Administering a Single-Phase, All-Adults Mail Survey: A Methodological Evaluation of the 2013 NATES Pilot Study

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EXECUTIVE SUMMARY

Introduction

This report presents key outcomes of a recent address-based sampling (ABS) mail survey sponsored by the National Center for Education Statistics (NCES)—the 2013 National Adult Training and Education Survey (NATES) pilot study—that tested the feasibility of using a unique "single-phase, all-adults" ABS methodology. Sampled households were asked to determine which household members were eligible for the survey and have each of them complete one of the topical questionnaires included in the mailing packet. Additionally, sampled households were randomly assigned to an *individual*-booklet condition (in which they received three separate questionnaire booklets) or a *composite*-booklet condition (in which they received a single booklet with three questionnaires).

There are several possible benefits of using a single-phase, all-adults design. First, limiting the survey to a single phase may increase the response rate because it only requires households to respond to one survey request. By contrast, a two-phase design requires obtaining survey responses from sampled households at two separate points (a screener for eligible household members followed by a separate survey mailing to the sampled household member), which may suppress the response rate. Second, requesting multiple responses from each household as part of an all-adults design may be more efficient because it allows survey materials to be sent to fewer households.

However, there also are potential drawbacks to a single-phase, all-adults design. First, the response burden on households is greater for households with more than one eligible adult. Similarly, sampled households may be put off by the quantity of information requested all at once, whereas a two-phase design allows them to ease into the response process by starting with the simpler task of completing a household screener. Second, a single-phase design places the responsibility for identification of eligible household members in the hands of the sample members themselves, which may be difficult and burdensome for sample members to implement accurately. Finally, receiving multiple responses per household will do little to improve statistical efficiency if the all-adults design simply brings into the sample individuals who have the same characteristics as those who would have participated had only one individual per household been selected.

Purpose of This Report

The purpose of this report is to evaluate the strengths and weaknesses of the NATES single-phase, all-adults design, as well as to identify important considerations that might influence the design of future household surveys that might want to use this methodology. The research effort described herein was undertaken for questionnaire and procedural development purposes only. The information collected and published from this effort should not be used to generate or cite population estimates.

Findings

Response Rate, Representativeness, and Response Quality

- NATES had an overall response rate of 63 percent. NHES:2012, a survey that shares many design features with NATES but that used a two-phase design, had an overall response rate of 58 percent.[1]
- Smaller households (with 1 or 2 eligible adults) were overrepresented and larger ones (with 3 or more eligible adults) were underrepresented, as compared to the gold standard for estimates of the characteristics of the U.S. population at the time that NATES was conducted (the March 2013 Current Population Survey (CPS)).

[1] Note that there is no perfectly equivalent survey to NATES for drawing comparisons. Nonetheless, because comparative information is useful for understanding how well the NATES methodology worked, we have included comparisons to surveys that share many of the same design and measurement features as NATES. However, it is important to note that any of the design and measurement differences between these surveys and NATES could contribute to the differences found.

- In 90 percent of the households that responded to NATES, all of the eligible adults believed to be living in the household responded.
- Accepting multiple responses per household did not help the survey to include a wider variety of individuals; for the key items that were examined, it was quite common for all of the responding household members to report identical responses to each other.
- As compared to the March 2013 CPS, NATES resulted in the underrepresentation of groups that have been found to be underrepresented in the survey methods literature more broadly, such as younger adults, males, non-Whites, and those with less education.
- There was little evidence of poor response quality for key items, as measured by item nonresponse or skip errors.

Screener Item Results

- There was extensive nonresponse to the two screener items that asked about the number of eligible individuals living in the household. About a quarter of the households that should have responded to the second item did not do so. In 8 percent of responding households, none of the returned questionnaires had a response to either screener item.
- Household-level screener item nonresponse was significantly less prevalent in the individual-booklet condition than in the composite-booklet condition (2 vs. 15 percent).
- Thirty percent of households' screener item responses had to be edited or imputed; this was significantly more likely for composite-booklet households than for individual-booklet households (36 vs. 24 percent).

Results of the Booklet Format Experiment

- The household-level response rate was not measurably different between the composite-booklet condition and the individual-booklets condition (65 percent in both).
- The person-level response rate was measurably higher in the composite-booklet condition than in the individual-booklet condition (99 vs. 94 percent).
- The overall response rate was 64 percent in the composite-booklet condition and 61 percent in the individual-booklet condition.
- There was little evidence of measurably different outcomes when the two booklet conditions were compared in terms of sample representativeness, responses to key items, and response quality. As a result, there was a not a clear answer as to which booklet format would be preferable to use in future surveys.

CONTENTS

Page

Page

LIST OF TABLES

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CHAPTER 1: INTRODUCTION

In-person and telephone surveys have traditionally been the most prominent modes of household data collection. However, decreasing landline telephone coverage, declining survey response rates, and increasing costs have led to decreased use of these modes and to efforts to find alternatives (Blumberg and Luke 2012; Curtin, Presser, and Singer 2005; Tuckel and O'Neill 2002). Due to improvements in the quality of residential sampling frames, address-based sampling (ABS) methods have been gaining popularity for survey data collection in recent years (Iannacchione 2011). For example, the National Center for Education Statistics (NCES) recently transitioned its National Household Education Survey (NHES) from a random-digit-dial telephone survey to an ABS mail design. While dual landline-cell phone surveys are another possible alternative, for household-based surveys like NATES and the NHES, the dual-frame phone design presents complicated sampling and operations issues, such how to deliver incentives and the fact that cell phones are often tied to a specific person; these issues can be avoided with an ABS mail design.

ABS surveys use the residential address delivery points included in the U.S. Postal Service Computerized Delivery Sequence File as their sampling frame. Because ABS frames primarily include mailing addresses, ABS surveys are often conducted via mail, although some are conducted in-person or incorporate designs that employ more than one mode of administration (for example, mail plus web or mail plus phone). In-person administration was not considered for NATES because of the high cost of in-person administration compared to other modes. Research comparing ABS mail surveys to other modes of administration (other than in-person administration) finds that it compares favorably in terms of response rates, nonresponse bias, cost, and response quality (Brick, Williams, and Montaquila 2011; Iannacchione 2011; Montaquila et al. 2013). However, there are several challenges associated with conducting an ABS mail survey, which are discussed in greater detail in the next section of this chapter. This report presents key outcomes from a recent ABS mail survey sponsored by NCES—the 2013 National Adult Training and Education Survey (NATES) pilot study—that tested the feasibility of using a relatively rare "single-phase, all-adults" ABS methodology to overcome some of these challenges. Such single-phase designs are comparatively untested when using mail as the mode of administration (Harter et al. 2016).

NCES was interested in determining whether or not high-quality data on adults' education, training, and work-related credentials could be collected using a single-phase, all-adults design in which both household screener information and topical survey responses were collected in a single mailing package and in which all eligible adults in each household were asked to complete a set of topical items.[2] This differs from the more common two-phase design, used in surveys such as the NHES, in which sampled households first complete a household screener and then, in a second phase of data collection, complete a topical questionnaire about a household member sampled by NCES from that roster. The Adult Training and Education Survey (ATES) was incorporated into this two-phase NHES design in 2014 and 2016. NATES also included an experiment aimed at determining the optimal format for presenting the survey booklets in this type of survey administration. The purpose of this report is to document the key outcomes of this pilot survey in an effort to understand which aspects of this methodology worked well and which didn't in order to inform future research using this methodology.

1.1 Challenges for Conducting ABS Mail Surveys

The self-administered nature of ABS mail surveys leads to several challenges for survey practitioners, such as: (1) determining whether there are any eligible individuals present at the sampled address, (2) selecting one or more target respondents from among any eligible household members, and, in some cases, (3) requesting responses from multiple members of the household.

[2] As noted here, NATES asked responding households to have all *eligible* adults respond to the survey; for ease of discussion, this will be referred to as an all-adults design even though only individuals ages 16–65 who were no longer in high school were eligible for the survey and asked to respond to it.

1.1.1 Identifying Eligible Household Members at Sampled Addresses

Many ABS surveys target subsets of the U.S. population, ranging from broad groups, such as adults, to narrower ones, such as parents of school-age children. Information available on the frame may give an indication as to whether such individuals are present in the household; however, these variables can have high missing rates (Roth, Han, and Montaquila, 2012) and be of questionable accuracy (English et al., 2014). As a result, ABS mail surveys typically include screener items that are used to determine more definitively the presence or absence of members of the target population at sampled addresses. These screener items also typically aim to determine the *number* of eligible individuals living in the household. This value then serves as an inflation factor that is applied to the household-level weights to generate person-level weights.

Although requesting that the household complete a roster with key information about the household members gives the researchers more information with which to make an assessment of the number of adults living there, it may also increase the perceived burden and intrusiveness of the survey request. Minimizing the negative impact of the screener phase on response is particularly important for a survey targeted at the general population of adults, such as NATES, given that almost all sampled households should have eligible household members. As a result, instead of asking households to complete a full household roster, NATES simply asked respondents to answer two items, reporting the number of eligible adults living in the household without providing specific information about each of those individuals. Chapter 3 of this report examines the quality of the responses to these items.

Screener items can also be used to determine which individual(s) within responding households should complete the survey; this effort is discussed in greater detail in the next section.

1.1.2 Selecting One or More Target Respondents

A second challenge associated with self-administered ABS household surveys is the effort to systematically select the appropriate individuals to complete the survey. Just as probability-based selection of households is essential, so too is ensuring that any within-household selection is done systematically. In contrast, allowing whichever household member is most available or willing to complete the questionnaire to do so is problematic because it can lead to biases—e.g., overrepresentation of unemployed adults or people who are highly interested in the survey topic—that may not be correctable with weighting adjustments because the variables on which there is bias may not be available in the sampling frame (Battaglia et al. 2008; Yan 2009). While interviewers can typically facilitate this process in telephone or in-person surveys, this is not an option in self-administered surveys.

A commonly used method that gives survey practitioners the most control over within-household selection is to conduct a two-phase data collection, as is currently done in the NHES. In this method, a household screener questionnaire is first sent to the household. Sample members are requested to provide information about the individuals living in the household and mail back the completed screener. One of the eligible household members is systematically selected by the survey researchers and then a topical questionnaire is mailed to the household with instructions for it to be filled out by or about a specific household member. The main benefit of this method is the assurance that systematic selection is implemented correctly (although there still remains the possibility that the screener form will not be filled out accurately or that someone other than the sampled household member will choose to complete the topical questionnaire). Researchers also can ease respondents into the response process by starting with the shorter screener form and then personalize the topical questionnaire mailing based on information obtained in the screener. A final benefit of a two-phase approach is the potential to save resources by not mailing topical questionnaires to sampled households that do not include any individuals who are eligible for the survey (Montaquila et al. 2013). However, there have not been experiments to evaluate whether single-phase or two-phase mail surveys result in a higher response rate (Harter et al. 2016).

However, using a two-phase approach also has potential drawbacks. First, it is challenging to get sample members to respond to two separate survey requests; as a result, two-phase designs may suffer from lower response rates than single-phase survey designs. In addition, there may be greater costs associated with having two separate mailing phases, both in

terms of materials (postage, printing, incentives) and labor (processing the returned screener forms and conducting the within-household selection). Finally, a two-phase approach can lead to longer survey administration windows that make it difficult to receive timely survey results; for example, NHES:2012 had a 6.5-month fielding period, while the field period for the single-phase NATES was only about 3 months.

To address the weaknesses of a two-phased approach, researchers have experimented with several methods in which households systematically select the target respondent on their own as part of a single-phase design. In most ABS mail surveys, these selection procedures are explained in a cover letter or at the beginning of the questionnaire. The adult who opens the survey packet is expected to read the selection instructions, decide who should complete the survey, and convince him or her to do so. One relatively common selection method is to use household members' birthdates to determine which adult(s) should complete the survey, selecting either the person with the next birthday ("next birthday" method) or the one who had the most recent birthday ("last birthday" method). Other methods ask households to select a particular household member to complete the survey based on age or gender information (e.g., the youngest male or the oldest household member). Finally, researchers may instead ask households to select "any adult" or "all adults" to complete the survey.

A key challenge associated with within-household selection methods in ABS surveys is the accuracy of the within-household selection. In an experimental comparison of the next-birthday, last-birthday, youngest adult, and oldest adult selection methods included in two ABS mail surveys of Nebraska residents, Olson, Stange, and Smyth (2014) found that all four methods had relatively low accuracy rates, with just over half of households with two or more adults living in them having had the correct household member complete the questionnaire (with statistically similar rates in all conditions, ranging from 53 percent in the last-birthday method to 63 percent in the next-birthday method). In another study by Battaglia and colleagues (2008), follow-up telephone calls conducted with a subset of "next-birthday" households that had two or more adults living in them found that the correct person had completed the questionnaire in just under half of the interviewed households. These error rates are on the higher end of those found in other evaluations of within-household selection accuracy in mail surveys (e.g., Gallagher, Fowler, and Stringfellow 1999; Schnell, Ziniel, and Coutts 2007; Olson and Smyth 2014) and greater than those found in telephone surveys (e.g., O'Rourke and Blair 1983; Lavrakas, Stasny, and Harpruder 2000; Lind, Link, and Oldendick 2000).

Relatively few respondents reported that they felt it did not matter who filled out the questionnaire or that the selection instructions were difficult to follow (Battaglia et al. 2008). However, the reported logic for selecting an alternate respondent suggests that these beliefs may be more common than respondents would like to admit. For example, respondents commonly reported that they "randomly" selected an alternate respondent, that whoever had the most time filled out the form, or that there is one household member who consistently fills out this type of paperwork (13 percent for each of these responses). Given the high selection error rates reported in the existing literature, an alternative approach was taken in NATES that allows all eligible adults to complete the survey. An all-adults design has the additional benefit of being a more efficient design because fewer households can be sampled to yield the needed number of adult respondents.

To date, there have been relatively few experimental tests of single-phase ABS methods in mail surveys (Harter et al. 2016). Given the limited evidence as to the ideal method for soliciting person-level responses from households in ABS surveys, NATES adds to the existing survey methods literature by attempting to administer a single-phase mail survey using the "all adults" method. Chapter 2 of this report describes the response rate and measures of representativeness and response quality in an effort to evaluate the effectiveness of this approach.

1.1.3 Requesting Responses from Multiple Household Members

The decision to use an all-adults design necessitates sending multiple questionnaires to each household. This raises the question of how best to present these questionnaires. In an interviewer-administered survey, the interviewer can help ease the transition between respondents. However, in a self-administered mail administration, it is not immediately clear whether it would be more effective to deliver these multiple questionnaires in a single, composite booklet or in multiple, individual booklets. There have been few prior all-adults ABS mail survey administrations. One example is a single-

phase, all-adults condition in a six-state pilot study conducted as part of the Centers for Disease Control's 2005 Behavioral Risk Factor Surveillance System (BRFSS), which used individual booklets (Battaglia et al. 2008). The NATES survey team was unaware of any prior experiments that addressed the question of how to present the questionnaires in such a design. The most closely related experiment was conducted as part of the 2011 field test of the U.S. Department of Agriculture's National Household Food Acquisition and Purchase Survey (FoodAPS), which was not an all-adults design. This study included an experiment that randomly assigned sample members to receive either one questionnaire booklet, which included all of the survey items, or several shorter booklets, each of which included a portion of the items. There were no significant differences between the single-booklet and multiple-booklet conditions in terms of the response rate or response quality, as measured by the prevalence of item nonresponse and inconsistent responses (Mathematica Policy Research 2011). Chapter 4 of this report assesses whether it is preferable to send multiple questionnaires to a household as a single, composite booklet or as multiple, separate booklets.

1.2 NATES Methods

NATES was the second of three pilot studies aimed at developing improved measures of the attainment of non-degree, work-related educational credentials and training among U.S. adults (see appendix A for a full copy of the NATES questionnaire).[3] The target population was noninstitutionalized adults ages 16–65 who were no longer enrolled in high school. The main purpose of NATES was to evaluate the feasibility of using a mailed survey to collect these data. While most NHES administrations between 1991 and 2005 had incorporated an adult-focused survey, the adult component was not released from the 2007 NHES (the last phone-based administration) due to low response rates. As a result, feasibility testing was necessary to determine whether a new adult-focused survey could eventually be reincorporated into the new mail-based NHES.

Data collection for NATES began on January 14, 2013 and was administered by the U.S. Census Bureau (for more details about the NATES sampling, data collection methodology, weighting, and response rate calculation see appendix B). Each of the 10,000 households selected from an address-based sampling frame was first mailed an advance letter alerting them that they had been selected for the survey. A few days later, each household was mailed a questionnaire packet that included a cover letter and three copies of the NATES topical questionnaire. Households were randomly assigned to one of two questionnaire booklet format conditions. In the "individual booklet" condition, households were sent three separate, identical booklets, each of which included one set of NATES topical items (these were equivalent to the topical questionnaire in a two-phase design). In the "composite booklet" condition, households were sent one booklet that included three sets of NATES topical items. Composite-booklet households were sent one return envelope for mailing back their responses, while individual-booklet households were sent three return envelopes. Each household was sent a $15 prepaid cash incentive with the first questionnaire booklet mailing.

At the beginning of each booklet were two items that were used to determine the number of eligible adults living in the household. These were equivalent to the screener phase of a two-phase design and, as a result, are referred to as the "screener items" in the remainder of this report. The first screener item asked for the number of people living in the household who were ages 16-65. Households that did not have any such adults were asked to mark "0" and return the booklet. Households with at least one adult in this age range were asked a second screener question: the number of adults ages 16-65 living in the household who were no longer in high school. The response to this second item was the number of eligible adults living in the household (with the exception of households that had already indicated in response to the first item that there was no one in the target age range living in the household and thus were skipped out of the second item). Households with no eligible adults were requested to mark "0" for the second item and return the booklet. Because the screener items were presented at the beginning of each booklet (as opposed to the beginning of each set of topical items), individual-booklet households received multiple sets of screener items, while composite-booklet households only received one set per mailing.

[3] More information about this series of pilot studies can be found at https://nces.ed.gov/surveys/gemena/surveys.asp.

Households with at least one eligible adult were asked to have each of the eligible adults complete a set of topical items about themselves. Households with more than three eligible members were instructed to call a toll-free help line to request additional sets of topical items.[4] Nonresponding households received up to three follow-up mailings. There were no follow-up mailings for nonresponding individuals within households that had already returned at least one questionnaire booklet. Data collection ended on April 9, 2013.

One potential issue with using a composite booklet is concern about the privacy of reported information, particularly for households comprised of unrelated adults. It is possible that concerns about privacy could depress response when using a composite booklet. However, the NATES questionnaire contained very few sensitive questions, so it is more likely that respondents would simply not answer select questions, such as questions about salary, rather than refuse to complete the survey at all. It also should be noted that the NATES questionnaires, contact materials, and survey methods were vetted and approved for public administration by the United States Office of Management and Budget, which serves as the equivalent of an Institutional Review Board for federal surveys.

[4] Approximately 5 households requested additional booklets. However, for operational reasons, no additional booklets ended up being sent.

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CHAPTER 2: RESPONSE RATE, REPRESENTATIVENESS, AND RESPONSE QUALITY

This chapter focuses on the response rate, sample representativeness, and response quality resulting from the NATES single-phase, adults design. Whenever possible, these outcomes are evaluated in relation to other single-phase or all-adult mail surveys as an attempt to assess how well NATES performed compared to other surveys that used similar designs. In addition, these outcomes often are evaluated in relation to findings from the survey literature more broadly in an effort to explore generally how well the NATES design performed. There is no perfectly equivalent survey to NATES for drawing comparisons. Nonetheless, because comparative information is useful for understanding how well the NATES methodology worked, we have included comparisons to surveys that share many of the same design and measurement features as NATES. However, it is important to note that any comparisons to other surveys that are presented in this report are not experimental in nature and there are differences, such as mode of administration, design, sponsor, or topic that may be drivers of any differences in the survey outcomes.

2.1 Unit Response

The response rate is commonly used as an indicator of overall survey quality. Although a low response rate does not automatically imply the presence of nonresponse bias, it does increase the potential for it to be present (Groves 2006). Several hypotheses were considered with regard to the potential impact of the single-phase, all-adults survey design on the unit response rate. One might expect a single-phase design to have a higher response rate than a two-phase design because it only requires a single phase of response from a household. Similarly, the fact that single-phase surveys allow sampled households to conduct their own within-household selection might lead to a higher response rate. However, prior research shows that it is common for someone other than the intended household member to end up completing single-phase surveys, often because the selected individual is not interested the survey or is not able to complete it (Battaglia et al., 2008). This seems less likely to occur in two-phase surveys, where the topical questionnaire mailing specifically identifies who should complete it. This could also lead two-phase surveys to have lower response rates because the selected individual, despite being specifically identified, remains uninterested or unable to complete the survey.

It is also possible that single-phase designs could lead to lower response rates. By design, single-phase survey screeners have to include items or instructions that make it clear to the household what type of individual is being targeted in the survey so that the household will be able to identify the correct person about whom to answer the survey questions. Thus, households that do not have household members fitting this description may choose not to return the completed screener portion of the questionnaire because they feel the survey is not relevant to them; this would lower household-level response. Conversely, in a two-phase survey researchers tend to present the screener in a way that makes it less obvious what type of individuals they are targeting (for example, by including a roster that asks for basic characteristics of all household members). Thus, they may receive completed screeners back from a larger proportion of the sampled households that do not have eligible individuals because these households are less likely to feel that the survey is not relevant to them; this would increase the household-level response rate. Furthermore, two-phase designs allow researchers to start with the small request of completing the screener items, thereby easing households into the response process, while single-phase designs must lay out the full scope of the burden all at once, potentially inhibiting some households from responding.

Finally, an all-adults design would be expected to lower the household-level response rate more so than a design that asked the household to select a single individual to complete the survey, as the all-adults request implies greater burden for households that have more than one eligible adult. In addition, it is possible that households that only achieve partial person-level response may opt not to respond at all, as opposed to sending back completed questionnaires for only some of their household members.

2.1.1 Household-Level Response

The household-level response rate is the estimated percentage of eligible households that responded. It is similar to the screener response rate reported in two-phase surveys. Households that returned at least one questionnaire booklet that included a response to at least one survey item were considered respondents. The household-level response rate was calculated per NCES standard 1-3-2, which corresponds to the American Association for Public Opinion Research (AAPOR) Response Rate 3 (RR3) (see Appendix B and C for details about response and eligibility status).

Table 2.1 shows the distribution of the final response status of the sampled households. About 5,470 of the 10,000 sampled households were respondents.[5] About 80 households were nonrespondents. Approximately 900 households were considered ineligible due to nondeliverable survey forms. Finally, about 3,550 households were identified as being of unknown eligibility.

Table 2.1. Number of sampled NATES households, by response status: 2013

Response status	Number of households
Total	10,000
Respondent[1]	5,470
Nonrespondent[2]	80
Ineligible[3]	900
Unknown eligibility[4]	3,550

[1] Respondent cases are those for which at least one questionnaire booklet was returned with a response to at least one item.
[2] Nonrespondent cases are those that only returned blank questionnaire booklets or indicated that they did not want to participate in the survey.
[3] Ineligible cases are those in which at least one mailing was returned as undeliverable and no questionnaire booklets with at least one question answered were received from the household.
[4] Cases of unknown eligibility are those for which no questionnaire booklet was returned and no information on the eligibility of the address was obtained.
NOTE: Counts are unweighted and are rounded to prevent the disclosure of restricted-use information. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

The base-weighted NATES household-level response rate was 65 percent (estimate not shown in table, standard error 0.66).[6] Given declining survey response rates (Brick and Williams 2013), this is a reasonable household-level response rate. For example, a single-phase, all-adults mail test of the Behavioral Risk Factor Surveillance System (BRFSS) in 2005 only achieved a 33 percent unweighted household-level response rate (Battaglia et al. 2008).[7] In comparison, the two-phase NHES:2012 achieved a 74 percent weighted household-level response rate. [8] The direction of the relationship between these two response rates supports the hypothesis that by starting with a smaller request that allows sampled households to ease into the response process, two-phase designs may achieve higher household-level response rates, although other differences between the surveys could account for this finding.

[5] Sample counts in this report are unweighted and are rounded to prevent the disclosure of restricted-use information.
[6] The analyses in this report generally were conducted using base weights (either household- or person-level, depending on the unit of analysis). This was done to correct for differential household sampling rates. The nonresponse-adjusted weights were not used in most analyses because the focus of this report is on the outcomes associated with the methods employed by this survey, as opposed to nonresponse-adjusted estimates of these phenomena. This should be taken into account when comparing estimates presented in this report to similar estimates reported elsewhere which may use nonresponse-adjusted weights. The sole exception is the analysis that compares NATES key estimates to ATES key estimates (see tables 2.8 and D.8). Since base weights were not available for ATES, that analysis uses nonresponse-adjusted weights for both studies to maximize the comparability of the estimates.
[7] Some of the difference in the response rate may be due to methodological differences between the two studies. For instance, the BRFSS test included only six states, whereas NATES included all states; those six states may be low-response-rate states as compared to the rest of the U.S. In addition, although Battaglia and colleagues note that households had to return at least one completed questionnaire to be considered a responding household, they do not indicate what was required for a questionnaire to be considered "complete" and may have held returned questionnaires to a higher standard of completeness than NATES (Battaglia et al. 2008).
[8] The two-phase NHES:2014 and NHES:2016 administrations also would have been useful comparison points for the NATES; however, the data from these survey administrations was not available at the time this report was written.

