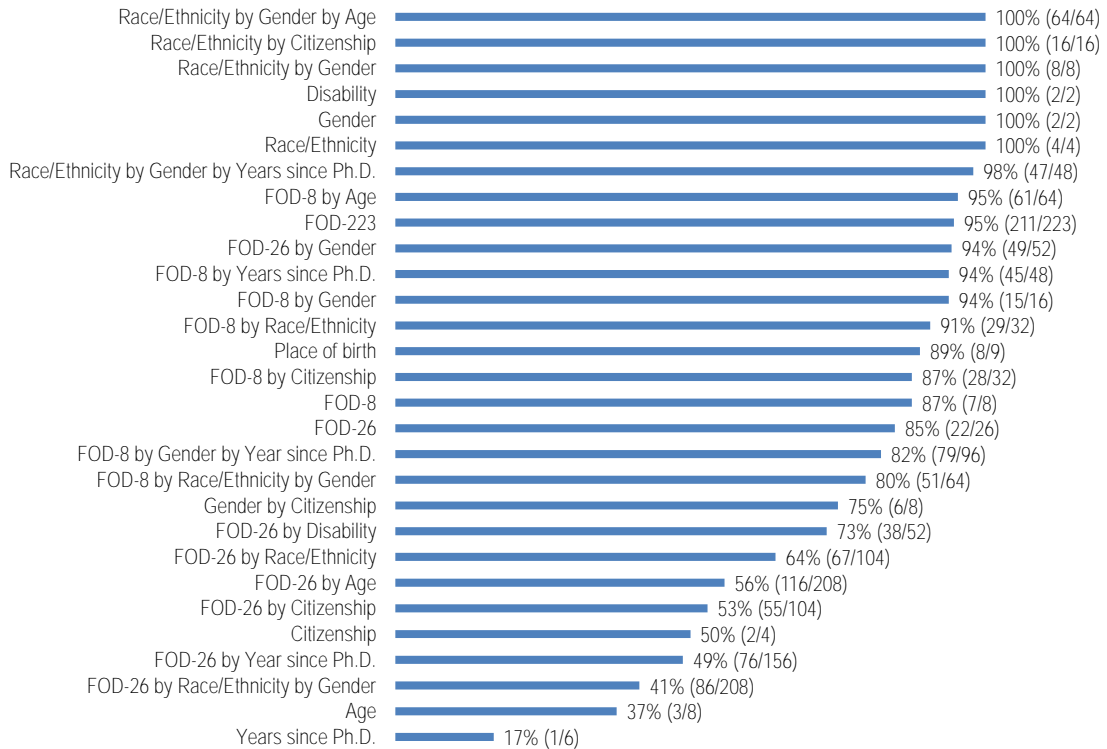
3.2 Results for Attaining Target Numbers of Completes for Key Analytic Domains

The adaptive design also aimed to increase the number of domains achieving their target numbers of completes across 29 sets of key analytic domains, or PADs, presented in Table 2. This goal was pursued by prioritizing cases in PAD cells below their target number of completes. For all 29 PADs, these targets were calculated prior to data collection based on desired precision targets for estimates.

Exhibit 6 shows the results across the 29 PADs. In 19 out of 29 PADs more than 80% of the cells achieved their target numbers of completes. A large percentage of cells were below their target numbers of completes in three single-variable PADs with high targets for number of completes (citizenship, years since doctorate, and age) as well as for domains

resulting from crossing the 26-level field of degree variable with one or two other variables (citizenship, years since doctorate, age, and race/ethnicity by gender). It is possible that the target numbers of completes in these PADs were too high to be effective for the adaptive design. This is an area recommended for further evaluation in future survey rounds.

Exhibit 6: Results for Attaining Completion Targets for 29 Primary Analytic Domains



Note: FOD = Field of degree. Field of Degree variables are aggregated at the 8, 26, or 223 category level.

4. Discussion

Adaptive survey design is a potent tool to manage interventions during survey data collection to help attain survey data quality objectives. Best practices for implementing adaptive designs are still emerging to address some challenges such as managing multiple interventions that are implemented simultaneously, such as locating and gaining cooperation efforts, and to pursue multiple data quality objectives, such as improving sample balance and attaining target numbers of completions for key domains.

We described the strategies of the 2017 SDR to address such challenges and analyzed the results regarding meeting the survey objectives. The SDR successfully implemented a method for operationalizing both locating and gaining cooperation interventions simultaneously. Our team developed different adaptive design prioritization schemes for the two kinds of data collection efforts, recognizing that their needs may differ. For example, we incorporated elements to give higher locating priority to sample members more likely to cooperate once located based on logistic regression propensity models, to

help with the efficiency of the data collection process. In addition, we combined measures to target sample members in different PADs that were either below their target numbers of completes and/or below the average response rate. This strategy was designed to pursue the goals of improving overall representativity and attaining target completion numbers for a wide range of key analytic domains simultaneously.

Our analyses show that the representativity of the respondent set improved between the beginning of the Interim phase and the end of data collection. As the adaptive design strategy began to account for differences in representation among groups at the beginning of the Interim phase, this suggests a possible role of the adaptive design in improving representation. However, as our analysis is descriptive in nature, further study would be needed to measure the causal effect of the adaptive design scheme on representativity. Further, we tracked the attainment of target numbers of completes in the 29 PADs, finding that 19 out of 29 sets of domains had 80% or more cells meet their targets. Again, further study would be needed to analyze the causal effect of the adaptive design on attainment of completion targets.

The approach of the 2017 SDR presents one set of possible approaches to address such challenges as balancing multiple adaptive design objectives and managing multiple intervention types. We think these are critical areas for further research to guide best practices for implementing adaptive designs.

Acknowledgements

This paper reports research undertaken by staff at the National Center for Science and Engineering Statistics (NCSES) at the U.S. National Science Foundation and NORC at the University of Chicago. The authors particularly thank Shana Brown, Daniel Foley, Karen Grigorian, Don Jang, Sam Mahmoudi, Lance Selfa, Anne Shapiro, Weihuang Wong, and Michael Yang for their contributions to and comments on the research. All views expressed are solely those of the authors and are not necessarily those of NCSES or NORC at the University of Chicago.

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