2.1.2 Person-Level Response

Responding, eligible households were asked to have all eligible adults complete and return a set of topical items. It is similar to the topical/main instrument response rate reported in two-phase surveys. The person-level response rate is the estimated percentage of eligible individuals in responding households who responded to the survey. At the person level, respondent status was assigned if a questionnaire was returned by an eligible individual and had a response to at least one of three critical items (highest education completed, sex, or age); respondents were assumed to be eligible unless their response to the age item indicated otherwise. The difference between the number of eligible adults in the household and the number of eligible sets of topical items returned was the number of nonrespondents in that household.[9]

Table 2.2 shows the distribution of the final response status of individuals in responding households. Just over 7,500 people responded to the survey. Just under 300 were considered nonrespondents. About 530 were considered ineligible because they indicated that their age was outside of the eligible age range.

Table 2.2. Number of persons in responding NATES households, by response status: 2013

Response status	Number of persons
Total	8,360
Respondent[1]	7,540
Nonrespondent[2]	290
Ineligible[3]	530

[1] Respondent cases are those for which a set of topical item responses was returned that had a response to at least one of three critical items and did not provide an age response outside of the eligible range.
[2] Nonrespondent cases were estimated using information on the number of eligible persons in each household and the number of respondents in each household.
[3] Ineligible cases are those for which a set of topical item responses was returned that included an age response outside of the eligible age range.
NOTE: Counts are unweighted and are rounded to prevent the disclosure of restricted-use information. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

The base-weighted person-level NATES response rate was 96 percent (estimate not shown in table, standard error 0.41). The person-level response rate was 85 percent in the single-phase, all-adults BRFSS test (Battaglia et al. 2008), while the NHES:2012 person-level response rate was 79 percent for the Early Childhood Program Participation (ECPP) and 78 percent for the Parent and Family Involvement in Education (PFI) topical surveys, supporting the hypothesis that single-phase surveys may result in higher person-level response rates than two-phase surveys.[10] However, it is important to keep in mind that the NATES person-level response rate may be inflated due to the high rate of screener item nonresponse and the use of the number of returned, eligible sets of topical items to impute the number of eligible household members for some cases (see appendix C for more details).

2.1.2.1 Within-Household Response

The two relevant pieces of information for determining the degree of within-household response are the number of eligible adults living in the household and the number of sets of topical items returned from each household with at least one eligible adult. Table 2.3 shows the distribution of the number of eligible adults in each responding household. About one in six responding households were determined to have no eligible adults. Most responding households had either one or two eligible adults (31 percent and 40 percent, respectively). About 11 percent had three eligible adults, and only 2 percent had four or more eligible adults. It is important to keep in mind that this differs from the distribution of the number of eligible households reported on the screener items (shown in table 3.1) because a considerable number of the original responses needed to be edited due to item nonresponse or responses of questionable quality (e.g., within

[9] In the five households that requested additional booklets, the same approach was used even though no additional booklets were sent to these households.
[10] However, the NHES:2012 did not include the ATES topical items; it instead included the Early Childhood Program Participation (ECPP) and Parent and Family Involvement in Education (PFI) topical items, which requested a response from one adult household member who was knowledgeable about the sampled child. This different topical and target population may have contributed to the difference in the response rate.

household inconsistency in reports). Table 2.3 presents the estimates after this editing was complete, while the estimates shown in table 3.1 are based on respondents' actual answers to the screener items. More details about the extent of editing of the screener item responses are provided in chapter 3, and additional information about the rules used to guide this editing is shown in appendix C.

Table 2.3. Percentage distribution of responding households, by survey and number of eligible adults: 2013

	Overall		With at least one eligible adult	
Number of eligible adults	NATES	CPS	NATES	CPS
0	16.4	15.1	†	†
1	30.6*	24.6	36.6*	29.0
2	40.2*	33.6	48.1*	39.6
3	10.8*	12.4	12.9*	14.6
4+	2.0*	14.3	2.4*	16.8

† Not applicable.
* Significantly different ($p < 0.05$) from the CPS.
NOTE: The NATES figures shown in this table are household-level base-weighted estimates and the CPS figures are person-level nonresponse-adjusted weighted estimates. These estimates represent the proportion of responding households that had the number of eligible adults shown. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and U.S. Census Bureau, Current Population Survey (CPS), March 2013.

The NATES estimates were compared to the March 2013 Current Population Survey (CPS) estimates of the distribution of the number of adults per household that would be eligible for NATES (ages 16-65); this was the gold standard for estimates of the characteristics of the U.S. population at the time that NATES was conducted (see table 2.3). The statistical significance of any differences between NATES and CPS was assessed using a Student's *t* test in which the *t* statistic is defined as the estimated bias divided by the standard error of the bias. Standard errors for the CPS and NATES account for survey design effects due to the complex survey designs and are presented in appendix E. The standard errors presented in this report were generated using replication methods. In this report, unless otherwise stated, the results are considered to be statistically significant if the *p* value of the *t* test is below .05.

There was not a measurable difference between the NATES and CPS estimates in the percentage of households with zero eligible adults (16 percent vs. 15 percent), suggesting that the NATES single-phase design may not have suppressed household-level response among households that did not have any eligible adults. However, the all-adults design may have suppressed response among larger households; NATES had a significantly larger percentage of households with either 1 or 2 eligible adults compared to the CPS (30.6 vs 24.6 percent and 40.2 vs. 33.6 percent), as well as a significantly smaller percentage of households with either 3 eligible adults or 4 or more eligible adults as compared to the CPS (10.8 vs. 12.4 percent and 2.0 vs. 14.3 percent). Some of this difference may be driven by the fact that NATES excludes adults who are currently in high school, whereas the CPS includes them; this could lead to higher estimates of the number of eligible adults in the CPS (for example, 16 year old high school students would be included in the CPS counts but would be excluded from NATES). Because CPS does not ask whether household members are currently enrolled in high school, it was not possible to exclude such individuals from the CPS counts. In addition, imputing the number of eligible adults in NATES based on the number of sets of topical items returned for some households (that did not provide responses to the screener items) may have suppressed the number of eligible adults estimated to be in responding NATES households. For more information about the extent of imputation of the number of eligible adults in NATES, refer to Section 3.4.

Table 2.3 also shows the distribution of eligible adults among households that had at least one eligible adult. Almost half of these households (48 percent) had two eligible adults and just over one-third (37 percent) had only one eligible adult. About 13 percent of these households had three eligible adults, and only 2 percent had four or more eligible adults. The statistically significant differences between NATES and the CPS discussed in the last paragraph were also present when the analysis was restricted to households that had at least one eligible adult. Table 2.4 shows the number of sets of

topical items returned in households that were determined to have at least one eligible adult. Most households returned either one or two sets of topical items. About one in eight households with at least one eligible adult returned three sets of topical items, and less than 1 percent returned four or more sets.

Table 2.4. Percentage distribution of responding households with at least one eligible adult, by number of eligible, complete sets of topical item responses returned: 2013

Number of sets of eligible, complete topical item responses returned	Overall
1	40.6
2	46.4
3	12.6
4+	0.4

NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates represent the proportion of responding households with at least one eligible adult that returned the number of eligible, complete sets of topical item responses shown. Sets of topical item responses were considered eligible and complete if they had a response to at least one key item and did not provide an age response outside of the eligible range. Detail may not sum to totals because of rounding. Even though only three sets of topical items were sent to a household at a time, it was possible for households to send back more than three sets if they sent back booklets from more than one mailing.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table 2.5 compares the percentage of responding households in which all of the eligible adults responded to the percentage of responding households in which only some of the eligible adults responded.[11] This analysis is limited to households in which it was determined that there was at least one eligible adult. In 90 percent of the responding households, all of the eligible individuals returned a complete, eligible set of topical item responses; however, as noted earlier in this chapter, person-level response is likely overestimated due to the high rate of screener item nonresponse and the use of the number of returned, eligible sets of topical items as the imputed value for the number of eligible adults for some cases.

Table 2.5. Percentage of responding households with at least one eligible adult, by proportion of eligible adults who responded and number of eligible adults in household: 2013

Total number of eligible adults in household	All eligible adults responded	Some eligible adults responded
Overall	90.3	9.7
1	100.0	0.0
2	95.1	4.9
3	89.0	11.0
4+	16.2	83.8

NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates represent the proportion of responding households that had the number of eligible adults shown. Details may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Due to the greater response burden of an all-adults survey for larger households, it was hypothesized that households with a greater number of eligible adults would be more likely to exhibit within-household nonresponse than would smaller households. In particular, it was expected that households with more than three eligible adults would be especially likely to exhibit person-level nonresponse, since submitting more than three sets of topical items per household required respondents to request extra questionnaire booklets.[12]

[11] There were no responding households in which it was determined that there were eligible household members, but none of them responded (i.e., at least one booklet was returned with screener item responses that indicated there were eligible household members present, but none of the returned sets of topical responses had answers to the three critical items).
[12] As table 2.3 shows, 2 percent of responding NATES households had more than three eligible adults.

To test this hypothesis, the percentage of responding households in which all of the eligible household members responded was calculated. Table 2.5 shows clearly that the within-household response decreases as the number of eligible adults in the household increases. For example, all of the eligible household members responded to the survey in 95 percent of the households with two eligible adults, compared to 89 percent of the households with three adults. As anticipated, an especially sharp decline was seen when the number of eligible adults was greater than the number of sets of topical items sent to the household; all of the eligible household members responded in only 16 percent of households with four or more eligible adults.

The statistical significance of this relationship was evaluated using a logistic regression in which the number of eligible household members was the independent variable and whether or not all eligible household members responded was the dependent variable. This analysis confirmed that there was a significant relationship (see table D.1 in appendix D for more details). As the number of eligible adults in the household increased, the likelihood of complete within-household response decreased.

2.1.2.2 Similarity of Responses From the Same Household

One of the main goals of using an all-adults design is the potential gain in efficiency due to receiving multiple responses from a single household. As shown earlier in table 2.4, about 60 percent of responding households returned more than one eligible, complete set of topical item responses. However, gaining responses per household only improves efficiency if there is variation in the types of individuals who respond from a given household; if accepting multiple sets of topical item responses from the same household simply brings more people into the respondent pool who have the same characteristics as those who would have responded if only a single household member had been sampled, this clustering would reduce the effective sample size and minimize the actual gain in efficiency.

Table 2.6 shows the percentage of responding households that returned at least two eligible, complete sets of topical items in which the responses to 10 items (that asked about demographic characteristics or were identified as key items[13]) were actually identical in all of the sets of topical items returned from that household.[14] Because this analysis focuses on reported responses, imputation was not conducted and households in which all respondents did not answer the item were not considered to have provided identical responses.

For the 10 survey items presented in table 2.6, there is considerable variation across items in the frequency with which all of the household members provided the same response, from 9 percent of the households for the sex item to 84 percent for the apprenticeship item. There are likely several factors that drive this variation in results across items. The first factor is differences in patterns of household composition across demographic variables. One possible explanation for the low percentage of responding households providing identical responses to the sex item is the fact that same-sex romantic couples make up a relatively small percentage of households in the United States; similarly, the high percentage of responding households with identical responses to the race/ethnicity item may be driven by the fact that interracial couples also make up a relatively small percentage of U.S. households (Lofquist et al. 2012). The second factor is the relative rarity of the characteristics asked about in the key items. For example, for characteristics that are relatively more common, such as having a certification/license or certificate, receiving multiple sets of topical item responses from a household increases the variation in responses received; however, for comparatively less common characteristics, such as having completed an apprenticeship, receiving multiple responses per household still results in identical responses from all household members for most households and does not necessarily facilitate locating respondents with these rarer characteristics. Finally, the number of response options provided for an item may, in part, drive the variation in responses received from household members, with items that have more response options, such as age or education, resulting in more variability in within-household response, and items with fewer response options, resulting in less

[13] Seven key items were identified: educational attainment, having a certification/license, having completed an educational certificate, having completed an apprenticeship, enrollment in college courses, having completed other work-related instruction or training, and employment status.
[14] There are other possible approaches for addressing whether or not the all-adults design resulted in a gain in efficiency, such as calculating the within-household, intra-class correlation. There are potential limitations to the approach taken here; for example, this approach does not allow for calculation of the effective sample size and estimation of the administration cost for the same effective sample size under other designs.

variability; however, item topic seems to mitigate the influence of the number of response options (for example, the large percentage of households where all household members provided identical race/ethnicity responses).

Reviewing these outcomes by the number of sets of topical items returned (and using *t* tests to evaluate statistical significance) shows that households that returned three or more sets of topical items were significantly less likely than those that returned two sets to provide identical responses for all items included in table 2.6, except for race/ethnicity.

Table 2.6. Percentage of identical responses within responding households that returned at least two sets of eligible, complete topical item responses, by number of eligible, complete sets of topical item responses returned and selected items: 2013

		Number of sets of eligible, complete topical item responses returned	
Selected items	Overall	2	3+
Q1 (educational attainment)	26.7	30.7	12.3*
Q4 (certification/license)	60.1	62.8	50.3*
Q20 (educational certificate)	74.9	77.1	67.0*
Q29 (apprenticeship)	83.9	85.5	78.0*
Q35 (college courses)	80.1	87.4	54.3*
Q46 (other work-related instruction or training)	61.4	64.8	49.1*
Q52 (employment status)	58.7	64.6	38.0*
Q70 (sex)	9.4	10.2	6.8*
Q71 (age category)	47.7	59.9	4.2*
Q74/75 (race/ethnicity)	82.8	83.4	80.5

* Significantly different ($p < .05$) from households that returned two sets of eligible, complete topical item responses.
NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates represent the proportion of responding households that returned at least two eligible, complete sets of topical items in which all responses were identical.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

2.1.3 Overall Response

As discussed earlier, two phases of response were taken into consideration to calculate the overall response rate. The first was the household-level response rate (the proportion of sampled households that provided at least some response), discussed in section 2.1.1, which was 65 percent. The second was the person-level response rate (the proportion of eligible adults in responding households that returned a complete, eligible set of topical items), discussed in section 2.1.2, which was 96 percent.

The base-weighted overall response rate, which is the product of the household-level response rate and the person-level response rate, was 63 percent. Again, in the context of declining survey response rates, this is a reasonable response rate. The two-phase NHES:2012 achieved a slightly lower overall weighted unit response rate of 58 percent for both the PFI and the ECPP. In addition, the BRFSS single-phase, all-adults mail test achieved an overall unweighted response rate of only 28 percent (Battaglia et al. 2008). Similarly, the six single-phase experimental conditions employed by Olson and colleagues in their two surveys of Nebraska residents achieved overall unweighted response rates ranging from 31 percent to 39 percent (Olson, Stange, and Smyth 2014). However, as the NATES response rate was below 85 percent, the *NCES Statistical Standards* would require that a nonresponse bias analysis be conducted if this had not been purely a methodological study.[15] As mentioned previously, differences in the response rate across surveys may also be explained by other differences in the survey design.

[15] Following the main NATES administration, a nonresponse follow-up study was conducted with a subsample of NATES nonrespondents. For more information about the results of that study, see *NATES:2013 Nonresponse Bias Analysis Report: Evidence from a Nonresponse Follow-up Study* (Jackson and Medway 2017).

2.2 Sample Representativeness

The goal of this set of analyses is to determine whether the NATES respondents are representative of the study's target population and to assess whether the extent and direction of any biases are in line with what is seen in other surveys, as an indirect way of assessing the potential extent of nonresponse bias associated with the 63 percent NATES overall response rate. Broadly speaking, nonresponse bias is the systematic deviation of a survey estimate from the true population value attributable to the fact that not all sampled households or persons completed the survey questionnaire. Although a low overall response rate does not, by itself, imply the presence of unit nonresponse bias, it may increase the potential for nonresponse bias. Three methods are used to measure representativeness: a comparison of respondents with the full sample using variables available in the frame; a comparison of respondent self-reported characteristics with a "gold standard" high-response-rate survey; and a comparison of NATES key estimates with those from the 2010 ATES pilot survey—the only other ATES administration for which final results were available at the time this report was written.

Prior studies using similar methods suggest the potential for nonresponse bias in single-phase surveys due to the underrepresentation of particular subgroups—such as those with less education or income, younger adults, males, and non-Whites—that also tend to be underrepresented in the survey literature more broadly (e.g., Collins et al. 2000; Dillman 1978; Porter and Whitcomb 2005). For example, in a survey of Nebraska residents, Olson, Stange, and Smyth (2014) found that, compared to the American Community Survey, both of the single-phase surveys they conducted underrepresented non-Whites, Hispanics, younger adults, those with a high school degree or less, and those whose income was less than $50,000. Battaglia and colleagues found very similar results in a single-phase, all-adults test of the BRFSS (Battaglia et al. 2008). When comparing weighted estimates to the CPS, the BRFSS test survey underrepresented non-Whites, those with a high school degree or less, those with incomes less than $50,000, and unmarried individuals. Compared to control totals from a telephone administration of the same survey, the BRFSS test also underrepresented young adults. These same groups were anticipated to be underrepresented in NATES as well, and, to the extent that characteristics such as age, race/ethnicity, education, gender, or income are associated with adults' training and education, this differential nonresponse would be expected to lead to nonresponse bias in NATES.

In addition, due to the higher burden associated with response for larger households, it was hypothesized that the all-adults design might make households with a larger number of eligible adults less likely to respond to the survey. Battaglia and colleagues found that, compared to the CPS, the BRFSS all-adults test overrepresented adults living in single-adult households and underrepresented those living in households with three or more adults (Battaglia et al. 2008). Characteristics that were anticipated to be positively associated with household size were in turn expected to be underrepresented in NATES compared to a single-adult survey. For example, there is likely an association between age and household size; both the youngest adults, who could be more likely to live in households with several roommates or with their parents/guardians, and the oldest adults, who might have children old enough to also fall into the NATES target age range, could be underrepresented in NATES as a result. To the extent that these same characteristics were associated with adults' training and education, this differential nonresponse would be expected to lead to nonresponse bias.

2.2.1 Comparison of Respondents and Eligible Sample on Frame Variables

A standard method of assessing sample representativeness is to compare the survey respondents to the eligible sample in terms of the percentage distribution of variables available in the sampling frame. The estimated bias is measured as the difference between the percentage estimated for the respondents and the percentage estimated for the entire eligible sample for each category of each variable. The statistical significance of the difference between the eligible sample and the respondents is evaluated. Subgroups that are significantly more or less prevalent among responding households than among sampled households can be considered to have been over- or underrepresented in the NATES respondent sample.[16]

[16] Additional details about this analysis can be found in NATES:2013 Nonresponse Bias Analysis Report: Evidence from a Nonresponse Follow-up Study (Jackson and Medway 2017).

When the percentage distributions for responding households are estimated using base weights, all 14 variables of interest show significant bias in the estimated proportions for at least some subcategories. In particular this suggests that the following types of households are underrepresented among NATES respondents (see table D.2 in appendix D):[17]

- located in the South;
- located in high-minority strata;
- located in high-poverty tracts;
- located in high rises or receive mail at a P.O. box;
- located in multi-unit dwellings;
- the head of the household is Black or Hispanic;
- the head of the household is single;
- low annual income;
- no phone number is available;
- including only one adult; and
- renters.

The direction of these differences is in line with much of what is reported in other single-phase surveys (Olson, Stange, and Smyth 2014; Battaglia et al. 2008) and in the survey literature more broadly (Collins et al. 2000; Dillman 1978; Porter and Whitcomb 2005), with the exception of the underrepresentation of households with only one adult, which runs counter to expectations for an all-adults survey and to the finding presented earlier when the number of eligible adults was compared to CPS estimates.[18] These differences could result in biased estimates if these variables are correlated with the variables of interest in the survey, unless weighting adjustments are made to correct for the differences in those who responded.

2.2.2 Respondent Demographic Characteristics Compared to a Gold Standard

Another common method for assessing the potential for nonresponse bias is to compare the percentage distributions of respondent characteristics to those from a "gold standard" high-response-rate study. Thus, this analysis compares the characteristics of the NATES respondents to the March 2013 CPS estimates, which were considered to be the gold standard for estimates of the characteristics of the U.S. population at the time that NATES was conducted.

The NATES topical items included several items about respondent characteristics that were also included in the CPS: sex, age, educational attainment, race/ethnicity, and household income. The person-level, base-weighted distributions of responses to the NATES demographic items are compared to the final distributions of equivalent CPS items in table 2.7. As the NATES target population (adults ages 16-65 who were no longer in high school) was narrower than that of the CPS, CPS respondents who reported being outside of this age range were excluded from the analysis. Since the CPS did not include a question to ascertain whether respondents were currently in high school, respondents who reported being 16 or 17 years old were excluded from both datasets due to the higher likelihood that CPS respondents in this age range might currently be in high school. In this analysis, the prevalence of key respondent characteristics is calculated for both NATES and the CPS and statistical significance is determined using *t* tests. Any significant differences between the two studies suggests bias in the characteristics of the NATES respondents.

[17] Additionally, for every frame variable for which at least some of the households were missing data, responding households were significantly less likely than the eligible sample to be missing data (by at least 1.3 percentage points). This means that households with missing frame data were less likely than those that did not have missing frame data to return a completed questionnaire.

[18] Auxiliary variables are useful in that they allow comparison of respondents to nonrespondents, but their usefulness is limited by several known quality problems. First, many auxiliary variables—particularly the demographic variables appended from commercial databases—show high missing rates. Second, for the addresses for which they are available, these variables are known to be subject to substantial measurement error. The issues may explain why this analysis contradicts the findings from the comparison of NATES to CPS. A comprehensive review of studies of the quality of commercial auxiliary data is provided by West et al. (2015).

Table 2.7. Percentage distribution of respondents, by survey and selected characteristics: 2013

Respondent characteristic	NATES	CPS	Difference between NATES and CPS
Sex			
Male	46.3	49.0	-2.7*
Female	53.7	51.0	2.7*
Age			
18-24	9.9	15.2	-5.3*
25-34	17.0	21.1	-4.1*
35-44	19.0	20.2	-1.2
45-54	25.7	22.1	3.6*
55-65	28.4	21.5	6.9*
Race/ethnicity			
White, non-Hispanic	70.4	63.3	7.1*
Black, non-Hispanic	9.4	12.3	-2.9*
Hispanic	11.6	16.5	-4.9*
Other race, non-Hispanic	8.7	8.0	0.7
Highest degree or school completed			
Less than high school	9.2	9.9	-0.7
High school completion	24.1	30.1	-6.0*
Some college or associate's degree	32.4	30.2	2.2*
Bachelor's degree	21.0	19.7	1.3
Graduate or professional degree	13.3	10.1	3.2*
Household income			
$0-$30,000	23.5	20.9	2.6*
$30,001-$75,000	36.8	35.4	1.4
$75,001+	39.7	43.7	-4.0*

* Significant difference ($p < .05$) between NATES and CPS.
NOTE: Only respondents ages 18-65 were included in this analysis in order to maximize comparability between the NATES and CPS datasets. The NATES figures shown in the table are person-level base-weighted estimates and the CPS figures are person-level nonresponse-adjusted weighted estimates. Observations with missing data for a given variable are excluded from that analysis. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and U.S. Census Bureau, Current Population Survey (CPS), March 2013.

For all five of the variables analyzed, the prevalence of at least one subcategory was found to be significantly different between the NATES estimates and the CPS estimates. Males were underrepresented. Younger adults (ages 18-34) were underrepresented, while older adults (ages 45-65) were overrepresented. Hispanics and Black, non-Hispanics were underrepresented, while White, non-Hispanics were overrepresented. NATES overrepresented more educated individuals (some college or a graduate degree), while underrepresenting less educated ones (high school completion). Finally, NATES overrepresented individuals whose household income was $30,000 or less and underrepresented those whose income was greater than $75,000. The underrepresentation of Hispanics may have been driven by the fact that NATES was not offered in Spanish.

In sum, there are significant differences between the reported demographic characteristics of the NATES responding households and the gold standard CPS estimates. The direction of these differences is in line with much of what has been reported in prior single-phase surveys and in the survey literature more broadly (Olson, Stange, and Smyth 2014; Battaglia et al. 2008), with the exception of the overrepresentation of lower income respondents, which runs counter to expectations because lower income individuals tend to be underrepresented in surveys. These differences could result in

biased estimates if these characteristics are correlated with the variables of interest in the survey, unless weighting adjustments are made to correct for the differences in those who responded.

2.2.3 Key Estimates Compared to a Prior Administration

The final outcome of interest was whether the responses to key survey items were in line with what would be expected based on a prior administration of this survey. This section uses the 2010 ATES pilot study as a comparison point, as it is the only other ATES administration for which final results were available at the time this report was written.[19] Three of the key NATES topical items were also asked in the ATES pilot study: the respondent's educational attainment, whether the respondent has a certification or license and whether the respondent has completed an educational certificate. Weighted estimates were calculated for both surveys; due to the lack of availability of base weights for the ATES pilot study, this analysis uses nonresponse-adjusted weights. Because the two surveys had slightly different target age ranges, the analysis was restricted to the age range included in both studies: ages 18-65.[20] In addition, it is important to note that the ATES pilot study was conducted via telephone and with slightly different question wordings, both of which could have had an effect on respondents' answers; for example, NATES respondents were asked to choose one of the educational attainment response options listed on the survey page, while this was an open-ended item in the ATES pilot study. Statistical significance was assessed using *t* tests. As noted previously, there is no perfectly equivalent survey to NATES for drawing comparisons. Nonetheless, because comparative information is useful for understanding how well the NATES methodology worked, we have included comparisons to surveys that share many of the same design and measurement features as NATES. However, it is important to note that any of the design and measurement differences between these surveys (including ATES) and NATES could contribute to the differences found.

The reported educational attainment of respondents differed significantly in the two surveys (table 2.8); NATES respondents were significantly less likely than ATES respondents to report high school or less, and they were significantly more likely than ATES respondents to report some college or more. On the key measures of attainment of certifications and licenses and attainment of educational certificates, there were no detectable differences. About the same percentage of NATES respondents (29 percent) and ATES respondents (31 percent) reported having a certification or license. Similarly, about 14 percent of both NATES and ATES respondents reported having completed an educational certificate.

[19] For more information about the 2010 ATES pilot study, see Bielick et al. (2013).

[20] The NATES target population was individuals ages 16–65 who were no longer in high school. The ATES pilot study target population was adults ages 18 or older. Because the ATES pilot study did not exclude individuals who were still in high school and did not have a question that asked if the respondent was currently in high school, it was not possible to exclude ATES pilot study respondents who might have still been in high school from this analysis. Thus, even after restricting the age range for both surveys, the ATES pilot study estimates may include some young adults who were still in high school, while the NATES estimates exclude them. This would be expected to result in slightly higher educational attainment and prevalence of certifications/license and certificates in NATES. In addition, since responses to these survey items were not imputed for NATES, the ATES results shown here are the non-imputed results.

Table 2.8. Percentage distribution of responses to selected key survey items, by survey and item: 2010 and 2013

Selected key survey items	NATES (2013)	ATES pilot study (2010)	Difference between NATES and ATES
Q1 (highest degree or level of school completed)			
Less than high school	9.2	14.8	-5.6*
High school completion	24.1	29.7	-5.6*
Some college or associate's degree	32.4	26.8	5.6*
Bachelor's degree	21.0	17.8	3.2*
Graduate or professional degree	13.3	10.9	2.4*
Q4 (certification/license)			
Has a certification/license	29.2	31.5	-2.3
Does not have a certification/license	70.8	68.5	2.3
Q20 (educational certificate)			
Has an educational certificate	13.6	13.6	0.0
Does not have an educational certificate	86.4	86.4	0.0

* Significant difference ($p < .05$) between NATES and ATES pilot study.
NOTE: Only respondents ages 18-65 were included in this analysis in order to maximize comparability between the NATES and ATES datasets. The figures shown in this table represent person-level nonresponse-adjusted weighted estimates. Observations with missing data for a given variable are excluded from that analysis. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and Adult Training and Education Survey (ATES) pilot study, 2010.

2.3 Response Quality

A third category of indicators often used to determine the success of a survey administration are those that assess the quality of responses to key survey items. It was hypothesized that the all-adults design might lead to reduced response quality because accepting multiple topical item responses from each household would increase the prevalence of reluctant respondents who only participated at the urging of another household member. Reluctant respondents have been found to provide poorer quality data (Fricker and Tourangeau 2010). In addition, it was expected that the composite booklet would reduce response quality because it would be more difficult to navigate than a booklet that only included a single set of topical items.

2.3.1 Item Nonresponse

The first outcome of interest was the rate of item nonresponse to key survey items. Seven key items were identified: educational attainment, having a certification/license, having completed an educational certificate, having completed an apprenticeship, enrollment in college courses, having completed other work-related instruction or training, and employment status. As these items were asked of all NATES survey respondents, the rate of item nonresponse was determined by dividing the number of survey respondents who did *not* answer the question by the total number of survey respondents.

As shown in table 2.9, the rate of nonresponse to these items ranged from 1 to 3 percent. These are reasonable item nonresponse rates for a self-administered survey; the *NCES Statistical Standards* suggest that an item nonresponse bias analysis is unnecessary unless the item nonresponse rate exceeds 15 percent. They are also in line with the results of the two-phase NHES:2012; between the two topical surveys administered that year, there were only five items whose nonresponse rates exceeded 15 percent. Therefore, these results do not raise concern about the quality of response in the single-phase, all-adults design.

Table 2.9. Item nonresponse rates in NATES, by key survey items: 2013

Key survey items	Overall
Q1 (educational attainment)	1.3
Q4 (certification/license)	2.0
Q20 (educational certificate)	2.0
Q29 (apprenticeship)	2.7
Q35 (enrollment in college courses)	2.2
Q46 (other work-related instruction or training)	2.1
Q52 (employment status)	2.5

NOTE: The figures shown in this table represent person-level base-weighted estimates. The rate of item nonresponse was determined by dividing the number of survey respondents who did not answer the item by the number of respondents who should have answered the item.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

2.3.2 Skip Errors of Omission

The second measure of response quality was the frequency of skip errors of omission following key items. The NATES topical items were structured so that each section of the survey began with respondents answering a key item on a topic (for example, whether or not they have an educational certificate), and their response to this item determined whether or not they were instructed to answer a series of follow-up items on this topic. Each of the seven key survey items included in the item nonresponse analysis had skip instructions associated with it that instructed respondents where to proceed next based on their response to that item.

This analysis examines the rate of skip errors of omission following these items: that is, the proportion of respondents who did *not* provide an answer to the item that the skip instructions told them to answer immediately following a key survey item.[21] The analysis focuses on errors of omission—and excludes errors of commission (answering items that should be skipped)—on the assumption that getting too little information from a survey respondent is more difficult to correct for than getting too much information. As shown in table 2.10, the rate of skip errors of omission following key items ranged from 2 to 5 percent. Applying the same *NCES Statistical Standards* guideline for item nonresponse to this context suggests that these skip error rates do not raise concerns about the overall quality of response to the single-phase design.

Table 2.10. Percentage of skip errors of omission in NATES, by key survey items: 2013

Key survey items	Overall
Q1 (educational attainment)	2.2
Q4 (certification/license)	3.7
Q20 (educational certificate)	4.3
Q29 (apprenticeship)	3.0
Q35 (enrollment in college courses)	2.3
Q46 (other work-related instruction or training)	2.8
Q52 (employment status)	5.1

NOTE: The figures shown in the table represent person-level base-weighted estimates. The rate of skip errors of omission was determined by dividing the number of survey respondents who did not answer the correct follow-up item after the branching item by the number of respondents who were asked that branching item.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

[21] Though skip instructions were not provided explicitly for respondents who did not respond to the branching item, for the purposes of this analysis it was determined that the correct action for these respondents was to make the furthest skip out of the options available to them (for example, respondents who reported having an educational certificate answered a series of follow-up items, while respondents who did not have one skipped to the next section of the survey; respondents who did not answer the educational certificate item also should have skipped to the next section).

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CHAPTER 3: SCREENER ITEM RESULTS

Having accurate responses to the screener items was very important because these responses were used for calculating the response rate and the survey weights. When screener item responses were missing or of questionable quality, the values needed to be edited after the survey. Since there often was not an unambiguous "right" answer, this required making assumptions that may not always have been correct and that may have led to inaccurate response rates and weights. This chapter reports on the frequency with which responding households did not provide usable responses to the screener items.

This chapter also compares the screener results for the composite- and individual-booklet experimental conditions, as part of an effort to determine which booklet format would prove the optimal design for any future single-phase, all-adult surveys. Composite-booklet households received one booklet with one set of screener items at the beginning of it, while individual-booklet households received three booklets, each of which began with a set of screener items. As a result, individual-booklet condition households with more than one eligible household member typically returned more than one set of screener item responses, while composite-booklet households typically returned only one.[22] Requesting multiple screener responses from a household can be beneficial because it means that there are several opportunities to receive the requested information from a given household, potentially reducing the frequency of household-level item nonresponse. On the other hand, it can be problematic if the responses are inconsistent. For example, complex and varied household structures can lead to inconsistent interpretation of which household members to report, such as in households where some members are temporary (for example, for young persons splitting their time between their parents' homes, partners living there part-time, long-distance commuters, or young adults away at school or who live elsewhere but spend significant time in the household). Ultimately, only one response can be retained for each household; inconsistent responses or other responses of questionable quality must be resolved, leading to extra post-processing work and potential uncertainty about which response is the most accurate. It was hypothesized that there would be lower household-level item nonresponse in the individual-booklet condition, but a lower incidence of poor quality responses in the composite-booklet condition. There was not a definitive expectation as to which condition would require a greater amount of overall editing.

3.1 Screener Item Responses

The distribution of responses to the screener items was calculated overall and by booklet condition, and *t* tests were performed to evaluate the statistical significance of any differences by booklet condition. For individual-booklet households that returned more than one booklet, this analysis retains the screener item response from the lowest numbered booklet that was returned.[23] The response from the lowest numbered booklet was retained to be as comparable as possible to the response provided in the composite-booklet condition (on the assumption that the individual who completed the "first" individual booklet was the most similar to the individual who completed the "first" part of the composite-booklet questionnaire, which was the part that included the screener items).[24]

Just over one-fifth of households reported not having any household members in the target age range in response to the first screener item, and an additional 3 percent of the households that responded to the second item indicated that none of the household members in the target age range were no longer enrolled in high school (table 3.1; see appendix A for the exact wording and presentation of the screener items). Most respondents indicated that either one or two eligible individuals lived in the household. There was not a measurable difference in the responses to the first screener item by booklet condition; however, in response to the second screener item, a significantly greater percentage of composite-

[22] Technically, it was possible for composite-booklet households to return more than one booklet and thus more than one set of screener items. For example, they could have returned the booklet from more than one mailing, with part of the household responding to each mailing. However, this was very uncommon, with only 2 percent of composite-booklet households returning more than one survey booklet.
[23] In the individual-booklet condition the three booklets that were sent to each household were numbered 1 through 3.
[24] However, it should be noted that it was relatively common for household members from individual-booklet households to report screener information that was inconsistent with other members of their household. See sections 3.2 through 3.4 for information about the quality of the screener item responses.

booklet respondents reported one eligible household member, while a significantly greater percentage of individual-booklet respondents reported three eligible household members. As noted in chapter 2, this distribution differs from that shown in table 2.3 due to the extent of editing that occurred to these original survey responses (table 2.3 shows the distribution of the final number of eligible adults determined to be in each household after the editing was complete). Additional details about the reasons for this editing are providing later in this chapter.

Table 3.1. Percentage distribution of responses to screener items, by item, booklet condition, and number of eligible adults: 2013

Number of eligible adults	First screener item			Second screener item		
	Overall	Composite booklet	Individual booklet	Overall	Composite booklet	Individual booklet
0	21.3	22.8	19.9	3.0	2.8	3.2
1	26.0	27.1	25.0	29.9	32.1	28.1*
2	36.2	34.9	37.3	52.3	53.0	51.8
3	11.1	10.1	12.0	11.2	9.0	13.0*
4+	5.4	5.1	5.7	3.5	3.1	3.9

* Significantly different ($p < .05$) from the composite-booklet condition.
NOTE: The figures in this table are household-level base-weighted estimates. These estimates represent the proportion of responding households that provided a response to each screener item. When more than one questionnaire booklet was returned by a household in the individual-booklet condition, this analysis retained the response from the lowest numbered questionnaire booklet. Respondents who did not answer the question were excluded from the analysis. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

3.2 Household-Level Item Nonresponse

Sections 3.2 through 3.4 examine the quality of the responses received for the screener items.[25] This particular section of the chapter examines the frequency of household-level nonresponse to the screener items. The primary outcome of interest is the percentage of households missing a response to the second screener item; this is the item that should indicate the number of eligible adults living in the household. The percentage of households missing a response to the first screener item, and to both screener items, is also examined.

Households were considered to have household-level item nonresponse if *all* of the returned questionnaire booklets were missing a response to the screener item; if even one returned questionnaire booklet included a screener item response, the household was considered to have responded to the item. This outcome is reported at the household level because the number of eligible adults is a household-level value, and it is sufficient to have a response from one household member even if other responding household members do not provide this information. Statistically significant differences between the booklet conditions were identified using *t* tests.

As shown in table 3.2, 9 percent of households did not provide a response to the first screener item. Composite-booklet households were significantly more likely not to provide a response than were individual-booklet households (15 vs. 2 percent). Twenty-four percent of the households that should have provided a response to the second screener item did not do so, with composite-booklet households significantly more likely than individual-booklet households not to have provided a response (32 vs. 16 percent). Finally, 8 percent of households did not provide a response to either screener item; again, composite-booklet households were significantly more likely not to have provided a response than were individual-booklet households (15 vs. 2 percent), although as noted in table 3.2, the individual-booklet estimate has a high coefficient of variation. Thus, these results support the hypothesis that the individual-booklet condition resulted in a lower rate of household-level item nonresponse than did the composite-booklet condition, likely because individual-booklet households received more than one set of screener items.

[25] The analyses focus on households with at least one eligible, responding adult because these are the households where it was necessary to use the responses to the screener items in the creation of person-level weights.

Table 3.2. Percentage of households with at least one eligible responding adult in which all respondents skipped one or both screener items, by booklet condition and item: 2013

Screener item	Overall	Composite-booklet households	Individual-booklet households
First item, number of household members ages 16–65	8.6	15.1	2.3*
Second item, number of eligible household members (ages 16–65 and no longer in high school)	24.1	32.5	15.8*
Both items	8.4	14.9	2.0!*

* Significantly different ($p < .05$) from composite-booklet households.
! Interpret data with caution. The coefficient of variation (CV) is between 30 and 50 percent.
NOTE: The figures shown in this table are household-level base-weighted estimates. Item nonresponse rates were calculated by dividing the number of households for which all returned questionnaire booklets were missing a screener item response by the number of households that should have provided a response to that screener item.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

3.3 Inconsistent Screener Item Responses

Two types of inconsistencies were considered. The first was the frequency with which individual-booklet respondents from the same household provided inconsistent responses to the screener items. The second was the frequency with which respondents reported fewer eligible household members than the number of eligible, complete sets of topical items returned from that household.

3.3.1 Within-Household Inconsistency

The outcome of interest was the frequency with which individual-booklet households that returned at least two questionnaire booklets provided responses that were not the same. Respondents who skipped the item when other household members provided responses were not considered to have provided inconsistent responses. Overall, 6 percent of the individual-booklet households that provided at least two questionnaire booklets reported inconsistent information to the first screener item, 6 percent reported inconsistent information to the second item, and 4 percent reported inconsistent information for both screener items (table 3.3).

Table 3.3. Rate of within-household inconsistency in screener information in individual-booklet households that returned at least two eligible, complete sets of topical item responses, by number of eligible questionnaires returned and screener item: 2013

Screener item	Overall	Number of eligible questionnaire booklets returned	
		2	3+
First item, number of household members ages 16–65	6.2	3.9	13.1*
Second item, number of eligible household members (ages 16–65 and no longer in high school)	6.3	4.0	13.3*
Both items	3.8	1.7	9.9*

* Significantly different ($p < .05$) from households that returned 2 eligible questionnaire booklets.
NOTE: Figures represent household-level base weighted estimates. Inconsistency rates were calculated by dividing the number of individual-booklet households with at least two questionnaire booklets returned in which at least two of the provided screener item responses were inconsistent by the number of households that responded to the survey.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

To determine whether the rate of inconsistency differed significantly by the number of questionnaire booklets returned by the household (2 questionnaire booklets vs. 3 or more questionnaire booklets), *t* tests were performed. The number of questionnaire booklets returned was a significant predictor of inconsistent within-household reporting in the individual-booklet condition for the first screener item, the second item, and both items combined. For example, 2 percent of the households that returned two questionnaire booklets provided inconsistent responses for both screener items, compared to 10 percent of the households that returned at least three questionnaire booklets.

3.3.2 Inconsistency with Number of Eligible Questionnaires Returned

The second inconsistency indicator that was analyzed was the frequency with which respondents reported a smaller number of eligible household members than the number of eligible, complete sets of topical item responses returned for the household.[26] This outcome suggests that the response to the screener item may be inaccurate. As shown in table 3.4, 8 percent of responses to the second screener item were smaller than the number of eligible, complete sets of topical item responses returned from the respondent's household.[27] A *t* test was performed to determine whether the prevalence of this outcome differed significantly by booklet condition. Individual-booklet condition responses were significantly more likely than composite-booklet condition responses to report a smaller number of eligible household members than the number of eligible, complete sets of topical item responses returned (9 vs. 6 percent).

Table 3.4. Percentage of screener item responses for which the reported number of eligible adults was less than the number of eligible, complete sets of topical item responses returned, by booklet condition: 2013

	Overall	Composite- booklet households	Individual-booklet households
Inconsistency in number of sets of eligible, complete topical item responses returned	7.9	5.6	9.0*

* Significantly different ($p < .05$) from composite-booklet households.
NOTE: Figures represent person-level base weighted estimates. Inconsistency rates were calculated by dividing the number of responses in which the response to the second screener item was smaller than the number of eligible, complete sets of topical items returned from the respondent's household by the total number of responses to the screener item.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

[26] It is possible that some households thought that all three set of topical item responses should be completed and returned even if there were less than three eligible adults living in the household.
[27] The screener items determined the number of eligible household members based on age and current high school enrollment. The eligibility of each returned set of topical item responses was determined based on self-reported age in the topical items. However, the NATES topical items did not include an item that assessed whether the respondent was currently enrolled in high school. As a result, it is possible that some of the returned sets of topical items are in fact ineligible due to the respondent still being in high school. This would make some of the reported values more plausible in comparison to the number of eligible, complete sets of topical item responses returned. However, it is anticipated that this is the case for quite a small percentage of responding households as current high school enrollment is likely restricted to a very small portion of the target age range.

3.4 Editing of Screener Item Responses

The final outcome of interest was the frequency with which any editing had to be done to a household's screener item responses; this is a composite indicator that takes into account the need for editing due to both item nonresponse and poor response quality. As shown in table 3.5, 30 percent of households' screener item responses required editing. To determine whether the editing rate differed significantly by booklet condition, *t* tests were performed. Composite-booklet households were significantly more likely to require screener item response editing than were individual-booklet households (36 vs. 24 percent).

Two types of editing were considered. The first was the editing that was required due to the household having provided incomplete screener item information. A household was considered to have provided incomplete screener item information if it did not provide at least one response to each of the screener items that it was asked to answer: more specifically, if all household respondents (1) skipped both screener items or (2) skipped the second screener item after providing a response greater than zero to the first screener item (providing a response of zero to the first screener item triggers a valid skip over the second item). Incomplete screener information was the driver of most of the screener editing and was required for 24 percent of households. As anticipated, composite-booklet households were significantly more likely than individual-booklet households to suffer from incomplete screener item information (33 vs. 16 percent).

The second type of editing was due to the responses provided to the screener items appearing to be of questionable accuracy. A household was considered to have provided responses of questionable accuracy if at least one household member provided a response to the second screener item that was different from the final value for the number of eligible household members that was assigned to that household. Typical reasons for differences between the reported response and the final assigned value for the household include the two response quality measures discussed above (fewer eligible household members reported than the number of eligible, complete questionnaires returned; within-household inconsistency in reports). Editing due to screener item responses of questionable accuracy was required for 6 percent of households and was less common than editing due to incomplete screener item information, which was required for 24 percent of households. As anticipated, individual-booklet households were significantly more likely than composite-booklet households to provide responses of questionable accuracy (8 vs. 4 percent).

Table 3.5. Percentage of responding households in which screener item responses required editing, by booklet condition and reason for editing: 2013

Reason for editing	Overall	Composite-booklet households	Individual-booklet households
Total	30.1	36.1	24.3*
Due to incomplete screener item response	24.1	32.5	15.8*
Due to questionable responses	6.0	3.5	8.5*

* Significantly different ($p < .05$) from composite-booklet households.

NOTE: Figures represent household-level base-weighted estimates. The editing rate due to incomplete screener item response was calculated by dividing the number of households that did not provide at least one response to each of the screener items that it was asked to answer by the number of households that responded to the survey. The editing rate due to questionable responses was calculated by dividing the number of households in which at least one respondent's reported number of eligible household members differed from the final estimated number of eligible adults by the number of households that responded to the survey. The total editing rate is equal to the number of households that required either of these types of editing divided by the number of households that responded to the survey.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

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CHAPTER 4: COMPOSITE-BOOKLET VERSUS INDIVIDUAL-BOOKLETS EXPERIMENT

This chapter discusses the results of an experiment in which households were randomly assigned to one of two different methods of presenting the mailed survey booklets. Among households with frame information about the number of adults living in them, 89 percent had 1 to 3 adults. As a result, it was decided that the most efficient design for attempting to survey all of the adults in the sampled households was for three sets of topical items to be sent to each household, along with instructions as to how larger households could request additional sets.

This design decision raised the question of how best to send multiple identical sets of items to the same household: Should they be mailed as several, individual booklets or as a single, composite booklet? Sending one booklet has the advantage of only requiring the household to keep track of one item to return. But it also has the potential disadvantages of requiring coordination among household members to fill it out one at a time and of being more complicated to navigate overall. On the other hand, sending multiple booklets increases the chance that at least one might be lost and makes it difficult to collect a single screener item response for the household. But it also has the advantage of being easier for each individual household member to complete at their convenience.

However, little to no prior research exists on the ideal method for delivering multiple sets of identical items to a single household. As a result, an experiment was included in NATES that randomly assigned sampled addresses to one of two conditions: (1) an individual-booklet condition, in which three separate, identical survey forms were sent to the household or (2) a composite-booklet condition, in which all three sets of topical items were combined into a single booklet.

4.1 Impact of Booklet Format on Unit Response

It was hypothesized that the composite-booklet condition would result in a lower household-level response rate than the individual-booklet condition. Because the composite booklet was so long, it might have appeared more burdensome than the shorter individual booklets and thus inhibited some households from responding. In addition, since all of the materials in the composite-booklet condition were presented in a single booklet, it required a certain amount of coordination among household members to complete the screener items and their respective sets of topical items. In this condition, household members might be more likely to wait for a final household member to respond before returning the booklet and, ultimately, not return it at all. Also, there could be potential concerns about privacy, especially in households composed of unrelated adults. In contrast, it was easier for individual-booklet household members to complete and return the topical items at a time that was convenient for them.

Contrary to this hypothesis, the base-weighted, household-level response rate rounded to 65 percent in both conditions (see table 4.1). A *t* test was performed to determine whether the household-level response rate differed significantly by booklet condition, but it showed no measurable difference.

Table 4.1. Overall response rate of surveyed NATES households and individuals, by booklet condition and response rate: 2013

Response rate	Composite booklet	Individual booklet
Overall	63.9	61.3
Household level	64.7	65.3
Person level	98.8	93.9*

* Significantly different (p <.05) from the composite-booklet condition.
NOTE: The figures shown in this table are household-level base-weighted estimates. The overall response rate is a product of the household- and person-level response rates. The household-level response rate represents the proportion of eligible households that returned at least one questionnaire booklet with at least one item completed. The person-level response rate represents the proportion of eligible adults in responding households that returned a set of topical item responses with at least one key item completed.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

For the same reasons as described earlier for the household-level response rate, it was hypothesized that the composite-booklet condition would lead to a higher person-level response rate than the individual-booklet condition; responding households in the composite-booklet condition would be more likely to return all of their sets of topical items than would those in the individual-booklet condition. The comparative flexibility afforded to individual-booklet respondents would make it more likely that only a subset of the household members would respond. The person-level response rate was 99 percent in the composite-booklet condition and 94 percent in the individual-booklet condition (see table 4.1 above). A *t* test was performed to determine whether the difference between the person-level response rates in the two booklet conditions was significant; it showed that the composite-booklet condition response rate was significantly higher than the response rate for the individual-booklet condition.

However, as discussed in chapter 3, a considerable percentage of households had missing or questionable data for the screener items, particularly in the composite-booklet condition. In the absence of screener item responses, the number of eligible adults (the denominator for the person-level response rate) had to be edited or imputed. At times, due to lack of other available information, the number of eligible, complete sets of topical item responses returned by the household was used as a proxy for the number of eligible adults in the household. This may have inflated the rate of person-level response, particularly for the composite booklet. As a result, the person-level response rate reported here is likely an overestimate, particularly in the composite-booklet condition.

The overall response rate is the product of the household-level response rate and the person-level response rate. The base-weighted overall response rate was 64 percent in the composite-booklet condition and 61 percent in the individual-booklet condition.

4.1.1 Within-Household Response

Due to the greater amount of coordination required of household members in the composite-booklet condition, it was expected that larger households would be less likely to respond in the composite-booklet condition than in the individual-booklet condition. As a result, it was expected that larger households would be less prevalent among composite-booklet condition respondents than among individual-booklet respondents. Table 4.2 shows the distribution of the number of eligible adults in each responding household by booklet condition. Overall, a significantly smaller percentage of the responding composite-booklet households than the responding individual-booklet households had 3 eligible adults or 4 or more eligible adults. Restricting the analysis to households with at least one eligible adult replicates this result, and also shows that a significantly greater proportion of the responding composite-booklet households than the responding individual-booklet households had one eligible household member. As discussed in chapter 2, NATES overrepresented smaller households (1 or 2 eligible adults) and underrepresented larger ones (3 or more eligible adults); the comparison presented in table 4.2 suggests that the individual-booklet estimates were more similar to CPS estimates of the number of eligible adults per household (shown in table 2.3) than were the composite-booklet estimates.

Table 4.2. Percentage distribution of responding households, by booklet condition and number of eligible adults: 2013

Number of eligible adults	Overall		With at least one eligible adult	
	Composite booklet	Individual booklet	Composite booklet	Individual booklet
0	16.8	16.0	†	†
1	32.1	29.0	38.6	34.5*
2	40.4	40.1	48.5	47.7
3	9.3	12.4*	11.1	14.7*
4+	1.5	2.5*	1.8	3.0*

† Not applicable.
* Significantly different ($p < .05$) from the composite-booklet condition.
NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates represent the proportion of responding households that had the number of eligible adults shown. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

There was not expected to be a significant difference in the number of eligible, complete sets of topical item responses returned per household by booklet condition. Responding composite-booklet households were expected to be more likely than responding individual-booklet households to have all eligible household members respond (which would result in a greater number of sets of topical item responses returned per household). However, the effect was expected to be canceled out due to fewer large households responding in the composite-booklet condition than in the individual-booklet (resulting in a smaller number of sets of topical items returned per household). The distribution of the number of eligible, complete sets of topical item responses returned by households with at least one eligible adult was calculated by booklet condition; the statistical significance of any differences found by booklet condition was evaluated by performing *t* tests. Most households in both conditions returned either one or two sets of topical item responses (nearly 90 percent in each condition), and there were no measurable differences between the composite- and individual-booklet conditions (see table D.5 in appendix D).

Within multi-adult households, the percentage of responding households in which all eligible household members responded was expected to be higher in the composite-booklet condition than in the individual-booklet condition. Limiting the analysis to households in which it was determined that there was at least one eligible adult, responding composite-booklet households were significantly more likely to have a response for all eligible adults in the household than were individual-booklet households, as anticipated. As shown in table 4.3, all eligible adults responded in 92 percent of the composite-booklet households, compared to 88 percent in the individual-booklet households. However, as mentioned earlier, due to the extent of missing or questionable data for the screener items, the number of eligible adults often had to be estimated – at times using the number of returned eligible, complete sets of topical item responses as a proxy measure due to a lack of other available data – and, as a result, the extent of complete within-household response is likely overreported here, particularly for composite booklet households.

Table 4.3. Percentage of responding households with at least one eligible adult, by booklet condition, proportion of eligible adults who responded, and number of eligible adults in household: 2013

Total number of eligible adults in household	Composite booklet		Individual booklet	
	All eligible adults responded	Some eligible adults responded	All eligible adults responded	Some eligible adults responded
Overall	92.3	7.7	88.3*	11.7*
1	100.0	0.0	100.0	0.0
2	96.6	3.4	93.5*	6.5*
3	92.3	7.7	86.4*	13.6*
4+	10.1!	89.9	20.5	79.5

! Interpret data with caution. The coefficient of variation (CV) is between 30 and 50 percent.
* Significantly different ($p < .05$) from the composite-booklet condition.
NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates show the proportion of responding households with at least one eligible adult by whether all or some of the eligible adults responded. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Finally, an analysis was performed to evaluate whether there were statistically significant differences in the percentage of households with all eligible adults responding in each booklet condition by the number of eligible adults in the household (table 4.3). This analysis found that, for both 2-adult and 3-adult households, households in the composite-booklet condition were significantly more likely to have all eligible adults respond than were households in the individual-booklet condition (97 vs. 94 percent and 92 vs. 86 percent, respectively). When the number of household members went above the number of questionnaires provided (four or more adults in the household), the direction of the pattern reversed (10 percent in the composite-booklet condition vs. 21 percent in the individual booklet condition), but the difference was no longer measurable. However, the magnitude of the difference was quite large (11 percentage points), suggesting that the lack of a measurable difference may be due to insufficient power; as noted in chapter 2, only 2 percent of responding households had four or more adults living in them.

4.2 Impact of Booklet Format on Sample Representativeness

As the individual-booklet condition resulted in greater person-level nonresponse, it was expected that a smaller proportion of its respondents would be the types of individuals who are commonly found to be underrepresented in surveys: those with less education or income, younger adults, males, and non-Whites. These demographic biases were also expected to lead to lower reports of work training and experience in the individual-booklet condition than in the composite-booklet condition. The same three methods reported in chapter 2 were used to evaluate the relative representativeness of the respondents in each booklet condition: comparison of frame-provided household-level characteristics of the respondents with those of the overall sample; comparison of person-level self-reported characteristics of the respondents with a "gold standard" high-response-rate survey; and comparison of key NATES estimates with a prior administration of these items.

First, frequency distributions were calculated by booklet condition for each of the 14 available household-level frame variables (see table D.6 in appendix D); *t* tests were performed to identify statistically significant differences between the full sample and the respondents in each experimental condition. The prevalence of subgroups was not measurably different in the two experimental groups, with two exceptions: the head of household in responding composite-booklet households was significantly less likely than the head of household in responding individual-booklet households to be married (51 percent vs. 56 percent), and households that were missing head-of-household marital status were significantly more prevalent in the composite-booklet condition than in the individual-booklet condition (29 percent vs. 25 percent). Overall, this indicates that the booklet condition had little impact on the characteristics of the responding households. Significant differences for 1 of 14 variables is an outcome that could occur by chance; in terms of the potential for nonresponse bias, marital status is not expected to be associated with any of the key estimates of interest.

Comparing the respondents in each booklet condition to the full sample produced almost the same results as when the full respondent group was compared to the full sample (see section 2.2), further suggesting that the extent of any bias as measured by household-level variables available in the frame) is roughly the same in the two groups.[28]

Next, the same five self-reported respondent demographic characteristics as reported in chapter 2 were compared in the composite-booklet and individual-booklet conditions. There were no measurable differences by booklet condition in the prevalence of any particular characteristic (see table D.7 in appendix D). This again suggests that booklet format did not have an influence on the characteristics of the individuals who responded to the survey request. Comparing each of the booklet conditions to the "gold standard" high-response CPS shows that the results are almost the same as when the full sample was compared to the CPS (see section 2.2); in both conditions, the following groups are underrepresented: males; younger adults; black, non-Hispanics and Hispanics; and those with less education.[29]

Finally, responses to the seven key survey items reported in chapter 2 were calculated for respondents in the composite- and individual-booklets conditions and compared using *t* tests. There were no measurable differences between the key survey estimates by booklet condition (see table D.8 in appendix D). This result is consistent with the findings presented above; the booklet format appears to have had little impact on sample composition. For the three items that were also included in the ATES pilot study, the estimates for each NATES booklet condition were compared to the ATES estimates (educational attainment, having a certification or license, having an educational certificate). Consistent with the results presented in chapter 2, the NATES respondents in each booklet condition reported being more educated than did ATES respondents and there was not a measurable difference for the certificate item between the NATES composite- or individual-booklet estimate and the ATES estimate. However, in contrast with the results presented in chapter 2, NATES respondents in the individual-booklet condition were significantly less likely to report having a certification than were ATES pilot study respondents (28 percent vs. 32 percent) (but there was not a measurable difference between the NATES composite-booklet estimate (30 percent) and the ATES estimate).

4.3 Impact of Booklet Format on Response Quality

It was hypothesized that the composite booklet would yield lower quality data because it would be harder for respondents to navigate the longer form. The outcomes of interest are item nonresponse and skip errors for key survey items; *t* tests were performed to determine statistical significance. For both of these outcomes, there was not a measurable difference between the composite- and individual-booklet conditions for any of the seven key items (see tables D.9 and D.10 in appendix D). This suggests that there was not a meaningful difference in the quality of the responses obtained in the two booklet conditions.

[28] The exception to this conclusion was that four subgroups that had been underrepresented in the full respondent group were significantly underrepresented only among individual-booklet condition respondents: households whose income is $10,001–$20,000, households for which the head of the household is Black, households that include only one adult, and households located in the South. Three subgroups that had been underrepresented in the full respondent group were significantly underrepresented only among composite-booklet respondents: households whose income was $10,000 or less, households that receive mail at a P.O. box, and households missing dwelling-type information.

[29] There are, however, a few exceptions. In both conditions, there is no longer a measurable difference between the percentage of the sample and respondents whose educational attainment is some college. However, the magnitude of the difference is consistent with the full sample analysis, suggesting that the lack of a measurable difference may be due to a lack of power to detect statistically significant differences because there are fewer cases included in the analysis when each booklet condition is analyzed separately (as compared to the chapter 2 analysis that combined both booklet conditions into a single group). In addition, in the composite-booklet condition, there is no longer a measurable difference between the percentage of the sample and respondents whose household income was less than $30,000, but those whose household income was $30,000–$75,000 were underrepresented. Finally, in the individual-booklet condition, adults ages 35–44 also were underrepresented (compared to just adults ages 18–34 in the full sample).

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CHAPTER 5: SUMMARY AND CONSIDERATIONS FOR THE FUTURE

The purpose of this report is to document outcomes of the single-phase, all-adults mailing design used in the 2013 NATES pilot study in order to evaluate its strengths and weaknesses and to identify important considerations for survey researchers using this approach in the future. NATES was the second of three pilot studies aimed at developing improved measures of the attainment of non-degree, work-related educational credentials and training among U.S. adults—and the first to attempt to collect this information via mail. Sampled households were requested to provide both household screener information and topical survey responses in a single phase of response. As part of this request, they were asked to determine which household members were eligible for the survey and have each of them complete a set of topical items. The survey also included an experiment aimed at determining the optimal format for presenting the survey booklets in this type of survey administration.

There are several potential benefits of using a single-phase, all-adults design. This design has the potential to be more efficient than a single-phase design in which a single household member is sampled. First, while requesting two separate phases of response from sampled households may suppress response, limiting the survey to a single phase instead may increase the overall response rate. This is especially worthwhile in a survey such as NATES, where most sampled households are expected to have at least one eligible household member, reducing the need for a separate screener phase. In addition, receiving multiple responses from a household may be more efficient because it allows the researcher to sample and send survey materials to fewer households.

However, there are also potential drawbacks to a single-phase, all-adults design. First, the single-phase gains in the overall response rate may be offset by decreases in response due to the greater burden implied by an all-adults design. Second, a single-phase design places the responsibility for identification of eligible household members in the hands of the sample members (as opposed to a two-phase design where the researcher retains greater control), which prior research suggests may be difficult and burdensome for sample members to implement accurately. Finally, if the all-adults design simply brings into the sample more of the same kinds of individuals that already would have participated had only one individual per household been selected, then this may reduce the intended gains in efficiency.

5.1 Findings

Response Rate, Representativeness, and Response Quality

In Chapter 2, the response rate, representativeness, and response quality were evaluated to determine the viability of using a single-phase, all-adults design in future surveys.

Overall response rate: The overall response rate was 63 percent in the single-phase, all-adults NATES and 58 percent in the two-phase NHES:2012.

Household-level response rate: The NATES household-level response rate was 65 percent in NATES and 74 percent in the two-phase NHES:2012. This is consistent with the expected direction of the relationship between the household-level response rates in the two surveys. There are several potential explanations for the lower NATES household-level response rate:

- First, receiving a large initial survey packet in a single-phase, all-adults design may inhibit some households from responding, particularly larger households. Comparison to the March 2013 CPS suggests that NATES overrepresented smaller households (with 1 or 2 adults) and underrepresented larger ones (with 3 or more adults).
- In addition, a single-phase design requires making clear the survey's target population from the start of the survey; this may lead households lacking such individuals not to respond because they feel the survey is not applicable to them. However, there was not a measurable difference between the NATES' and March 2013 CPS' estimates of the percentage of households with no eligible adults living in them.

- An all-adults, single-phase design also may increase the prevalence of household-level "all or nothing" response situations, whereby households respond only if all of the eligible respondents from the household have completed the survey. Ninety percent of the responding NATES households had all of their eligible household members respond, though, as noted previously, this may be an overestimate due to the extent of editing and imputation that needed to be done to determine the number of eligible household members.

Person-level response rate: The person-level response rate was 96 percent in NATES and in the high seventies in NHES:2012 (79 percent for the Early Childhood Program Participation survey (ECPP) and 78 percent for the Parent and Family Involvement in Education survey (PFI)). This is consistent with the expected direction of the relationship between the person-level response rates in the two surveys. However, the NATES person-level response rate may be falsely inflated due to the need to impute the number of eligible adults using the number of sets of complete, eligible topical items returned for some cases.

- Within-household nonresponse was significantly more common in larger households than in smaller ones. In particular, the rate of within-household nonresponse jumped dramatically when the number of adults in the household was greater than the number of questionnaires provided in the NATES mailing packet, with 84 percent of households with four or more adults having some person-level nonresponse compared to only 11 percent of three-adult households and 5 percent of two-adult households.
- Consistency in within-household responses to key survey items suggests a reduction in the potential efficiency that can be gained by sending multiple sets of topical items to each household because these additional topical item responses are simply bringing more of the same types of people into the respondent pool as would have responded had only one topical response been collected per household. Among those households that returned two or more questionnaires, it was quite common for all of the household members to report identical responses to key survey items. Respondents from the same household were particularly likely to provide identical responses for race/ethnicity, which is potentially troublesome because it may increase the overrepresentation of White, non-Hispanics.

Representativeness: NATES underrepresented the same groups that have been found to be underrepresented in previous single-phase administrations and in survey research more broadly, such as non-Whites, males, younger adults, and those with less education.

- Both a comparison of sampled and responding households on household-level frame variables and a comparison of respondent-reported characteristics to the "gold standard" CPS found significant differences that were largely consistent with what has been observed in prior surveys.
- Comparison of the NATES estimates to those from the sole prior ATES administration completed at the time this report was written found that NATES overrepresented more educated respondents compared to the ATES pilot. However, there was no measurable difference for the other two NATES estimates that could be compared to those from the sole prior ATES administration (having a certification or a certificate), suggesting that for these items, at the least, any bias in the NATES estimates is no worse than what was observed in that initial test administration.
- In addition to person-level nonresponse follow-up to improve sample representativeness in future administrations, targeted household-level nonresponse follow-up aimed at reducing the biases seen in NATES may be a useful strategy for future surveys.

Response quality: Poor response quality was not a major concern for NATES.

- Though it was hypothesized (in section 2.3) that the all-adults design might bring in more reluctant respondents who would provide lower quality data and that the item composite booklet might be harder to navigate, the rates of item nonresponse skip and of skip errors of omission were quite low (1 to 3 percent for item nonresponse, 2 to 5 percent for skip errors).

- However, future research should test these outcomes specifically among respondents with lower levels of educational attainment or literacy to ensure that there is not differential response quality by these characteristics, which could lead to bias in the survey estimates.

Screener-Item Results

The results of the single-phase, all-adults design with respect to the data collected in the survey screener items were presented in Chapter 3.

Screener item responses: Households without any eligible individuals still often returned the completed screener. This is an encouraging result, since a potential negative of single-phase designs is the need for the researcher to divulge the target population at the same time as the screener items are asked

- Overall, just over one-fifth of the responding households indicated in response to the first screener item that there were no eligible household members. An additional 3 percent of the households that responded to the second item indicated that none of the household members in the target age range were eligible for NATES (which requires being no longer enrolled in high school). Most households reported having one or two eligible adults.
- Larger households may have been less likely to respond in the composite-booklet condition because they were waiting for additional household members to complete the rest of the booklet, while larger household individual-booklet respondents may have felt freer to return the survey package without all of the individual questionnaires having been completed. A comparison of the response distribution by booklet condition indicated that composite-booklet respondents were more likely than individual-booklet respondents to report that there was a single eligible household member in response to the second screener item, while individual-booklet respondents were more likely to report that there were three eligible household members.

Household-level item nonresponse to screener items: Nonresponse to the screener items was an issue in NATES.

- There was extensive nonresponse to the second, key screener item, with about a quarter of the households that should have responded to this item not having done so. In 8 percent of responding households, none of the returned questionnaire booklets had a response to either of the screener items.
- One possible explanation for the high level of nonresponse to the second item is that many respondents may have felt that it violated the Gricean maxim of quantity, which suggests that participants in social interactions—of which Bradburn and colleagues suggest surveys are a special case—will not make repetitive statements or requests within an interaction (Bradburn, Sudman, and Wanisk 2004). As most adults ages 16-65 would not be currently enrolled in high school, many respondents may have seen the first and second items as asking the same question and may have felt that it was not necessary to respond to the second request for this information. However, the fact that both of these items likely are asking the same thing for most households also means that the information provided for the first item—which had a lower rate of household-level nonresponse (9 percent)—was likely often a valid proxy for the missing responses to the second item.
- Screener item nonresponse was significantly less prevalent in the individual-booklet condition than in the composite-booklet condition, suggesting that providing multiple sets of screener items may be a viable strategy for reducing household-level item nonresponse to both items. As a result, if a composite booklet were to be used in future surveys, it could be worthwhile to include a set of screener items at the beginning of each questionnaire in order to reduce household-level item nonresponse. Nevertheless, nearly one in seven individual-booklet households that should have responded to the second screener item did not do so, suggesting that sending multiple sets of screener items to a household is not sufficient to eliminate the nonresponse problem in the context of the current screener item wording and presentation.

Quality of screener item responses: Providing responses of questionable accuracy was less frequently an issue than was item nonresponse.

- Among individual-booklet households that returned more than one questionnaire booklet, 6 percent provided inconsistent responses to either the first or second item. The rate of inconsistent within-household responding to the screener items was significantly greater when three or more questionnaire booklets were returned than when only two questionnaire booklets were returned. This pattern may be due to differences in household composition by household size. For example, for some households with more than two adults, it may be less clear whether the household count should include some of these adults, such as college students or tenants who live at the house during the workweek but return to their family home on the weekend.
- In addition, 8 percent of respondents in either condition provided a screener item response that suggested fewer eligible adults lived in the household than the number of eligible, complete sets of topical item responses returned from that same household. This outcome was significantly more common among individual-booklet respondents than it was among composite-booklet respondents.
- This suggests that allowing multiple screener item responses from a single household (as in the individual-booklet condition) may lead to an influx of lower quality responses than would be received if only one household member provided a response (as in the composite-booklet condition). However, responses of questionable accuracy were common enough in the composite-booklet condition to suggest that respondents in both conditions either may not have read the screener items very carefully or may not have understood what was asked.

Composite screener response quality indicator: Finally, a composite indicator that took into account the need for the editing of screener item responses due to both item nonresponse and poor response quality indicated that such editing was required for 30 percent of households.

- Incomplete screener item information was the main driver of the need for editing in both conditions. Incomplete screener item information was significantly more common in composite-booklet households than in individual-booklet households, and responses of questionable quality were significantly more common in individual-booklet households than in composite-booklet households.
- Since there often is not an unambiguous "right" answer when editing the screener item responses, this substantial need for editing may have had a negative effect on the accuracy of the person-level response rates and weights.

Composite-Booklet Versus Individual-Booklets Experiment

In Chapter 4, the results of an experiment in which households were randomly assigned to receive the three sets of topical items either in a single, composite booklet or as multiple, individual booklets were presented to evaluate which booklet format would be preferable to use in future surveys.

Overall response rate by booklet condition: The overall response rate was 64 percent in the composite-booklet condition and 61 percent in the individual-booklet condition.

Household-level response rate by booklet condition: The household-level response rates were not measurably different in the two conditions (65 percent in both).

- The composite-booklet condition seems to have reduced response among larger households, likely due to the greater need for coordination among household members in this condition; the composite-booklet households that responded were significantly more likely than the individual-booklet households that responded to have only one eligible household member, while the responding individual-booklet households were significantly more likely to have three or more eligible household members. There was not a measurable difference in the number of questionnaires returned per household in the two groups.
- *Person-level response rate by booklet condition:* The individual-booklet condition had a higher person-level response rate than the composite-booklet condition (99 vs. 94 percent). The composite-booklet households that responded to the survey were significantly more likely than the responding individual-booklet households to

have all eligible household members respond to the survey. Looking at this outcome by the number of eligible adults in the household showed that the significant difference by booklet condition held for smaller households (2- and 3-adult households), but not in households with 4 or more adults, although this lack of a measurable difference by booklet condition may be due to a lack of power to detect statistically significant differences because of the relatively small number of households in each condition with 4 or more adults.

Representativeness by booklet condition: Even though there was greater person-level nonresponse in the individual-booklet condition, booklet format led to few measurable differences in sample representativeness (with the sole exception being for marital status of the head of household), as measured by household- or individual-level characteristics of the respondents or the responses received for key items, suggesting that bias was no worse under one condition or the other.

Response quality by booklet condition: Overall, booklet format did not have a significant effect on response quality. There were no measurable differences between the two conditions in the prevalence of item nonresponse or skip errors for seven key items.

Based on the results presented in chapters 3 and 4, there is not a clear answer as to which booklet format would be preferable to use in future surveys. The two experimental conditions had similar results for almost all of the explored outcomes, with two exceptions.

- The first was that the person-level response rate was higher in the composite-booklet condition (99 percent) than it was in the individual-booklet condition (94 percent).
- The second was that composite-booklet households were significantly more likely than individual-booklet households to require editing of their screener item responses (36 vs. 24 percent). However, this result is likely a function of the large amount of missing and questionable data arising from the screener items, particularly in the composite-booklet condition, which led to the use of the number of complete, eligible sets of topical item responses returned as a proxy for the number of eligible household members for some cases – and likely to an inflated person-level response rate, particularly in the composite-booklet condition.

5.2 Limitations

A few potential limitations of this study should be noted.

Limitation 1: *A lack of an experimental comparison for the single-phase, all-adults design.* Chapter 2 reports on data quality outcomes of the single-phase, all-adults survey design used in NATES. Whenever possible, these outcomes are evaluated in relation to other single-phase or all-adult mail surveys as an attempt to assess how well NATES performed compared to other surveys that used similar designs. In addition, these outcomes often are evaluated in relation to findings from the survey literature more broadly, in an effort to explore more generally how well the NATES design performed. There is no perfectly equivalent survey to NATES for drawing comparisons. Nonetheless, because comparative information is useful for understanding how well the NATES methodology worked, we have included comparisons to surveys that share many of the same design and measurement features as NATES. However, it is important to note that any comparisons to other surveys that are presented in this report are not experimental in nature and there are additional differences between NATES and the other surveys referenced, such as mode of administration, design, sponsor, or topic that may also be drivers of any differences in the survey outcomes.

Limitation 2: *A high level of screener item nonresponse and responses of questionable accuracy, which was resolved in some cases by using the number of returned, eligible questionnaires to estimate the number of eligible household members.* Given the relatively high rate of item nonresponse and responses of questionable accuracy for the screener items, it often was necessary to estimate the number of eligible adults present in the responding households. In the absence of other available data, the number of complete, eligible sets of topical item responses returned was used for this estimate in some cases. Because of the way the study was designed and conducted this was determined to be the best option for these cases; however, this also means that the number of eligible household members may be underestimated and the extent of person-level response artificially inflated. In the absence of validation data or an external benchmark, it is difficult to know the accuracy of

these estimates. Having accurate information about the number of eligible adults in the household is important for calculating person-level weights and the person-level response rate. This inability to directly assess the quality of the estimates of households makes it difficult to know whether, for example, this is a true difference in the person-level response rate or if it is an artifact of the higher screener item missing rate in the composite-booklet condition and the greater need to estimate the number of eligible adults in composite-booklet households.

5.3 Considerations for Future Single-Phase, All-Adults Surveys

This final section of this chapter discusses five considerations for any future single-phase all-adults surveys that should be taken into account by survey researchers thinking about using a similar design. Most importantly, the priority would be to revise the screener items to reduce item nonresponse and improve response quality.

Consideration 1: *Revise and test screener items and instructions.* Having accurate responses to the screener items is critical for ensuring that the weights and response rates are calculated correctly. There was considerable item nonresponse to the NATES screener items, as well as a relatively high prevalence of responses of questionable quality. To improve the quality of responses, cognitive interviews could be conducted to try to identify key points of respondent confusion with the wording and presentation of the current items, and the screener items could then be modified to resolve these areas of confusion. Researchers should consider revising and testing the screener items and associated instructions used in NATES prior to any future surveys using this design to make it as clear as possible to respondents that accurate responses to these items are just as critical to the survey's success as are responses to the topical items. Several revisions could be considered to reduce nonresponse to such items. First, the page including the screener items could be formatted to look more similar to the other survey items to increase the likelihood that respondents will understand that these are important survey items—and not just an introductory, instructional page. In addition, the formatting and wording of skip instructions could be updated to reflect current NHES practices (for example, by including arrows and instructions both for respondents who should proceed to the next item and those who should not). Finally, the items could be revised to reduce redundancy.

As elaborated below, instead of using a two-item screener, it could be beneficial to use a more thorough set of screener items that would make it easier to determine the true number of eligible adults living in the household. In addition, to maximize the household-level response rate, revisions to the instructional text on the screener page could be considered to make it as clear as possible that households should complete the screener page even if there are no eligible adults living in the household—for example, by stating this at the top of that page and by removing topic-related references (in this case to work and jobs) that might make individuals who are not eligible think that the request for responses to the screener items does not apply to them.

Consideration 2: *Conduct additional tests of the single-phase, all-adults design that include random assignment to experimental conditions—in particular, to test the relative quality of screener item responses received using an updated version of abbreviated NATES-like screener items against those received from a more thorough household screener.* Because the comparisons between NATES and other surveys presented in this report are not experimental in nature, the report can only indirectly assess the impact of a single-phase, all-adults design on the ATES outcomes. After developing an updated version of NATES-like screener items (per consideration 1), any future testing of this style of screener items and overall survey design could be conducted in the context of an experiment in which sample members are purposefully assigned to experimental conditions. Relevant experimental comparisons include a two-phase, single-adult design (the current NHES approach) and a single-phase design that includes more extensive screener items that are more comparable to those currently used in the NHES two-phase design (for example, completing a grid with basic information about eligible household members or even a full household roster), which could involve either selecting all adults or a single adult from within responding households. Using a more thorough screener could provide additional details about the household composition, making it easier to determine the true number of eligible household members and to make a more informed decision about which screener item responses to retain, even when respondents provide incomplete or questionable responses. This type of experimentation would allow for a more definitive assessment of the relative benefits and tradeoffs of using a single-stage, all-adults design. Such experimentation would ideally be preceded by an

empirical investigation of the relative quality of responses received in the current, longer NHES screener in order to determine which aspects of that design should be retained and which should be modified.

Consideration 3: *Experiment with measures to maximize person-level response.* NATES had a high person-level response rate; however, the validity of this rate is somewhat uncertain due to the high percentage of households for which the number of eligible adults had to be estimated. In addition, it is possible that there are households that achieved partial within-household response that ended up not responding to the survey at all because they felt it was not acceptable to respond without a completed questionnaire for each eligible adult. As a result, it may be worthwhile to experiment with design features that would maximize person-level response. One option would be to conduct within-household nonresponse follow-up by sending additional follow-up materials to households that return a smaller number of sets of topical item responses than the number of eligible adults reported to be living in the household. This effort could be facilitated by the use of a more thorough household screener, which would make it easier to target specific individuals in the household. In addition, making use of the individual-booklet design would provide each household member the maximum flexibility to return his or her topical responses once he or she had completed them. In particular, it could be a useful addition to the literature for future research to aim to determine the impact of within-household nonresponse in larger households on survey estimates.

Consideration 4: *Incorporate design features that would allow for better evaluation of the quality of the screener item responses.* It is unlikely that any future tests of a single-phase, all-adults design would have access to validation data. However, it might be beneficial to incorporate certain design features into future surveys that would help to assess the quality of the screener data. One option would be to have a subset of the sample be a recontact of households that have already responded to the CPS and for which information from the CPS household roster is available about the number of eligible adults living in the household. However, a limitation associated with this approach is that this analysis would be limited to households that are likely more willing to respond to surveys and may not be representative of all survey sample members. A second option would be to conduct a follow-up data collection in an interviewer-administered mode with a subset of respondents; in the follow-up, interviewers could ask additional questions about household composition in order to validate the information provided on the paper questionnaire or to fill in missing data.

Consideration 5: *After determining the optimal design of the screener items, consider conducting additional testing to determine which booklet condition is more efficient.* As mentioned above, overall, neither of the booklet conditions clearly outperformed the other in NATES. Once the issues noted above with the screener items were addressed, future surveys could then return to the question of which booklet format is ideal for use in such a design. Until that time, it may be preferable to use individual booklets, which would allow for the collection of multiple screener item responses (helping to address the high rate of screener item nonresponse), as well as facilitating within-household nonresponse follow-up.

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REFERENCES

Battaglia, M.P., Link, M.W., Frankel, M.R., Osborn, L., and Mokdad, A.H. (2008). An Evaluation of Respondent Selection Methods for Household Mail Surveys. *Public Opinion Quarterly*, *72*(3): 459–469.

Bielick, S., Cronen, S., Stone, C., Montaquila, J., and Roth, S. (2013). *The Adult Training and Education Survey (ATES) Pilot Study Technical Report* (NCES 2013-190). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Blumberg, S.J., and Luke, J.V. (2012). *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July–December 2011*. National Center for Health Statistics. Retrieved June 14, 2014, from http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201206.pdf.

Bradburn, N.M., Sudman, S., and Wanisk, B. (2004). *Asking Questions*. San Francisco, CA: Jossey-Bass.

Brick, J.M., and Williams, D. (2013). Explaining Rising Nonresponse Rates in Cross-Sectional Surveys. *Annals of the American Academy of Political and Social Science, 645*: 36–39.

Brick, J.M., Williams, D., and Montaquila, J.M. (2011). Address-Based Sampling for Subpopulation Surveys. *Public Opinion Quarterly*, *75*(3): 409–428.

Collins, R.L., Ellickson, P.L., Hays, R.D., and McCaffrey, D.F. (2000). Effects of Incentive Size and Timing on Response Rates to a Follow-up Wave of a Longitudinal Mailed Survey. *Evaluation Review, 24*(4): 437–463.

Curtin, R., Presser, S., and Singer, E. (2005). Changes in Telephone Survey Nonresponse Over the Past Quarter Century. *Public Opinion Quarterly*, *69*(1): 87–98.

Dillman, D.A. (1978). *Mail and Telephone Surveys: The Total Design Method*. New York: John Wiley.

English, N., Li, Y., Mayfield, A., and Frasier, A. (2014). *The Use of Targeted Lists to Enhance Sampling Efficiency in Address-Based Sample Designs: Age, Race, and Other Qualities*. Proceedings of the Survey Research Methods Section of the American Statistical Association, Boston, MA, pp. 50–55.

Fricker, S. and Tourangeau, R. (2010). Examining the Relationship Between Nonresponse Propensity and Data Quality in Two National Household Surveys. *Public Opinion Quarterly*, *74*(5): 934–955.

Gallagher, P.M., Fowler Jr., F.J., and Stringfellow, V.L. (1999). Respondent Selection by Mail: Obtaining Probability Samples of Health Plan Enrollees. *Medical Care, 37*(3): MS50–MS58.

Groves, R.M. (2006). Nonresponse Rates and Nonresponse Bias in Household Surveys. *Public Opinion Quarterly*, *70*(5): 646–675.

Harter, R., Battaglia, M.P., Buskirk, T.D., Dillman, D.A., English, N., Mansour, F., Frankel, M.R., Kennel, T.,

McMichael, J.P., McPhee, C.B., Montaquila, J., Yancey, T., and Zukerberg, A.L. (2016). *Address-Based Sampling*. American Association for Public Opinion Research Task Force Report.

Iannacchione, V.G. (2011). The Changing Role of Address-Based Sampling in Survey Research. *Public Opinion Quarterly*, *75*(3): 556–575.

Jackson, M., and Medway, R. (2017). *NATES:2013 Nonresponse Bias Analysis Report: Evidence from a Nonresponse Follow-up Study* (NCES 2017-012). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Lavrakas, P.J., Stasny, E.A., and Harpuder, B. (2000). *A further Investigation of the Last-Birthday Respondent Selection Method and Within-Unit Coverage Error*. Proceedings of the Survey Research Methods Section of the American Statistical Association, Indianapolis, IN, pp. 890–895.

Lind, K., Link, M., and Oldendick, R. (2000). *A Comparison of the Accuracy of the Last Birthday Versus the Next Birthday Methods for Random Selection of Household Respondents*. Proceedings of the Survey Research Methods Section of the American Statistical Association, Indianapolis, IN, pp. 887–889.

Lofquist, D. Lugalia, T., O'Connell, M., and Feliz, S. (2012). *Households and Families 2010: 2010 Census Briefs* (C2010BR-14). U.S. Department of Commerce. Washington, DC: U.S. Census Bureau.

Mathematica Policy Research. (2011). *Appendix B: Field Test Results*. Retrieved June 28, 2014, from www.reginfo.gov/public/do/DownloadDocument?objectID=33839701.

Montaquila, J.M., Brick, J.M., Williams, D., Kim, K., and Han, D. (2013). A Study of Two-Phase Mail Survey Data Collection Methods. *Journal of Survey Statistics and Methodology*, *1*(1): 66–87.

Olson, K., and Smyth, J.D. (2014). Accuracy of Within-Household Selection in Web and Mail Surveys of the General Population. *Field Methods, 26*(1): 56–69.

Olson, K., Stange, M., and Smyth, J. (2014). Assessing Within-Household Selection Methods in Household Mail Surveys. *Public Opinion Quarterly*, *78*(3): 656–678.

O'Rourke, D., and Blair, J. (1983). Improving Random Respondent Selection in Telephone Surveys. *Journal of Marketing Research*, *20*: 428–432.

Porter, S.R., and Whitcomb, M.E. (2005). Non-response in Student Surveys: The Role of Demographics, Engagement and Personality. *Research in Higher Education, 46*(2): 127–152.

Roth, S.B., Han, D., and Montaquila, J.M. (August, 2012). *The ABS Frame: Quality and Considerations*. Paper presented at the Joint Statistical Meetings, San Diego, CA.

Schnell, R., Ziniel, S., and Coutts, E. (June, 2007). *Inaccuracy of Birthday Respondent Selection Methods in Mail and Telephone Surveys*. Paper presented at the European Survey Research Association Conference, Prague, Czech Republic.

Tuckel, P., and O'Neill, H. (2002). The Vanishing Respondent in Telephone Surveys. *Journal of Advertising Research*, *42*(5): 26–48.

West, B.T., Wagner, J., Hubbard, F., and Gu, H. (2015). The Utility of Alternative Commercial Data Sources for Survey Operations and Estimation: Evidence from the National Survey of Family Growth. *Journal of Survey Statistics and Methodology, 3*(2): 240–264.

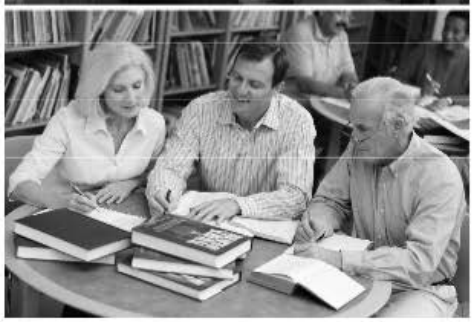
Wolter, K. (1985). *Introduction to Variance Estimation*. New York: Springer-Verlag.

Yan T. (May, 2009). *A Meta-Analysis of Within-Household Respondent Selection Methods*. Paper presented at the Annual Meeting of the American Association for Public Opinion Research, Hollywood, FL.

APPENDIX A: NATIONAL ADULT TRAINING AND EDUCATION SURVEY QUESTIONNAIRE

OMB No. 1850-0803: Approval Expires 09/30/2013

The 2013 National Adult Training and Education Survey



25103011

Conducted by

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau

NATES-10AC
(01/03/2013)

Instructions

- The Department of Education is studying the education and job training experiences of adults and youth. Each household is different, and we need your response.
- Each person living at this address, ages 16 to 65 should fill out a survey. Youths who are still in high school should not fill out a survey.
- Surveys should be completed by adults and youth who are temporarily away from home (for example, on vacation) but do not include adults or youth who are living at another address for an extended period of time (for example, living in college dormitories).
- If you need additional surveys, please call us on our toll-free number: 1-800-845-8243.
- Return each completed survey using the postage-paid envelopes provided.
- To answer a question, simply mark the box [X] that best represents the answer.
- Please use a black or blue pen, if available.

251030029

Introduction

Start Here

Adults acquire their job skills in many ways, including formal education, on-the-job-training, and other work training. This survey asks about all of these, including sections on professional certifications and licenses, educational certificates and other education degrees and classes, apprenticeship programs, and other classes taken for work reasons.

You will be asked to answer only the sections that apply to you. Please start with question A below. (Only one adult in the household needs to answer questions A and B on this page.)

A. How many of the people living in this household are ages 16-65?

☐ If no one in this household is ages 16-65, please enter "0" in the box and return the questionnaire in the postage-paid envelope. It is important that you return your questionnaire. No one in your household needs to complete any other questionnaires.

B. Of these people ages 16-65, how many are no longer in high school?

☐ If everyone in this household ages 16-65 is still in high school, please mark this box and return this questionnaire in the postage-paid envelope. No one in your household needs to complete any other questionnaires.

☐ → ***Please have each of these people fill out a questionnaire.***

If you have any questions or need additional questionnaires, please contact us toll-free at 1-800-845-8243.

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NATES-10AC

Educational Attainment

1. What is the highest degree or level of school you have completed? (Mark one.)

- ☐ Elementary or high school, but no high school diploma or GED
  → *GO TO question 4*
- ☐ High school diploma, GED, or other high school completion
- ☐ Some college credit but less than one year of college credit
- ☐ 1 or more years of college credit, no degree
  → *GO TO question 3*
- ☐ Associate's degree (for example, AA, AS)
- ☐ Bachelor's degree (for example, BA, BS)
- ☐ Master's degree (for example, MA, MS, MEng, MEd, MSW, MBA)
- ☐ Professional degree beyond a bachelor's degree (for example, MD, DDS, DVM, LLB, JD)
- ☐ Doctorate degree (for example, PhD, EdD)

2. What was the major or field of study for your highest level of education? If there was more than one, please choose the one you consider most important.

Write in:

3. Did you complete your high school requirements through a regular high school diploma, or through the GED or other high school equivalency? (Mark one.)

- ☐ Regular high school diploma
- ☐ GED or other high school equivalency

4. Do you have a professional certification or a state or industry license? A professional certification or license shows you are qualified to perform a specific job and includes things like Licensed Realtor, Certified Medical Assistant, Certified Construction Manager, a Project Management Professional certification, or an IT certification.

- ☐ Yes
- ☐ No → *GO TO question 20*

5. Thinking of all the certifications and licenses you have, did you get any of them for work-related reasons, or were they all for personal interest? (Mark one.)

- ☐ I got ONE OR MORE certifications or licenses for work-related reasons
  → *GO TO question 6*
- ☐ I did NOT GET ANY certifications or licenses for work-related reasons
  → *GO TO question 20*

▶ **Continue on the next page.**

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Certification and Licensure

➢ In the questions below, we ask a few details about the certification or license that you most recently earned for work-related reasons.

➢ Please answer these questions only about this MOST RECENT work-related certification or license. If you got a certification as part of getting a license, please respond for the license.

6. In what year were you first issued your MOST RECENT work-related certification or license?

Write in year:

7. Who issued this certification or license? (Mark one.)

- ☐ Federal, state, or local government
- ☐ Professional or trade association (for example, Pediatric Nursing Certification Board, National Exercise and Sports Trainers Association, CompTIA)
- ☐ Business or company (for example, Microsoft™, 3M Company™, Xerox®)
- ☐ Other group or organization (specify)

8. Why did you get this certification or license? (Mark "Yes" or "No" for each.)

	Yes ▼	No ▼
To get a job in a new field	☐	☐
To get a promotion or raise in pay	☐	☐
To stay current in my field or expand skills in my field	☐	☐
To start my own business	☐	☐
To meet an employer requirement	☐	☐
Other (specify)	☐	☐

9. Did you have to pass a test or exam or demonstrate your skills to get this certification or license?

- ☐ Yes
- ☐ No

10. What kind of courses, training, or instruction (online or in-person) did you take in order to prepare for this certification or license? (Mark all that apply.)

- ☐ I did not need any courses, training, or instruction
- ☐ I took vocational or occupationally focused high school courses
- ☐ I took courses from a vocational or trade school, community or technical college, or other college or university
- ☐ I took courses from a private company or my employer
- ☐ I participated in on-the-job training, an internship, or an apprenticeship
- ☐ I studied on my own
- ☐ Other (specify)

11. Do you have to earn continuing education units (CEUs) or other professional development credits to maintain this certification or license?

- ☐ Yes
- ☐ No → *GO TO question 14*

▶ **Continue on the next page.**

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12. Which ONE of the following best describes the MOST RECENT activity you engaged in to earn your continuing education or other professional development credits for this certification or license? (Mark one.)

- ☐ Have not yet had to meet these requirements
  - → *GO TO question 14*
- ☐ Attended conference or demonstration (online or in-person)
- ☐ Completed class or seminar (online or in-person)
- ☐ Read instructional materials (online or hardcopy)
- ☐ Other (specify)

13. Who was the main provider of the instruction or learning materials for the activity you indicated in question 12? (Mark one.)

- ☐ My employer

A group other than my employer:

- ☐ Professional or trade association
- ☐ Labor union or labor organization
- ☐ Community or technical college, vocational or trade school, college, or university
- ☐ Federal, state, or local government
- ☐ Private training company
- ☐ Other (specify)

14. What is the name of your MOST RECENT certification or license? Please do not use abbreviations.

Write in:

15. What kind of work is this certification or license for? (for example: teaching, vocational nursing, computer network administration, auditing, truck driving)

Write in:

16. Could this certification or license be used if you wanted to get a job with any employer in that line of work? If you have a state certification or license that can be used state-wide, please answer "yes".

- ☐ Yes
- ☐ No

17. Is this certification or license for the job you have now? If you are currently not employed, please answer "no". (Mark one.)

- ☐ Yes, and it is required for my job
- ☐ Yes, and it is NOT required for my job
  - → *GO TO question 20*
- ☐ No

18. Is this certification or license for a job you held in the past or for a job you plan to hold in the future? (Mark "Yes" or "No" for each.)

	Yes ▼	No ▼
For a job that I held in the past	☐	☐
For a job that I plan to hold in the future	☐	☐

19. Other than your most recent certification or license, do you have another certification or license for the job you have now? If you are currently not employed, please answer "no".

- ☐ Yes
- ☐ No

▶ **Continue on the next page.**

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Educational Certificates

➢ These next questions ask about education you might have received after high school. Include educational certificates you may have earned as part of getting a professional certification or license, but report only information for the educational certificate (not for the certification or license).

20. Some people complete a program of study at a vocational or trade school, community or technical college, or other college or university in order to earn an educational certificate rather than a degree. Sometimes this is called a vocational diploma, for example, a cosmetology or mechanics diploma, which differs from a high school diploma. Have you ever earned this type of educational certificate?

- ☐ Yes
- ☐ No → *GO TO question 29*

21. Thinking of all the educational certificates you have, which one of the following best describes them? (Mark one.)

- ☐ All of my educational certificates were for people who HAVE a bachelor's degree
  → *GO TO question 29*
- ☐ One or more of my educational certificates were for people who DO NOT HAVE a bachelor's degree

➢ Of the educational certificates or diplomas you earned after high school, we would like to know a few details about the one you earned most recently. We will use the word "certificate" to refer to this educational certificate or diploma.

➢ Please answer the questions in this section about this MOST RECENT certificate.

22. In what year did you earn this MOST RECENT certificate?

Write in year: ☐☐☐☐

23. How long did it take you to earn this certificate? (Mark one.)

- ☐ Less than 10 weeks (2½ months)
- ☐ 10 weeks (2½ months) or more, but less than one year
- ☐ One year or more
- ☐ I don't know

24. What type of school awarded this certificate? (Mark one.)

- ☐ Trade, vocational, or business school
- ☐ Community or technical college
- ☐ Other college or university
- ☐ Other type of school (specify)

▶ Continue on the next page.

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25. Why did you get this certificate? (Mark "Yes" or "No" for each.)

	Yes ▼	No ▼
To get a job in a new field	☐	☐
To get a promotion or raise in pay	☐	☐
To stay current in my field or expand skills in my field	☐	☐
To start my own business	☐	☐
To get a professional certification or license	☐	☐
Other (specify)	☐	☐

26. What was the primary subject or field of study for this certificate?

Write in:

27. Is the subject field of this certificate related to the job you have now? If you are currently not employed, please answer "no."

☐ Yes → *GO TO question 29*

☐ No

28. Is the subject field of this certificate related to a job you held in the past or to a job you plan to hold in the future? (Mark "Yes" or "No" for each.)

	Yes ▼	No ▼
Related to a job that I held in the past	☐	☐
Related to a job that I plan to hold in the future	☐	☐

▶ **Continue on the next page.**

Apprenticeships

29. In a formal apprenticeship program, an apprentice receives both instruction and on-the-job training and is paid a training salary. Have you ever participated in this type of apprenticeship program? (Do not count student teaching, medical internship or residency, or unpaid internships. Mark one.)

- ☐ Yes, I have COMPLETED this type of program
- ☐ Yes, I am currently participating in this type of program
- ☐ No, I have not participated in this type of program

→ *GO TO question 35*

30. In what year did you complete this apprenticeship program?

Write in year:

31. Did this apprenticeship program lead to a Certificate of Completion of Apprenticeship from your state or from the U.S. Department of Labor?

- ☐ Yes
- ☐ No
- ☐ I don't know

32. As part of this apprenticeship program, did you take any courses from a community or technical college or from another college or university?

- ☐ Yes
- ☐ No

33. Was this apprenticeship program for the job or industry you work in now? If you are currently not employed, please answer "no".

- ☐ Yes → *GO TO question 35*
- ☐ No

34. What occupation was this apprenticeship program for? (for example: carpenter, electrician, water treatment operator, emergency medical technician)

Write in:

▶ **Continue on the next page.**

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College Classes

35. Are you currently taking classes from a vocational or trade school, community or technical college, or other college or university? If you are on spring, summer, or holiday break, please answer "yes".

- ☐ Yes
- ☐ No → *GO TO question 46*

➢ The rest of this section asks about these college classes. If you are on a school break, please respond for the classes you were taking before you went on break.

36. Are you taking these classes to earn a diploma, certificate, or degree? (Do not count professional certifications or licenses.)

- ☐ Yes
- ☐ No → *GO TO question 39*

37. What diploma, certificate, or degree are you earning? (Mark one.)

- ☐ Diploma or certificate below the bachelor's degree level
- ☐ Associate's degree (for example, AA, AS, AAS)
- ☐ Bachelor's degree (for example, BA, AB, BS, BFA)
- ☐ Certificate above the bachelor's degree level
- ☐ Master's degree (for example, MA, MS, MEng, MEd)
- ☐ Professional or doctorate degree (for example, MD, DDS, DVM, LLB, JD, PhD, EdD)

38. Are you going to school full time or part time? (Mark one.)

- ☐ Full time
- ☐ Part time

→ *GO TO question 46*

39. How many classes are you currently taking? (Mark one.)

- ☐ One class
- ☐ Two or more classes

40. Which ONE of the following best describes the type of classes you are taking? (Mark one.)

- ☐ All my classes are for college credit
- ☐ Some of my classes are for college credit, some are not for credit
- ☐ All my classes are not for credit
- ☐ I don't know whether my classes are for college credit

41. Why are you taking these classes? (Mark "Yes" or "No" for each.)

	Yes ▼	No ▼
To get a job in a new field	☐	☐
To get a promotion or raise in pay	☐	☐
To stay current in my field or expand skills in my field	☐	☐
To start my own business	☐	☐
To get a professional certification or license	☐	☐
To earn continuing education or other professional development credits	☐	☐
To help me decide if I want to get a diploma, certificate, or degree	☐	☐
Classes are required to enter a college program	☐	☐
Personal interest in the subject of the classes	☐	☐
Other (specify)	☐	☐

42. What is the primary subject or field of study for these classes? If you are taking classes in different subjects, please list the subject you consider your main interest or focus.

Write in:

▶ **Continue on the next page.**

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43. Did your employer require that you take any of these classes?

- ☐ Not relevant – I am not employed or I am self-employed
  - → *GO TO question 46*
- ☐ Yes
- ☐ No

44. For any of these classes, is your employer paying your tuition or fees, or reimbursing you for your tuition or fees? (Mark one.)

- ☐ Yes, my employer is paying all of the tuition and fees
- ☐ Yes, my employer is paying part of the tuition and fees
- ☐ No

45. Are any of these classes designed specifically for employees at your company?

- ☐ Yes
- ☐ No
- ☐ I don't know

▶ **Continue on the next page.**

25103110

Other Instruction or Training

46. OTHER THAN APPRENTICESHIPS AND COLLEGE CLASSES YOU MAY HAVE DESCRIBED EARLIER, in the past 12 months, have you completed any other courses, training, or formal instruction, either at work or outside of work?

This includes both work or personal interest courses, seminars, webinars, or workshops on topics such as:

- *job safety, work ethics or other regulations*
- *equipment use*
- *communication, sensitivity, or team-building*
- *computer or technical skills*
- *management skills*
- *other job skills*
- *fitness classes, art, dance, or music lessons, religious education*
- *learning to speak English*
- *basic skills education classes*
- *other topics not listed here*

Have you completed any such instruction or training IN THE PAST 12 MONTHS?

☐ Yes

☐ No → *GO TO question 52*

47. In the past 12 months, which of the following types of instruction or training have you completed, either online or in-person? (Mark all that apply.)

Job training

☐ SAFETY AND COMPLIANCE TRAINING (includes information on company or professional procedures and regulations concerning legal, ethical, and safety issues)

☐ COMMUNICATION, SENSITIVITY, OR TEAM TRAINING (includes training to improve communication in the workplace, encourage teamwork, or to reorganize work teams and work flow)

☐ MANAGEMENT TRAINING (includes training in supervising employees and in implementing employment practices, regulations, and policies)

☐ JOB SKILLS TRAINING (includes training to develop the skills you need to do your work, such as sales and customer relations training, professional or technical skill development, use of computer applications, and other practical job skills)

Basic skills education

☐ BASIC READING, WRITING, OR ARITHMETIC INSTRUCTION (instruction for adults below the high school level)

☐ HIGH SCHOOL COMPLETION (classes to prepare for the GED or other adult high school program)

☐ ENGLISH LANGUAGE INSTRUCTION (classes to learn to speak English)

Other instruction or training

☐ PERSONAL INTEREST OR DEVELOPMENT (instruction related to hobbies and interests outside of work)

☐ OTHER (specify)

▶ **Continue on the next page.**

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48. Did any ONE of these activities last at least 8 hours (either in one session or across multiple sessions)?

- ☐ Yes
- ☐ No → *GO TO question 52*

➢ In the questions below, we ask a few details about your most recently completed instruction or training that lasted at least 8 hours.

➢ Please answer these questions only about this MOST RECENT completed instruction or training that lasted at least 8 hours.

49. Which ONE of the following best describes this MOST RECENT instruction or training? (Mark one.)

- ☐ Safety and compliance training
- ☐ Communication, sensitivity, or team training
- ☐ Management training
- ☐ Job skills training
- ☐ Basic reading, writing, or arithmetic instruction
- ☐ High school completion
- ☐ English language instruction

→ *GO TO question 50*

- ☐ Personal interest or development

→ *GO TO question 52*

- ☐ Other (specify)

50. Was this instruction or training that your employer offered at no charge during working hours?

- ☐ Yes
- ☐ No
- ☐ Not relevant – I was self-employed or not employed when I took the instruction or training

51. Why did you take this instruction or training? (Mark "Yes" or "No" for each.)

	Yes ▼	No ▼
To get a job in a new field	☐	☐
To get a promotion or raise in pay	☐	☐
To stay current in my field or expand skills in my field	☐	☐
To start my own business	☐	☐
To get a professional certification or license	☐	☐
To earn continuing education or other professional development credits	☐	☐
To meet an employer requirement	☐	☐
Other (specify)	☐	☐

▶ **Continue on the next page.**

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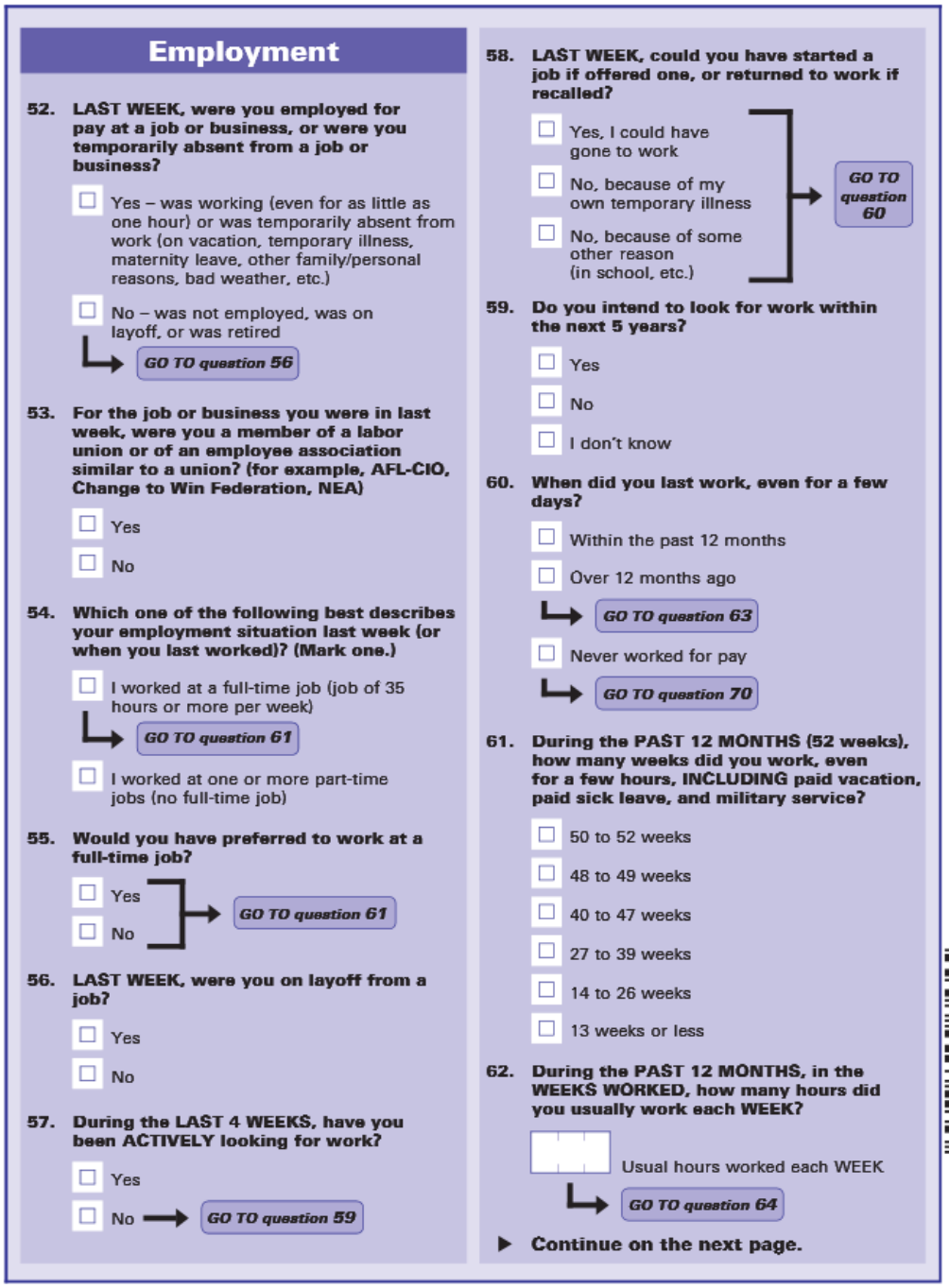

Employment

52. LAST WEEK, were you employed for pay at a job or business, or were you temporarily absent from a job or business?

- ☐ Yes – was working (even for as little as one hour) or was temporarily absent from work (on vacation, temporary illness, maternity leave, other family/personal reasons, bad weather, etc.)
- ☐ No – was not employed, was on layoff, or was retired
  → *GO TO question 56*

53. For the job or business you were in last week, were you a member of a labor union or of an employee association similar to a union? (for example, AFL-CIO, Change to Win Federation, NEA)

- ☐ Yes
- ☐ No

54. Which one of the following best describes your employment situation last week (or when you last worked)? (Mark one.)

- ☐ I worked at a full-time job (job of 35 hours or more per week)
  → *GO TO question 61*
- ☐ I worked at one or more part-time jobs (no full-time job)

55. Would you have preferred to work at a full-time job?

- ☐ Yes
- ☐ No

→ *GO TO question 61*

56. LAST WEEK, were you on layoff from a job?

- ☐ Yes
- ☐ No

57. During the LAST 4 WEEKS, have you been ACTIVELY looking for work?

- ☐ Yes
- ☐ No → *GO TO question 59*

58. LAST WEEK, could you have started a job if offered one, or returned to work if recalled?

- ☐ Yes, I could have gone to work
- ☐ No, because of my own temporary illness
- ☐ No, because of some other reason (in school, etc.)

→ *GO TO question 60*

59. Do you intend to look for work within the next 5 years?

- ☐ Yes
- ☐ No
- ☐ I don't know

60. When did you last work, even for a few days?

- ☐ Within the past 12 months
- ☐ Over 12 months ago
  → *GO TO question 63*
- ☐ Never worked for pay
  → *GO TO question 70*

61. During the PAST 12 MONTHS (52 weeks), how many weeks did you work, even for a few hours, INCLUDING paid vacation, paid sick leave, and military service?

- ☐ 50 to 52 weeks
- ☐ 48 to 49 weeks
- ☐ 40 to 47 weeks
- ☐ 27 to 39 weeks
- ☐ 14 to 26 weeks
- ☐ 13 weeks or less

62. During the PAST 12 MONTHS, in the WEEKS WORKED, how many hours did you usually work each WEEK?

☐☐ Usual hours worked each WEEK

→ *GO TO question 64*

▶ **Continue on the next page.**

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63. Please write in the month and year for when you last worked.

month / year

GO TO question 65

64. Which category best fits your earnings from wages, salary, commissions, bonuses or tips, from all jobs over the PAST 12 MONTHS? Report amount before deductions for taxes, bonds, dues or other items. (Mark one.)

- ☐ $0 to $10,000
- ☐ $10,001 to $20,000
- ☐ $20,001 to $30,000
- ☐ $30,001 to $40,000
- ☐ $40,001 to $50,000
- ☐ $50,001 to $60,000
- ☐ $60,001 to $75,000
- ☐ $75,001 to $150,000
- ☐ $150,001 or more

65. For the next few questions, please describe clearly your chief job activity or business last week. If you had more than one job, describe the one at which you worked the most hours. If you had no job or business last week, give information for your last job or business.

In your current or last job, which ONE of the following were you? (Mark one.)

- ☐ An employee of a private for-profit company or business, or of an individual, for wages, salary, or commissions
- ☐ An employee of a private not for-profit, tax exempt, or charitable organization
- ☐ A local government employee (city, county, etc.)
- ☐ A state government employee
- ☐ A Federal government employee
- ☐ Self-employed in own business, professional practice, or farm
- ☐ Working without pay in family business or farm

66. For whom did you work?

☐ *If now on active duty in the Armed Forces, mark (X) this box and print the branch of the Armed Forces below.*

Name of company, business, or other employer

67. What kind of business or industry was this?

Describe the activity at the location where employed. (for example: hospital, newspaper publishing, mail order house, auto engine manufacturing, bank)

68. What kind of work were you doing?
(for example: registered nurse, personnel manager, supervisor of order department, secretary, accountant)

69. What were your most important activities or duties?
(for example: patient care, directing hiring policies, supervising order clerks, typing and filing, reconciling financial records)

▶ **Continue on the next page.**

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Background

70. Are you male or female?

- ☐ Male
- ☐ Female

71. How old are you?

☐☐ years old

72. What is your current marital status?

- ☐ Now married → GO TO question 75
- ☐ Widowed
- ☐ Divorced
- ☐ Separated
- ☐ Never married

73. Are you currently living with a boyfriend/girlfriend or partner in this household?

- ☐ Yes
- ☐ No → GO TO question 75

74. Are you currently in a registered domestic partnership or civil union?

- ☐ Yes
- ☐ No

75. Are you of Hispanic or Latino origin?

- ☐ Yes
- ☐ No

76. What is your race? Choose one or more.

- ☐ White
- ☐ Black or African American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander

77. Do you speak a language other than English at home?

- ☐ Yes
- ☐ No → GO TO question 79

78. How well do you speak English? (Mark one.)

- ☐ Very well
- ☐ Well
- ☐ Not very well
- ☐ Not at all

79. Where were you born? (Mark one.)

- ☐ In the United States (the 50 states or the District of Columbia) → GO TO question 82
- ☐ In a U.S. territory (Puerto Rico, Guam, American Samoa, U.S. Virgin Islands, or Northern Marianas) → GO TO question 82
- ☐ Outside the U.S. (in a foreign country)

80. Were you born abroad to one or more parents who were U.S. citizens?

- ☐ Yes
- ☐ No

81. When did you come to live in the United States?

Year

☐☐☐☐

▶ **Continue on the next page.**

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82. Which category best fits the total income of all persons in your household over the past 12 months? Include your own income. Include money from jobs or other earnings, pensions, interest, rent, Social Security payments, and so on. (Mark one.)

- ☐ $0 to $10,000
- ☐ $10,001 to $20,000
- ☐ $20,001 to $30,000
- ☐ $30,001 to $40,000
- ☐ $40,001 to $50,000
- ☐ $50,001 to $60,000
- ☐ $60,001 to $75,000
- ☐ $75,001 to $150,000
- ☐ $150,001 or more

Thank you.

Please return this questionnaire in the postage-paid envelope provided.
If you need additional questionnaires for other eligible household members, please call the Census Bureau toll-free at 1-800-845-8243.

If you have lost the envelope, mail the completed questionnaire to:

U.S. Census Bureau
ATTN: DSB 60-A
1201 E. 10th Street
Jeffersonville, IN 47132-0001

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NATES-10AC

APPENDIX B: SAMPLING, DATA COLLECTION, WEIGHTING, AND ESTIMATION PROCEDURES

This appendix details the sampling, data collection, weighting, and estimation procedures for the National Adult Training and Education Survey pilot study (NATES), a mailed household survey sent to a sample of 10,000 addresses.

B.1 Sampling

Sampling for NATES was conducted by the U.S. Census Bureau. The household-level target population for NATES was all U.S. households containing noninstitutionalized adults. The NATES sample was composed of unused sample addresses from the 2012 National Household Education Survey (NHES:2012). NHES:2012 had obtained a sample of 208,000 addresses from Marketing Systems Group (MSG), of which 160,000 were randomly selected for the 2012 data collection. The remaining 48,000 comprised the frame for the NATES sample. Several steps were followed to select the final NATES sample of 10,000 households.

First, since NHES:2012 had undersampled P.O. box addresses that were not the household's only way to get mail (OWGM), the file of 48,000 households had an oversample of these addresses. In order to reduce the proportion of non-OWGM P.O. boxes to correspond to the proportion in the original NHES:2012 frame, a random subsample of these addresses was selected for retention at a rate of 3 in 11. The remaining non-OWGM P.O. boxes were dropped. Approximately 37,750 addresses remained after this step.

Second, because the NATES questionnaire was not available in Spanish, the NHES:2012 oversample of the Hispanic stratum (census tracts with 40 percent or more persons of Hispanic origin) was also removed. Addresses in the Hispanic stratum were subsampled for retention at a rate of 1 in 1.767335. The remaining households in the Hispanic stratum were deleted, leaving approximately 35,290 addresses.

Third, a random subsample of 1,200 households was selected for a separate pilot study intended to test different versions of the NHES household screener, leaving 34,090 available for NATES.

Fourth, the remaining households were restricted to include only addresses that were within the county-level primary sampling units (PSUs) selected for the National Crime Victimization Survey (NCVS). A PSU design was used to facilitate in-person data collection during the nonresponse follow-up phase of the study. Addresses not located in an NCVS PSU as of the summer of 2013 were dropped, leaving 21,690 addresses.

The NCVS PSU design included some PSUs selected with a probability of 1.0 (referred to as self-representing PSUs) and some selected with a probability of less than 1.0 (referred to as non-self-representing PSUs). The optimum design for NATES was to keep all 3,200 addresses in the non-self-representing PSUs and subsample the self-representing PSUs.[30] Thus, 6,800 addresses in the self-representing PSUs were subsampled to obtain the final sample size of 10,000.

Households in the self-representing PSUs were subsampled as follows. No further stratification was conducted in the Black stratum (Census tracts with 25 percent or more Black persons) because these households were already oversampled. However, the Other stratum (census tracts not in the Black or Hispanic stratum) was further stratified by tract-level poverty rates. Specifically, the Other stratum was divided into a high-poverty stratum (tracts with poverty rates of 20 percent or higher) and a low-poverty stratum (tracts with poverty rates below 20 percent). The 820 households in self-representing PSUs and the high-poverty Other stratum were subsampled at a rate of 1 in 1.710692, while the remaining 17,670 households in self-representing PSUs were subsampled at a rate of 1 in 2.794401.

[30] This design minimized travel costs for the planned in-person follow-up phase. Self-representing PSUs are designed to be geographically representative and the cases in them tend to be more clustered together, so only visiting a subsample of these PSUs allows field interviewers to travel within a smaller area.

Together, the 3,200 households from the non-self-representing PSUs and the 6,800 households subsampled from the self-represented PSUs comprised the final NATES sample of 10,000 households.

Because all eligible members of sampled households were asked to fill out and return a NATES questionnaire, no within-household sampling was conducted.

B.2 Data Collection

Data collection for NATES was conducted by the U.S. Census Bureau. Table B.1 provides a calendar of activities.

Table B.1. Timeline of NATES data collection activities: 2013

Activity	Date
Advance letters for NATES mailed	January 14, 2013
Initial set of questionnaires mailed	January 23, 2013
Reminder postcards mailed	February 4, 2013
Second set of questionnaires mailed	February 13, 2013
Third set of questionnaires mailed	March 6, 2013
Fourth set of questionnaires mailed	March 27, 2013
End of data collection for NATES	April 9, 2013

SOURCE: U.S. Census Bureau, 2013.

Data collection began with the mailing of advance notification letters to sampled addresses on January 14, 2013. The letters introduced the survey, informed the household that it had been selected to participate, and provided notice of the forthcoming questionnaire mailing, including the approximate time to complete it. The letter also informed the household that it would receive a small token of appreciation. The letter included a toll-free number for the recipient to call with any questions. The advance letters and all NATES packages were addressed to "Dear Resident" in the mailing salutation. The packages were addressed to the "CURRENT RESIDENT." All envelopes were preprinted with the Census Bureau logo on the left-hand side.

The initial topical packages were mailed to all sample addresses on January 23, 2013, and contained the following:

- a letter to the household that introduced the survey and requested that a set of topical items be filled out by each adult in the household;
- either three single-person topical questionnaire booklets or one composite questionnaire that captured the data for three respondents in one booklet;
- a $15 cash incentive in the form of three $5 bills; and
- either three pre-addressed, postage-paid return envelopes for those receiving three separate questionnaire booklets or one pre-addressed, postage-paid return envelope for those receiving one composite questionnaire booklet.

Households with more than three adults were able to request additional sets of topical items by calling the toll-free number on the cover letter. Approximately 5 households requested additional booklets. However, for operational reasons, no additional booklets ended up being sent.

A reminder postcard was sent to nonresponding households on February 4, 2013. Households that did not respond to the first mailing were sent topical packages in three subsequent mailings. Except in the third mailing, when most topical packages were shipped via FedEx, packages were shipped via U.S. Postal Service (USPS) First-Class mail.[31] Each follow-up mailing wave was sent 3 weeks after the previous follow-up wave to allow time for the receipt of completed questionnaires.

[31] FedEx does not ship to P.O. boxes, so any packages in the third mailing with a P.O. box address were sent by USPS Priority Mail.

The follow-up packages included a cover letter, either three single-person topical questionnaire booklets or one composite questionnaire booklet that captured the data for three respondents in one booklet, and either three pre-addressed, postage-paid return envelopes for those receiving three separate questionnaire booklets or one pre-addressed, postage-paid return envelope for those receiving one composite questionnaire booklet. No incentive was included in any of the follow-up mailings.

The Census Bureau maintained a Telephone Questionnaire Assistance (TQA) hotline to assist respondents who called with questions about the questionnaire; address respondent concerns about confidentiality, purpose, sponsorship, and other similar issues; and convey the importance of survey participation to respondents who were reluctant to participate. Interviewers who participated in the NATES TQA were provided self-study training.

Respondents were encouraged to complete and mail back all forms sent to them in the pre-addressed, postage-paid return envelope(s) addressed to the Census Bureau's main processing facility in Jeffersonville, Indiana. Upon receipt of the questionnaires, clerical staff immediately checked them into the Automatic Tracking and Control (ATAC) system and assigned a household-level outcome code. At this stage, a household received an outcome code of complete if it returned at least one questionnaire booklet with at least one item answered. Additional outcome codes included refusals, blanks, duplicates, undeliverable as addressed (UAA), and various out-of-scope codes.

During data review, the Census Bureau conducted a second round of completeness checks for all returned sets of topical item responses. At this stage, a set of topical item responses passed the completeness check if at least one of the following items was answered: highest education completed, sex, or age. Sets of topical item responses that passed the completeness check were included in the final NATES data file, while those that failed the completeness check were excluded. In some of the responding households, all of the topical surveys returned by the household failed the completeness check. For most of these households, the responses to the screener items indicated that there were no eligible household members (i.e., no household members ages 16 through 65 and not in high school). The final household-level outcome code was not changed for these households because they had completed the items that were relevant to them and were valid skips out of the remaining items. Cases that failed the completeness check only because they were valid skips based on screener items were, for weighting and response rate purposes, treated as household-level respondents and person-level ineligibles.

The NATES data collection ended on April 9, 2013.[32]

B.3 Weighting

This section describes the procedures for calculating several sets of weights used in the analyses reported in this study. It first discusses the calculation of the NATES household-level base weights (HBW) and the NATES household-level adjusted weights (HHW), which were applied to all NATES observations in the household-level analyses reported in chapters 2 and 3. It then discusses the calculation of the person-level base weights (UPW) and the person-level adjusted weights (NPW) for NATES respondents, the latter of which were applied to all observations in the person-level analyses reported in chapter 4.

NATES household-level base weights

The base weight for each sampled household was the inverse probability of its selection for the final NATES sample. The calculation of each household's base weight began with the household's original MSG weight (WMSG), the inverse probability of the household's being among the 208,000 households originally sampled by MSG for NHES:2012. WMSG was equal to 487.786827 for households in the Black stratum, 442.880128 for households in the Hispanic stratum, and 773.037833 for households in the Other stratum. Several adjustment factors were then applied to reflect the multiple rounds of subsampling described in section B.1:

[32] At the conclusion of the mail-based data collection, a random sample of NATES nonresponding households were contacted for in-person follow-up interviews as part of a Nonresponse Follow-up Study (NRFS). This report focuses only on respondents to the main NATES data collection. See the *NATES:2013 Nonresponse Bias Analysis Report* (Jackson and Medway 2017) for more information about the results of the NRFS.

- WSUB accounted for the probability of the household's being among the 48,000 households that were not included in the final sample for NHES:2012 and therefore available for sampling for NATES.
- WPOBNOWGM accounted for the removal of the oversample of P.O. boxes that were not the household's only way to receive mail.
- WHISP accounted for the removal of the oversample of the Hispanic stratum.
- WNONSCR accounted for the probability of the household's not being sampled for the separate NHES screener study.
- WNCVS represented the inverse probability of selection for each NCVS PSU used in the NATES study, thereby accounting for the restriction of the sample to households located within NCVS PSUs.
- WFINAL accounted for the subsampling of households within PSUs. Its value was determined by whether the household was located in a self-representing or non-self-representing PSU and, for households in the Other stratum, whether it was located in a high- or low-poverty tract.

HBW_j, the household-level base weight for household *j*, was the product of WT_MSG and all of these adjustment factors:

$$HBW_j = WMSG_j * WSUB_j * WPOBNOWGM_j * WHISP_j * WNONSCR_j * WNCVS_j * WFINAL_j$$

Table B.2 provides the values of each adjustment factor for different types of households.

Table B.2. Components of NATES household-level base weights: 2014

Component	Value
WMSG	If stratum = Black: 487.786827 If stratum = Hispanic: 442.880128 If stratum = Other: 773.037833
WSUB	If non-OWGM = Yes: 1.5 If non-OWGM = No: 5.51
WPOBNOWGM	If non-OWGM = Yes: 3.67 If non-OWGM = No: 1
WHISP	If stratum = Hispanic: 1.767335 If stratum = Black or Other: 1
WNONSCR	1.0351968
WNCVS	Varies by NCVS PSU
WFINAL	If SR = No: 1 If SR = Yes and stratum = Black or Hispanic: 2.794401 If SR = Yes and stratum = Other and poverty = High: 1.710692 If SR = Yes and stratum = Other and Poverty = Low: 2.794401

NOTE: non-OWGM = Yes refers to P.O. box addresses that are the only way for households to receive mail; non-OWGM = No refers to all other households. SR = Yes refers to households in self-representing NCVS PSUs; SR = No refers to households in non-self-representing NCVS PSUs. Poverty = High refers to households in census tracts with poverty rates of 20 percent or higher; Poverty = Low refers to all other households.
SOURCE: U.S. Census Bureau, 2013.

NATES household-level adjusted weights

The NATES base weights were adjusted for household-level nonresponse using a standard procedure known as weighting class adjustment. On the basis of the household-level outcome codes as of April 9, 2013 (the cutoff date for the mailed NATES data collection), each sampled address was classified as a respondent (type R), a nonrespondent (type N), an ineligible case (type I), or a case of unknown eligibility (type U). Respondents were households with an outcome

code of "01" (complete), with a small number of exceptions.[33] Nonrespondents were households with outcome codes of "03" (blank) or "05" (soft refusal); there were no hard refusals. Ineligible households were households with outcome codes of "10" or "20" through "36," all of which correspond to various types of out-of-scope and undeliverable as addressed (UAA) statuses. Cases of unknown eligibility were households with an outcome code of "99"; these were cases for which no questionnaire booklet was returned and no information on the eligibility of the address was obtained.

A procedure called Chi-Squared Automated Interaction Detection (CHAID) was then used to identify household-level characteristics associated with nonresponse. Because the characteristics used in this analysis needed to be available for both respondents and nonrespondents, the household-level CHAID model used a set of variables available in the NATES sampling frame. Table B.3 lists and defines the frame variables used in the household-level CHAID model, along with an indication of whether each variable was determined by the procedure to be predictive of nonresponse. For variables for which values were missing for some households, "missing" was treated as its own category.

Table B.3. Variables used in NATES household-level CHAID analysis: 2013

Variable	Definition	Values	Predictive of nonresponse[1]	Missing rate[2]
Drop point	Whether the address is a single postal delivery point for multiple housing units	1 = Drop point 2 = Not a drop point 99 = Missing	No	0.0
Dwelling type	Whether the address is a single-family or multi-unit structure	1 = Single family 2 = Multi-unit 99 = Missing	No	8.8
Phone match	Whether a phone number is available for the household in the sampling frame	1 = Matched 2 = Not matched	Yes	0.0
Address route type	Whether the address is a street address, P.O. box address, high-rise building address, or rural-route address	1 = Street 2 = High rise 3 = P.O. box 4 = Rural route	Yes	0.0
Seasonal address	Whether the address is seasonal	1 = Seasonal 2 = Not seasonal 3 = Educational seasonal	No	0.0
Address vacancy status	Whether the address is vacant	1 = Vacant 2 = Not vacant	No	0.0
Home tenure	Whether the address is owned or rented by the household	1 = Own 2 = Rent 99 = Missing	Yes	24.8
Only way to get mail	Whether a P.O. box address is the household's only address to get mail	1 = Only way to get mail 2 = Not only way to get mail	No	0.0

See notes at end of table.

[33] Approximately 860 households had outcome codes of "01," but were not included in the final NATES data file after the completeness check described in section B.1. Upon further examination, it was determined that approximately 850 of these households had indicated in the two screener items on the NATES questionnaire that there were no eligible household members living at that address; these households were retained as complete cases because they had completed all parts of the questionnaire that were relevant to them (the screener items) and were valid skips out of the remaining items. The remaining 10 households were reclassified as nonrespondents for the purpose of weighting and response rate calculation.

Table B.3. Variables used in NATES household-level CHAID analysis: 2013—Continued

Variable	Definition	Values	Predictive of nonresponse[1]	Missing rate[2]
Educational attainment	Highest educational attainment of the head of household	1 = High school diploma 2 = Some college 3 = Bachelor's degree 4 = Graduate degree 5 = Less than high school diploma 99 = Missing	Yes	43.7
Gender	Gender of the head of household	1 = Male 2 = Female 99 = Missing	Yes	22.0
Race/ethnicity	Race or ethnicity of the head of household	1 = White 2 = Black 3 = Hispanic 4 = Asian/Pacific Islander 5 = Other 99 = Missing	Yes	40.1
Marital status	Marital status of the head of household	1 = Single 2 = Married 99 = Missing	No	34.0
Age	Age of the head of household	1 = 17 or younger 2 = 18–24 3 = 25–34 4 = 35–44 5 = 45–64 6 = 65 or higher 99 = Missing	Yes	42.4
Income	Household income	1 = $10,000 or lower 2 = $10,001–$20,000 3 = $20,001–$30,000 4 = $30,001–$40,000 5 = $40,001–$50,000 6 = $50,001–$60,000 7 = $60,001–$75,000 8 = $75,001–$100,000 9 = $100,001–$150,000 10 = $150,001 or higher 99 = Missing	Yes	19.3
Number of adults	Number of adults living in the household	1-8 = Number of adults in household 99 = Missing	Yes	19.5

[1] Indicates whether the variable was found by the household CHAID model to be predictive of household-level nonresponse.
[2] Indicates the unweighted percentage of NATES sampled households for which information on the specified variable was not available in the sampling frame.

All sampled households were allocated to nonresponse adjustment cells defined by the characteristics identified by the CHAID analysis as being predictive of nonresponse. Table B.4 specifies the variables and values that defined the NATES household-level nonresponse adjustment cells.

Table B.4. NATES household-level nonresponse adjustment cells: 2013

Cell	Address route type	Income	Number of adults	Age	Gender	Phone match	Home tenure	Education	Ethnicity
1	3,4	1,99	†	†	†	†	†	†	†
2	3,4	2,10	2,3,4,6,7	†	†	†	†	†	†
3	3,4	2,10	1,5,99	†	†	†	†	†	†
4	2	†	†	6	†	†	†	†	†
5	2	†	†	4,5	1	†	†	†	†
6	2	†	†	4,5	2,99	†	†	†	†
7	2	3,6,7,8,9,10	†	2,3,99	†	†	†	†	†
8	2	1,5,99	†	2,3,99	†	†	†	†	†
9	2	2,4	†	2,3,99	†	†	†	†	†
10	1	†	†	†	†	1	2	†	†
11	1	5,7,9,10	2,5,6	6	†	1	1,99	†	†
12	1	5,7,9,10	1,3,4	6	†	1	1,99	†	†
13	1	1,2,3,4,6,8	†	6	†	1	1,99	1,2,3,4	†
14	1	1,2,3,4,6,8	†	6	†	1	1,99	5,99	†
15	1	1,9	†	5	†	1	1,99	†	†
16	1	6,10	†	5	†	1	1,99	†	†
17	1	2,4,7	†	5	†	1	1,99	†	†
18	1	3,5,8	2,5,7	5	†	1	1,99	†	†
19	1	3,5,8	1,3,4,6,8	5	†	1	1,99	†	†
20	1	†	2,4,6,7	3,4	†	1	1,99	†	†
21	1	†	1,3,5	3,4	†	1	1,99	†	†
22	1	†	†	2,7	†	1	1,99	†	2,99
23	1	†	†	2,7	†	1	1,99	†	1,3,4,5
24	1	†	†	4,5,6	†	2	2,99	†	†
25	1	3,6,9,10,99	†	2,3,99	†	2	2,99	†	†
26	1	1,2,4,5,7,8	†	2,3,99	†	2	2,99	†	†
27	1	†	†	3,6	†	2	1	†	†
28	1	†	†	5	†	2	1	3,4,99	†
29	1	†	†	5	†	2	1	2,5	†
30	1	†	†	5	†	2	1	1	†
31	1	7,10	†	2,4,99	†	2	1	†	†
32	1	5,8,9	2,3,4,6,7	2,4,99	†	2	1	†	†
33	1	5,8,9	1,5	2,4,99	†	2	1	†	†
34	1	1,2,3,4,6	†	2,4,99	†	2	1	†	†

† Not applicable (variable was not used to define the specified cell).
NOTE: Cells were defined using Chi-Squared Automated Interaction Detection (CHAID).
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

A household non-interview adjustment factor (HNIAF) was assigned to each adjustment cell using the following procedure. For cells with no type N nonrespondents, the HNIAF was set to 1.[34] For all other cells, the HNIAF for cell c was calculated as the inverse of the weighted *ee*-adjusted response rate within the cell:

$$HNIAF_c = \frac{\sum_{j\epsilon R} HBW_{jc} + \sum_{j\epsilon N} HBW_{jc} + ee_c * \sum_{j\epsilon U} HBW_{jc}}{\sum_{j\epsilon R} HBW_{jc}}$$

$$ee_c = \frac{\sum_{j \in R} HBW_{jc} + \sum_{j \in N} HBW_{jc}}{\sum_{j \in R} HBW_{jc} + \sum_{j \in N} HBW_{jc} + \sum_{j\epsilon I} HBW_{jc}}$$

where:

HBW_{jc} = the household-level base weight;
j = the household identifier;
c = the nonresponse adjustment cell identifier;
R = respondents;
N = nonrespondents; and
I = ineligible cases.

For all nonrespondent, ineligible, and unknown-eligibility households, the household-level adjusted weight (HHW) was set equal to 0. For each responding household *j*, the household-level adjusted weight was obtained by multiplying the household-level base weight by the HNIAF for the household's adjustment cell *c*:

$$HHW_j = HBW_j * HNIAF_{jc}$$

NATES person-level base weights

As noted in section B.1, no within-household sampling was conducted for NATES; all eligible members of each sampled household were asked to fill out and return a set of topical item responses. However, because only three sets of topical items were sent with each mailing wave, there were some households in which the number of eligible persons exceeded the number of available sets of topical items. The person-level weighting procedure was designed to account for such situations by increasing the base weights of person-level respondents in these households.

Therefore, in order to calculate person-level weights, it was necessary to first determine the number of persons in each household who were eligible for NATES. The first two items in the NATES questionnaire booklet asked respondents to enumerate the eligible members of the household. Specifically, item QA asked for the number of household members ages 16–65. Respondents who entered 0 were directed to return the questionnaire booklet without filling in any other items. Respondents who entered a number greater than 0 were directed to respond to item QB, in which they were asked for the number of household members ages 16–65 who were no longer enrolled in high school. Respondents who entered 0 for QB were directed to return the questionnaire booklet without filling in any subsequent items, while respondents who entered a number greater than 0 were asked to have each of those household members fill out and return the topical items.

[34] In subsequent discussions with the U.S. Census Bureau, it was determined that the assignment of HNIAF = 1 to all cells with no type N nonrespondents, even if the cell did contain cases of unknown eligibility (and thus had a response rate below 100 percent), was performed in error. Approximately 590 out of 5,470 NATES respondent households were in adjustment cells affected by this error. After this issue was discovered, the U.S. Census Bureau evaluated its likely impact on weighted percentage estimates, and determined that any impact on weighted survey estimates was likely to be minimal. Because of this, in light of the fact that NATES was a pilot study, NCES opted against further revisions to the data files. Readers are cautioned that NATES estimates that use person-level weights or household-level nonresponse-adjusted weights may have been affected by this weighting error.

In practice, however, there were numerous inconsistencies in the information reported in these two items. For example, some households returned a greater number of sets of topical item responses than the numbers entered in QA and QB, and others reported a greater number in QB than in QA even though it would be impossible for the number of individuals ages 16–65 and no longer in high school to exceed the total number of individuals ages 16–65. For this reason, a set of editing rules was used to determine *m*, the final number of eligible individuals in the household. Letting Q = the number of sets of topical item responses received from the household, a = the number reported in QA, and b = the number reported in QB:[35]

1) If Q = a, then m = Q
2) If Q ≠ a, then m = max(Q,b)

The variables m and Q were then used to generate a person inflation factor (PIF) for each household. The PIF inflates the person-level base weights for households with more than three eligible household members because these households had more eligible household members than the number of sets of topical survey items that were sent; their person-level base weights are increased to account for this. Applying the PIF to each household makes the sum of the person-level base weights equal to the total number of eligible persons in the population. The PIF for each household was determined as follows:

1) If m ≤ 3, then PIF = 1
2) If m > 3 and Q ≤ 3, then PIF = m/3
3) If m > 3, Q > 3, and m ≥ Q, then PIF = m/Q[36]

For all person-level cases in the final NATES data file, each person's base weight was calculated as the product of the household-level adjusted weight and the PIF for household *j*:

$$UPW_j = HHW_j * PIF_j$$

NATES person-level adjusted weights

In order to generate person-level nonresponse-adjusted weights (NPW), it was necessary to estimate the number of nonresponding persons within each household, based on the estimated number of eligible persons in the household as determined in the calculation of the person-level base weights.

This was done in several steps. First, the total number of eligible sets of topical item responses received from the household was defined as E = Q – c, where c is the number of sets of topical item responses received from the household where the topical respondent was not actually eligible for NATES (based on respondents reporting in a topical item asking for their age that they were outside the eligible age range for NATES (16-65)).[37] The proportion of sets of topical item responses received from the household that were not outside the eligible age range was then calculated as p = E/Q. The following rules were then applied:

1) For households in which Q < 3 and Q < m, it was assumed that there was within-household nonresponse, and the number of nonresponding persons in the household was estimated as N = p * (m – Q).

[35] For households that received individual questionnaire booklets rather than a composite booklet, every individual respondent was asked to fill out these first two items. For the purpose of this procedure, and for the calculation of person-level response rates (see section B.4), the responses to QA and QB were taken from the first person in each household to fill out a questionnaire. For households in the composite-booklet condition, this was the individual who filled out the set of topical items closest to the front of the booklet. For households in the individual-booklet condition, this was the individual who filled out the lowest-numbered questionnaire booklet. For households that returned mailings on more than one date, data was retained from the earliest mailing.

[36] Note that, because m was defined as the maximum of Q and b, a situation in which m < Q would be impossible by construction.

[37] Because the NATES questionnaire did not include items asking whether an individual was currently enrolled in high school, it was impossible to determine individual eligibility on that criterion. This means that the number of eligible forms received is likely overestimated for some households.

2) For households in which Q ≥ 3 and/or Q = m, it was assumed that there was no within-household nonresponse, and N was set equal to 0.[38]

Once N was estimated for each household, a new record was created for each nonresponding person in order to create the input file for a second person-level CHAID analysis. Because NATES did not include a screener stage, the only variables available for the person-level CHAID analysis were variables available in the NATES sampling frame. Table B.5 lists and defines the variables used in the person-level CHAID analysis, along with an indication of whether each variable was determined by the procedure to be predictive of person-level nonresponse.

Table B.5. Variables used in NATES person-level CHAID analysis: 2013

Variable	Definition	Values	Predictive of nonresponse[1]	Missing rate[2]
Stratum	Whether the household was located in the Black stratum, the Hispanic stratum, or the Other stratum	1 = Black 2 = Hispanic 3 = Other	Yes	0.0
Region	Whether the household was located in the Northeast, South, Midwest, or West census region	1 = Northeast 2 = South 3 = Midwest 4 = West	Yes	0.0
Dwelling type	Whether the address is a single-family or multi-unit structure	1 = Single family 2 = Multi-unit 99 = Missing	Yes	4.8
Home tenure	Whether the address is owned or rented by the household	1 = Own 2 = Rent 99 = Missing	Yes	15.3
Educational attainment	Highest educational attainment of the head of household	1 = High school diploma 2 = Some college 3 = Bachelor's degree 4 = Graduate degree 5 = Less than high school diploma 99 = Missing	Yes	34.0
Race/ethnicity	Race or ethnicity of the head of household	1 = White 2 = Black 3 = Hispanic 4 = Asian/Pacific Islander 5 = Other 99 = Missing	No	30.1
Age	Age of the head of household	1 = 17 or younger 2 = 18–24 3 = 25–34 4 = 35–44 5 = 45–64 6 = 65 or higher 99 = Missing	Yes	31.3

See notes at end of table.

[38] See note 20, above.

Table B.5. Variables used in NATES person-level CHAID analysis: 2013—Continued

Variable	Definition	Values	Predictive of nonresponse[1]	Missing rate[2]
Income	Household income	1 = $10,000 or lower 2 = $10,001–$20,000 3 = $20,001–$30,000 4 = $30,001–$40,000 5 = $40,001–$50,000 6 = $50,001–$60,000 7 = $60,001–$75,000 8 = $75,001–$100,000 9 = $100,001–$150,000 10 = $150,001 or higher 99 = Missing	Yes	10.8
Number of adults	Number of adults living in the household	1-8 = Number of adults in household 99 = Missing	Yes	10.9

[1] Indicates whether the variable was found by the person CHAID model to be predictive of person-level nonresponse.

[2] Indicates the unweighted percentage of NATES person-level cases for which information on the specified variable was not available in the sampling frame.

All responding (R) and nonresponding (N) persons were allocated to nonresponse adjustment cells defined by the characteristics identified by the CHAID analysis as being predictive of nonresponse. Table B.6 specifies the variables and values that defined the NATES person-level nonresponse adjustment cells.

Table B.6. NATES person-level nonresponse adjustment cells: 2013

Cell	Age	Income	Number of adults	Stratum	Education	Region	Home tenure	Dwelling type
1	6	1,2,3,4,5,6,9	†	†	†	†	†	†
2	6	7,8,10	†	†	†	†	†	†
3	3	3,4,8,9,10	†	†	†	†	†	†
4	3	1,2,5,6,7	†	†	†	†	†	†
5	4	†	1,4,6	†	†	†	†	†
6	4	†	3,5	†	†	†	†	†
7	4	2,5,6,8	2	†	†	†	†	†
8	4	3,4,7,9,10	2	†	†	†	†	†
9	5	†	†	1	†	†	†	†
10	5	†	†	2	†	†	†	†
11	5	†	5,7	3	†	†	†	†
12	5	†	1,6	3	1,4,5	†	†	†
13	5	†	1,6	3	2,3,99	†	†	†
14	5	1,2,4,9	2	3	†	†	†	†
15	5	6,7	2	3	†	†	†	†
16	5	3,5,8,10	2	3	†	2,4	†	†
17	5	3,5,8,10	2	3	†	1,3	†	†
18	5	5,6	3,4	3	†	†	†	†
19	5	7,10	3,4	3	†	†	†	†
20	5	1,2,3,4,8,9	4	3	†	†	†	†

See notes at end of table.

Table B.6. NATES person-level nonresponse adjustment cells: 2013—Continued

Cell	Age	Income	Number of adults	Stratum	Education	Region	Home tenure	Dwelling type
21	5	1,2,3,4,8,9	3	3	1,5,99	†	†	†
22	5	1,2,3,4,8,9	3	3	2,3,4	†	†	†
23	2,99	4	†	†	†	†	†	†
24	2,99	6,8	†	†	†	3,4	†	†
25	2,99	6,8	†	†	†	1,2	†	†
26	2,99	2,3,99	†	†	†	†	1	†
27	2,99	2,3,99	†	†	†	†	2,99	†
28	2,99	5,10	†	†	†	†	†	†
29	2,99	1,9,99	†	1	†	†	†	†
30	2,99	1,9,99	1	2,3	†	†	†	†
31	2,99	1,9,99	2,3,4,5,6,99	2,3	†	1	†	†
32	2,99	1,9,99	2,3,4,5,6,99	2,3	†	4	†	†
33	2,99	1,9,99	2,3,4,5,6,99	2,3	†	2,3	†	1
34	2,99	1,9,99	2,3,4,5,6,99	2,3	†	2,3	†	2,99

† Not applicable (variable was not used to define the specified cell).
NOTE: Adjustment cells were defined using Chi-Squared Automated Interaction Detection.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Each cell *c* was assigned a person non-interview adjustment factor (PNIAF) equal to the inverse of the weighted response rate within the cell:

$$PNIAF_c = \frac{\sum_{j \epsilon R} UPW_{jc} + \sum_{j \epsilon N} UPW_{jc}}{\sum_{j \epsilon R} UPW_{jc}}$$

where:

UPW_{jc} = the person-level base weight;
j = the person identifier;
c = the nonresponse adjustment cell identifier;
R = respondents; and
N = nonrespondents.

For all nonresponding persons, as well as all responding persons who reported that their age was outside the eligible age range, the person-level adjusted weight NPW was set equal to 0. For each eligible responding person *j*, the person-level adjusted weight was obtained by multiplying the person-level base weight by the PNIAF for the person's adjustment cell *c*:

$$NPW_j = UPW_j * PNIAF_{jc}$$

It is important to note that, relative to a person-level weighting procedure for a two-stage survey with a screener roster and within-household sampling, the person-level weighting procedure for NATES required a number of assumptions in order to determine the number of eligible persons and the number of nonrespondents in each household. This is attributable to two characteristics of the NATES data collection. First, rather than being asked to provide a roster of household members, households were asked to simply provide the number of eligible household members. As noted above, inconsistencies and errors in the responses to these items were found for a number of households. Second, rather than using a random procedure to sample individual eligible persons from within each household to receive the topical items, the single-stage design used for NATES required households to determine for themselves who was eligible to take the survey and ensure that all such individuals returned a set of topical item responses. Both of these factors could have led to errors in the estimation of the number of person-level eligible cases and nonrespondents in the NATES sample.

B.4 Variance Estimation

Overview of variance estimation procedures

In surveys with complex sample designs, direct estimates of standard errors typically underestimate the variability in the estimates (Wolter 1985). The NATES sample design and weighting included procedures that deviated from the assumption of simple random sampling, such as oversampling in areas with higher concentrations of Blacks and in high-poverty areas, and sampling households within PSUs with differential sampling probabilities. In order to reflect these aspects of the sample design and weighting, the standard errors of all estimates reported in this study were calculated using a jackknife replication procedure.

Replication involves splitting the entire sample into a set of groups, or replicates, based on the actual sample design of the survey. The survey estimates can then be computed for each replicate by creating replicate weights that mimic the actual sample design and estimation procedures used in the full sample. The variation in the estimates computed from the replicate weights can then be used to directly estimate the sampling errors of the estimates from the full sample.

To create replicate weights, the initial NATES sample of 10,000 households was divided into 70 random subsamples. The addresses were then assigned 70 replicate base-weight variables (REPBW1 through REPBW70) on the basis of the following procedures. REPBW1 was created by multiplying the full-sample base weight (HBW) by 0 if the household was in the first subsample and $\frac{70}{69}$ otherwise. Similarly, REPBW2 was created by multiplying HBW by 0 if the household was in the second subsample and $\frac{70}{69}$ otherwise. This procedure was repeated to create all 70 household-level replicate base weights.

The household-level replicate base weights were then multiplied by the adjustment factors defined in section B.2 to generate household-level replicate adjusted weights (HHW1-HHW70), person-level replicate base weights (UPW1-UPW70), and person-level replicate adjusted weights (NPW1-NPW70). Specifically, for each household *j*:

$$HHWn_j = REPBWn_j * HNIAF_{jc}$$

$$NPWn_j = UPWn_j * PNIAF_{jc}$$

$$UPWn_j = HHWn_j * PIF_j$$

where n = 1, 2, …, 70

Using the 70 jackknife replicate weights, the variance $v(\hat{\theta})$ of an estimate $\hat{\theta}$ can be estimated as:

$$v(\hat{\theta}) = \frac{69}{70}\sum_{i=1}^{70}(\hat{\theta}_i - \hat{\theta})^2$$

where:

UPW_{jc} = the person-level base weight;

$\hat{\theta}_i$ = the estimate calculated using the i^{th} replicate weight

$\hat{\theta}$ = the estimate calculated using the full-sample weight

The standard error $se(\hat{\theta})$ is the square root of the variance.

Variance of bias

A variant of the above formula was used to calculate the standard errors of the bias reported in sections 2.2.1 and 4.2. The variance of the difference between two estimated proportions $\hat{p}$ and $\hat{q}$ is given by:

$$v(\hat{p} - \hat{q}) = \frac{69}{70}\sum_{i=1}^{70}[(\hat{p}_i - \hat{q}_i) - (\hat{p} - \hat{q})]^2$$

The standard error of the difference is the square root of the variance of the difference. This formula was used to calculate the standard error of the bias in tables D.2 and D.6 by substituting the appropriate values for $\hat{p}$ and $\hat{q}$. Specifically, $\hat{p}$ represents the base-weighted proportion, while $\hat{q}$ represents the base-weighted eligible sample proportion.

B.5 Final Response Status and Household Size Determination

In order to calculate base weights and the response rate, it was necessary to determine three pieces of information: (1) the final response status for each sampled household, (2) the number of eligible adults living in each responding household, and (3) the final response status for each eligible adult living in each responding household.

Household-level response status

First, household-level response status was determined for each sampled address. Cases that returned at least one questionnaire booklet with at least one item answered by April 9, 2013, were considered to be *responding* households. Whether or not a household returned completed sets of topical item responses for *all* of the eligible adults was not taken into account in the determination of household-level response. Cases that only returned a blank questionnaire booklet or explicitly stated their refusal to participate in the survey were considered to be *nonresponding* households. All U.S. civilian, noninstitutional, occupied addresses were eligible for the survey; a sampled household was considered *ineligible* only if at least one survey mailing to that address was returned as undeliverable or as associated with a business—and if there were not any questionnaire booklets with at least one question answered returned from that address. Since person-level eligibility was not a criterion for establishing household-level eligibility, households whose screener item responses indicated that they had no eligible adults were still considered eligible. All households for which a questionnaire booklet or other response was never received were assigned a final response status of *unknown eligibility* because there was insufficient information to determine whether they were valid, occupied households.

Number of eligible adults living in responding households

Next, the number of eligible adults living in the household was determined. Generally, the number of eligible household members was the value reported in the second screener item (with the exception of households that had already indicated in response to the first item that there was no one in the target age range living in the household). However, as discussed further in chapter 4, a considerable proportion of respondents declined to provide an answer to this item or provided a response that appeared likely to be inaccurate. For example, in some of the individual-booklet households that returned multiple questionnaire booklets, the household members provided conflicting screener item responses. In such situations, the Census Bureau used data editing rules to assign a value for the estimated number of eligible household members, typically using the response to the first screener item or the number of eligible sets of topical items that were returned as a guide. Additional information about these editing rules can be found in appendix C.

Person-level response status

Finally, the person-level response status was determined within responding households. Adults living in responding households who were ages 16–65 and no longer in high school were eligible for the survey. All adults who completed at least one of the three key survey items (highest education completed, sex, or age) and did not report being outside of the target age range were considered to be respondents to the survey. There was no item that assessed whether respondents were still in high school, so it was not possible to validate individual-level eligibility on this criterion.

The number of adults returning an eligible, complete set of topical item responses in each household was considered to be the number of responding adults for that household. The number of nonresponding adults per household was determined by subtracting the number of eligible, responding adults from the number of eligible adults determined to be living in the household.

B.6 Response Rate Calculation

The overall response rate to the mailed NATES was the product of the household-level response rate and the person-level response rate. This section describes the procedures used to calculate first the household-level response rate and then the person-level response rate to NATES.

NATES household-level response rate

As was the case with the development of the NATES household-level adjusted weights (see section B.2), the response status of each sampled household was determined by its outcome code as of April 9, 2013 (the cutoff date for the mailed NATES data collection). Respondents (R) were households with an outcome code of "01" (complete), with a small number of exceptions. Nonrespondents (N) were households with outcome codes of "03" (blank) or "05" (soft refusal). Ineligible households (I) were households with outcome codes of "10" or "20" through "36," all of which correspond to various types of undeliverable as addressed (UAA) statuses. Cases of unknown eligibility (U) were households with an outcome code of "99"; these were cases for which no questionnaire booklet was returned and no information on the eligibility of the address was obtained.

The household-level response rate was calculated as the number of responding households divided by the number of responding and nonresponding households, plus the number of unknown-eligibility households estimated to be eligible. The number of unknown-eligibility households estimated to be eligible was calculated as the number of eligible households divided by the total number of sampled households minus the number of unknown-eligibility households. The response rate was calculated using the American Association for Public Opinion Research (AAPOR) response rate 3 (RR3) formula:

$$ee = \frac{\sum_{j \in R} HBW_j + \sum_{j \in N} HBW_j}{\sum_{j \in R} HBW_j + \sum_{j \in N} HBW_j + \sum_{j \epsilon I} HBW_j}$$

$$HRR = \frac{\sum_{j \epsilon R} HBW_j}{\sum_{j \epsilon R} HBW_j + \sum_{j \epsilon N} HBW_j + ee * \sum_{j \epsilon U} HBW_j}$$

where HBW_j = the household-level base weight for household *j*

Table B.7 provides the approximate unweighted count of sampled addresses with each household-level outcome code as of the April 9, 2013 cutoff.

Table B.7. NATES household-level outcome codes, definition of each outcome code, and number of sampled households with each outcome code: 2013

Outcome code	Definition	Number of sampled households
01	Complete[1]	5,480
03	Blank	60
05	Soft refusal	10
10	Out of scope	30
20	UAA with address correction	10
21	Not deliverable as addressed	150
22	Insufficient address	30
23	Moved, left no address	10
24	Unclaimed	#
25	Attempted - not known	40
26	No such street	#
27	No such street number	30
28	Vacant	560
30	No mail receptacle	20
31	P.O. box closed - no forwarding order	20
33	Deceased	10
34	Forwarding order has expired	#
36	UAA missing unit/apartment designation	10
99	Mailed, not yet returned	3,550

Rounds to zero.
[1] Approximately 860 households had outcome codes of "01," but were not included in the final NATES data file after the completeness check described in section B.1. Upon further examination, it was determined that approximately 850 of these households had indicated in the two screener items of the NATES questionnaire booklet that there were no eligible household members living at that address; these households were retained as complete cases because they had completed all parts of the questionnaire booklet that were relevant to them (the screener items). The remaining 10 households were reclassified as nonrespondents for the purpose of weighting and response rate calculation.
NOTE: Figures represent the unweighted count of sampled households with the specified outcome code as of April 9, 2013, the cutoff date for the NATES data collection. Counts are rounded to prevent disclosure of restricted-use information. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

NATES person-level and final response rates

For each household that returned at least one questionnaire booklet that passed the completeness check described in section B.1, the number of eligible persons and the number of nonrespondents in each household were estimated using the same procedure as in the development of person-level base and adjusted weights (see section B.2). Because there were no person-level cases of unknown eligibility, the use of an *ee* adjustment factor was unnecessary. Therefore, the person-level response rate was calculated as the sum of the person-level base weights for responding persons divided by the sum of the person-level base weights for responding and nonresponding persons:

$$PRR = \frac{\sum_{j \epsilon R} UPW_j}{\sum_{j \epsilon R} UPW_j + \sum_{j \epsilon N} UPW_j}$$

where UPW_j = the person-level base weight for person *j*

The overall response rate was calculated as the product of the household- and person-level response rates:

$$RR = HRR * PRR$$

Table B.8 provides the approximate unweighted count of respondents, nonrespondents, and ineligible cases at the person level.

Table B.8. NATES person-level outcomes: 2013

Outcome	Number of persons
Respondent	7,540
Nonrespondent[1]	290
Ineligible	530

[1] The number of person-level nonrespondents was estimated using questionnaire information on the number of eligible persons in each household.
NOTE: Counts are unweighted and are rounded to prevent the disclosure of restricted-use information.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

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APPENDIX C: EDITING RULES FOR DETERMINING NUMBER OF ELIGIBLE HOUSEHOLD MEMBERS

In order to calculate person-level weights, it was necessary for the Census Bureau to determine the number of people in each responding household who were eligible to participate in the survey. When possible, responses to the NATES screener items—the number of people ages 16–65 living in the household and the number of people ages 16-65 who were no longer in high school—were used to obtain this number. However, because of inconsistent or missing information for these items, several assumptions had to be made to develop a set of editing rules that were used to arrive at a final estimate of the number of eligible adults in the household, including relying on the number of completed, eligible sets of topical item responses the Census Bureau received per sampled address or household. Table C.1, on the following page, shows the different possible scenarios that were used to derive the assumptions about the data in the absence of responses to the screener items. The editing rules are listed below.

1. For households where the number of sets of topical item responses received equaled the number of people ages 16-65 living in the household, it was assumed that the number of completed sets of topical item responses was the correct number of eligible people in the household. See scenarios 3, 9, and 12, as well as others, in table C.1.
2. For households where the number of sets of topical item responses received did not agree with the number of people ages 16-65 reported to be living in the household, it was assumed that the larger of the number of people ages 16-65 no longer in high school and the number of completed sets of topical item responses was the correct number of eligible people in the household. See scenarios 1, 2, 4, 5, 7, and 8, as well as others. For example, in scenario 1 in table C.1, there were several NATES households where the respondent answered zero for both screener items, left both items blank, or answered with a combination of zero and blank. The number of completed sets of topical item responses would be the best estimate of the number of eligible people in the household for this example. This assumption took care of the following inconsistencies in the data:
    - It appeared that some individuals counted only themselves in the number of people ages 16–65, yet multiple completed sets of topical item responses were received for the household. Table C.1 illustrates these scenarios (4, 10, 14, and 15) and the information used to resolve this discrepancy.
    - Some respondents reported more people ages 16–65 no longer in high school than people ages 16–65, even though it is not possible to have more 16- to 65-year-olds no longer in high school than all 16- to 65-year-olds in the household. These scenarios (2, 7, 8, 14, and 15) and the variable used to resolve the discrepancy are illustrated in table C.1.
3. Some households returned booklets that had the screener check box marked indicating that everyone in the household between the ages 16 and 65 was in high school and therefore ineligible for the survey. Overall, the answers to this item, when compared to the other variables discussed here, indicated confusion about the purpose of the check box. As a result, having a mark in this check box ultimately was not used for determining the number of eligible people in the household, and is not incorporated into table C.1.

Table C.1. Editing rules for determining number of eligible household members

Scenario Number	Response to number of household member ages 16–65 (PPLAGES)	Response to number of adults ages 16–65 and no longer in high school (PPLAGESNOSCH)	Number of sets of topical item responses received per household (ELIGQS)	Variable to use for number of eligible people in the household ("m")	Reason for choice of variable to use for number of eligible people
1	0/missing	0/missing	1+	ELIGQS	Use ELIGQS since it is only information available
2	0/missing	1	2	ELIGQS	Use ELIGQS since PPLAGESNOSCH appears wrong
3	1	0/missing	1	ELIGQS	Use ELIGQS because do not know number of eligible people
4	1	0/missing	2	ELIGQS	Use ELIGQS because do not know number of eligible people
5	2	0/missing	1	ELIGQS	Use ELIGQS because do not know number of eligible people
6	0/missing	1	1	PPLAGESNOSCH	Use PPLAGESNOSCH because trust response for this item
7	0/missing	2	1	PPLAGESNOSCH	Use PPLAGESNOSCH because trust response for this item
8	0/missing	5+	2	PPLAGESNOSCH	Use PPLAGESNOSCH because trust response for this item
9	1	1	1	ELIGQS	Use ELIGQS because it agrees with PPLAGES
10	1	1	2	ELIGQS	Use ELIGQS since PPLAGESNOSCH appears wrong and PPLAGES is wrong
11	1	2	2	PPLAGESNOSCH	Use PPLAGESNOSCH because it agrees with ELIGQS and PPLAGES is wrong

See note at end of table.

Table C.1. Editing rules for determining number of eligible household members—Continued

Scenario Number	Response to number of household member ages 16–65 (PPLAGES)	Response to number of adults ages 16–65 and no longer in high school (PPLAGESNOSCH)	Number of sets of topical item responses received per household (ELIGQS)	Variable to use for number of eligible people in the household ("m")	Reason for choice of variable to use for number of eligible people
12	1	2	1	ELIGQS	Use ELIGQS because it agrees with PPLAGES and PPLAGESNOSCH appears wrong
13	1	3	3	PPLAGESNOSCH	Use PPLAGESNOSCH because it agrees with ELIGQS and PPLAGES is wrong
14	1	5+	3	PPLAGESNOSCH	Use PPLAGESNOSCH because trust response for this item. Cannot use PPLAGES since it is wrong per the number of forms received. "m" will be used to adjust the person base weight for the number of people in PPLAGESNOSCH over the number expected. If this scenario is encountered, the number of nonrespondents to adjust for will be 3-ELIGQS.
15	1	4	2	PPLAGESNOSCH	Use PPLAGESNOSCH because trust response for this item. Cannot use PPLAGES since it is wrong per the number of forms received. "m" will be used to adjust the person base weight for the number of people in PPLAGESNOSCH over the number expected. If this scenario is encountered, the number of nonrespondents to adjust for will be 3-ELIGQS.
16	2	1	2	ELIGQS	Use ELIGQS because it agrees with PPLAGES and PPLAGESNOSCH appears wrong

See note at end of table.

Table C.1. Editing rules for determining number of eligible household members—Continued

Scenario Number	Response to number of household member ages 16–65 (PPLAGES)	Response to number of adults ages 16–65 and no longer in high school (PPLAGESNOSCH)	Number of sets of topical item responses received per household (ELIGQS)	Variable to use for number of eligible people in the household ("m")	Reason for choice of variable to use for number of eligible people
17	2	1	1	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
18	2	2	1	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
19	3	1	2	ELIGQS	Use ELIGQS because PPLAGESNOSCH appears wrong
20	3	2	2	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
21	3	2	1	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense vs. PPLAGES and ELIGQS
22	3	4	3	ELIGQS	Use ELIGQS because it agrees with PPLAGES and PPLAGESNOSCH appears wrong
23	2	3	2	ELIGQS	Use ELIGQS because it agrees with PPLAGES and PPLAGESNOSCH appears wrong
24	1	4	4	PPLAGESNOSCH	Use PPLAGESNOSCH because it agrees with ELIGQS and PPLAGES is wrong
25	2	3	4	ELIGQS	Use ELIGQS since PPLAGESNOSCH appears wrong and PPLAGES is wrong

See note at end of table.

Table C.1. Editing rules for determining number of eligible household members—Continued

Scenario Number	Response to number of household member ages 16–65 (PPLAGES)	Response to number of adults ages 16–65 and no longer in high school (PPLAGESNOSCH)	Number of sets of topical item responses received per household (ELIGQS)	Variable to use for number of eligible people in the household ("m")	Reason for choice of variable to use for number of eligible people
26	4	5+	4	ELIGQS	Use ELIGQS because agrees with PPLAGES and PPLAGESNOSCH appears wrong
27	4	3	4	ELIGQS	Use ELIGQS because it agrees with PPLAGES and PPLAGESNOSCH appears wrong
28	4	3	2	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
29	5+	4	3	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
30	1	3	2	PPLAGESNOSCH	Use PPLAGESNOSCH because trust response for this item. PPLAGES is wrong per the number of forms received
31	3	3	1	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
32	3	3	5	ELIGQS	Use ELIGQS because PPLAGES and PPLAGESNOSCH are wrong per the number of forms received
33	3	3	2	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
34	5+	5+	5	PPLAGESNOSCH	Use PPLAGESNOSCH where PPLAGES=PPLAGESNOSCH=ELIGQS

See note at end of table.

Table C.1. Editing rules for determining number of eligible household members—Continued

Scenario Number	Response to number of household member ages 16–65 (PPLAGES)	Response to number of adults ages 16–65 and no longer in high school (PPLAGESNOSCH)	Number of sets of topical item responses received per household (ELIGQS)	Variable to use for number of eligible people in the household ("m")	Reason for choice of variable to use for number of eligible people
35	0/missing	1	5	ELIGQS	Use ELIGQS since PPLAGESNOSCH appears wrong and PPLAGES is wrong
36	0/missing	2	5	ELIGQS	Use ELIGQS since PPLAGESNOSCH appears wrong and PPLAGES is wrong
37	0/missing	5+	5	PPLAGESNOSCH	Use PPLAGESNOSCH because it agrees with ELIGQS and PPLAGES is wrong
38	5+	5+	4	PPLAGESNOSCH	Use PPLAGESNOSCH because it makes sense compared to PPLAGES and ELIGQS
39	4	4	5	ELIGQS	Use ELIGQS since PPLAGESNOSCH appears wrong and PPLAGES is wrong

Note: Scenarios where more than 3 sets of topical item responses were returned were rare given the decision not to send additional booklets to households that requested them.

APPENDIX D: ADDITIONAL TABLES

Table D.1. Summary of logistic regression analyses for variables predicting whether or not all eligible household members responded to the survey

Characteristic	Coeff.	SE	Odds ratio
Number of eligible household members	-1.69*	0.07	0.18
Intercept	5.98*	0.22	394.51

* Significant ($p < .05$)
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.2. Percentage distribution of NATES eligible sample and respondents, by selected frame characteristics: 2013

Selected frame characteristic	Percentage of eligible sample	Percentage of respondents
Race/ethnicity stratum		
Black	14.8	12.9*
Hispanic	9.6	7.5*
Other	75.7	79.6*
Ethnicity of the head of household		
Missing	36.7	32.4*
White	44.4	49.6*
Black	6.8	6.3*
Hispanic	6.4	5.5*
Asian/Pacific Islander	2.6	2.8
Other	3.1	3.4*
Household income		
Missing	15.6	11.2*
$0–$10,000	2.7	2.0*
$10,001–$20,000	5.7	4.8*
$20,001–$30,000	8.3	7.9
$30,001–$40,000	9.2	8.6
$40,001–$50,000	9.5	10.0
$50,001–$60,000	8.9	9.1
$60,001–$75,000	10.8	11.8*
$75,001–$100,000	12.8	14.5*
$100,001–$150,000	11.3	14.0*
$150,001 +	5.2	6.2*
Address route type		
High rise	19.6	14.8*
Street	71.7	77.9*

See notes at end of table.

Table D.2. Percentage distribution of NATES eligible sample and respondents, by selected frame characteristics: 2013—Continued

Selected frame characteristic	Percentage of eligible sample	Percentage of respondents
Rural route	‡	‡
P.O. box	8.3	6.9*
Education of head of household		
Missing or unknown	40.4	35.7*
Less than high school diploma	10.2	9.8
High school diploma	16.8	18.3*
Some college	15.6	16.1
Bachelor's degree	10.6	12.4*
Graduate degree	6.4	7.8*
Age of head of household		
Missing or unknown	38.6	31.1*
18–24	1.3	1.1
25–34	6.0	5.7
35–44	11.0	11.4
45–54	14.5	15.3*
55–65	15.0	17.6*
Over 65	13.6	17.8*
Poverty		
High	17.6	14.4*
Not high	82.4	85.6*
Phone number matched on sampling frame		
Matched	41.5	48.2*
Not matched	58.5	51.8*
Number of adults in household		
Missing	15.9	11.3*
1	34.3	31.6*
2	27.6	31.8*
3	13.4	15.1*
4	5.7	6.5*
5	2.1	2.5*
6	0.8	0.9
7	0.2	0.3*
8	‡	‡
Home tenure		
Missing	20.8	15.5*
Own	61.2	70.8*

See notes at end of table.

Table D.2. Percentage distribution of NATES eligible sample and respondents, by selected frame characteristics: 2013—Continued

Selected frame characteristic	Percentage of eligible sample	Percentage of respondents
Rent	18.0	13.7*
Census region		
Northeast	18.0	18.4
South	38.7	37.1*
Midwest	21.3	23.0*
West	22.0	21.5
Dwelling type		
Missing	8.3	6.9*
Single-family unit	70.0	76.6*
Multi-unit	21.7	16.5*
Gender of head of household		
Missing or unknown	18.1	12.9*
Female	26.1	25.2
Male	55.8	61.9*
Marital status of head of household		
Missing	31.2	26.7*
Married	47.1	53.7*
Single	21.7	19.6*

* Significantly different ($p < .05$) from the eligible sample.
‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.
NOTE: The figures shown in this table are household-level base-weighted estimates. The estimates represent the proportion of eligible sampled households or responding households with the specified characteristic. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.2A. Standard errors for Table D.2: Percentage distribution of NATES eligible sample and respondents, by selected frame characteristics: 2013

Selected frame characteristic	Overall	
	SE of eligible sample	SE of respondents
Race/ethnicity stratum		
Black	1.08	1.15
Hispanic	0.69	0.70
Other	1.17	1.24
Ethnicity of head of household		
Missing	0.78	0.87
White	0.98	1.04
Black	0.60	0.64
Hispanic	0.39	0.42
API	0.18	0.24
Other	0.22	0.27
Household income		
Missing	0.51	0.59
$0–$10,000	0.30	0.32
$10,001–$20,000	0.33	0.42
$20,001–$30,000	0.40	0.59
$30,001–$40,000	0.47	0.60
$40,001–$50,000	0.45	0.59
$50,001–$60,000	0.49	0.55
$60,001–$75,000	0.47	0.60
$75,001–$100,000	0.48	0.61
$100,001–$150,000	0.41	0.57
$150,001+	0.25	0.33
Address route type		
High rise	0.48	0.55
Street	0.65	0.82
Rural route	†	†
P.O. box	0.47	0.56
Education of head of household		
Less than high school diploma	0.49	0.60
Missing or unknown	0.81	0.90
High school diploma	0.65	0.84
Some college	0.49	0.63
Bachelor's degree	0.41	0.49
Graduate degree	0.34	0.42
Age of head of household		
Missing or unknown	0.92	0.96
18–24	0.13	0.13
25–34	0.33	0.47
35–44	0.59	0.76
45–54	0.52	0.64

See notes at end of table.

Table D.2A. Standard errors for Table D.2: Percentage distribution of NATES eligible sample and respondents, by selected frame characteristics: 2013—Continued

	Overall	
Selected frame characteristic	**SE of eligible sample**	**SE of respondents**
55–65	0.63	0.73
Over 65	0.53	0.80
Poverty		
High	0.80	0.94
Not high	0.80	0.94
Phone number matched on sampling frame		
Matched	0.89	1.02
Not matched	0.89	1.02
Number of adults in household		
Missing	0.52	0.59
1	0.66	0.90
2	0.75	0.92
3	0.54	0.78
4	0.37	0.51
5	0.25	0.35
6	0.10	0.15
7	0.04	0.06
8	†	†
Home tenure		
Missing	0.61	0.69
Own	0.86	0.89
Rent	0.59	0.60
Census region		
Northeast	1.80	2.08
South	2.70	2.78
Midwest	2.23	2.44
West	2.08	2.24
Dwelling type		
Missing	0.47	0.56
Single-family unit	0.54	0.75
Multi-unit	0.46	0.55
Gender of head of household		
Missing or unknown	0.56	0.65
Female	0.56	0.77
Male	0.75	0.90
Marital status of head of household		
Missing	0.69	0.72
Married	0.78	0.89
Single	0.55	0.65

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.3. Overall number of sampled NATES households, by booklet condition and response status: 2013

Response status	Composite booklet	Individual booklets
Total	5,000	5,000
Respondent[1]	2,740	2,730
Nonrespondent[2]	40	30
Ineligible[3]	450	450
Unknown eligibility[4]	1,760	1,790

[1] Respondent cases are those for which at least one questionnaire booklet was returned with a response to at least one item.
[2] Nonrespondent cases are those that only returned blank questionnaire booklets or indicated that they did not want to participate in the survey.
[3] Ineligible cases are those in which at least one questionnaire booklet was returned as undeliverable and no questionnaire booklets with at least one item answered were received from the household.
[4] Cases of unknown eligibility are those for which no questionnaire booklet was returned and no information on the eligibility of the address was obtained.
NOTE: Counts are unweighted and are rounded to prevent the disclosure of restricted-use information. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.4. Number of persons in responding NATES households, by booklet condition and response status: 2013

Response status	Composite booklet	Individual booklets
Total	4,030	4,330
Respondent[1]	3,710	3,830
Nonrespondent[2]	40	250
Ineligible[3]	280	250

[1] Respondent cases are those for which a set of topical item responses was returned that had a response to at least one of three critical items and did not provide an age response outside of the eligible range.
[2] The number of person-level nonrespondents was estimated using information on the number of eligible persons in each household and the number of respondents in each household.
[3] Ineligible cases are those for which a set of topical item responses was returned that included an age response outside of the eligible age range.
NOTE: Counts are unweighted and are rounded to prevent the disclosure of restricted-use information. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.5. Percentage distribution of responding households with at least one eligible adult, by booklet condition and number of eligible, complete sets of topical item responses returned: 2013

Number of sets of eligible, complete topical item responses returned	Composite booklet	Individual booklet
1	41.0	40.2
2	47.1	45.6
3	11.6	13.6
4+	0.2	0.6

* Significantly different ($p < .05$) from the composite-booklet condition.
NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates represent the proportion of responding households with at least one eligible adult that returned the number of eligible, complete sets of topical item responses shown. Sets of topical item responses were considered eligible and complete if they had a response to at least one key item and did not provide an age response outside of the eligible range. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.5A. Standard errors for Table D.5: Percentage distribution of responding households with at least one eligible adult, by booklet condition and number of eligible, complete sets of topical item responses returned: 2013

Number of sets of eligible, complete topical item responses returned	Composite booklet	Individual booklet
1	1.68	1.38
2	1.52	1.27
3	1.01	1.09
4+	0.10	0.14

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.6. Percentage distribution of NATES eligible sample and NATES respondents, by booklet condition and selected frame characteristics: 2013

Selected frame characteristic	Percentage of eligible sample	Percentage of composite-booklet respondents	Percentage of individual-booklet respondents
Race/ethnicity stratum			
Black	14.8	13.3*	12.4*
Hispanic	9.6	6.9*	8.1*
Other	75.7	79.8*	79.4*
Race/ethnicity of head of household[1]			
Missing	36.7	32.6*	32.2*
White	44.4	49.4*	49.8*
Black	6.8	6.6	5.9*
Hispanic	6.4	5.5*	5.5*
Asian/Pacific Islander	2.6	2.7	2.8
Other	3.1	3.1	3.7*
Household income			
Missing	15.6	11.8*	10.7*
$0–$10,000	2.7	1.6*	2.4
$10,001–$20,000	5.7	5.2	4.4*
$20,001–$30,000	8.3	8.0	7.7
$30,001–$40,000	9.2	8.5	8.8
$40,001–$50,000	9.5	10.3	9.7
$50,001–$60,000	8.9	9.3	8.8
$60,001–$75,000	10.8	10.9	12.7*
$75,001–$100,000	12.8	14.2*	14.9*
$100,001–$150,000	11.3	13.5*	14.4*
$150,001+	5.2	6.8*	5.6
Address route type			
High rise	19.6	14.7*	14.8*
Street	71.7	77.9*	77.8*
Rural route	‡	‡	‡
P.O. box	8.3	6.7*	7.2
Education of head of household			
Missing or unknown	40.4	35.5*	35.9*
Less than high school diploma	10.2	10.0	9.5
High school diploma	16.8	17.9	18.7*
Some college	15.6	16.1	16.0
Bachelor's degree	10.6	12.8*	12.0*
Graduate degree	6.4	7.8*	7.8*

See notes at end of table.

Table D.6. Percentage distribution of NATES eligible sample and NATES respondents, by booklet condition and selected frame characteristics: 2013—Continued

Selected frame characteristic	Percentage of eligible sample	Percentage of composite-booklet respondents	Percentage of individual-booklet respondents
Age of head of household			
Missing or unknown	38.6	31.7*	30.5*
18–24	1.3	1.1	1.1
25–34	6.0	6.0	5.4
35–44	11.0	11.7	11.1
45–54	14.5	15.3	15.3
55–65	15.0	16.9*	18.2*
Over 65	13.6	17.3*	18.3*
Poverty			
High	17.6	14.6*	14.3*
Not high	82.4	85.4*	85.7*
Phone number matched on sampling frame			
Matched	41.5	47.8*	48.6*
Not matched	58.5	52.2*	51.4*
Number of adults in household			
Missing	15.9	11.8*	10.8*
1	34.3	32.6	30.7*
2	27.6	31.1*	32.4*
3	13.4	14.7	15.6*
4	5.7	6.2	6.8
5	2.1	2.4	2.6
6	0.8	1.0	0.7
7	0.2	0.3	0.3
8	‡	‡	‡
Home tenure			
Missing	20.8	15.5*	15.5*
Own	61.2	70.4*	71.2*
Rent	18.0	14.1*	13.4*
Census region			
Northeast	18.0	18.4	18.3
South	38.7	38.9	35.3*
Midwest	21.3	21.9	24.1*
West	22.0	20.8	22.3

See notes at end of table.

Table D.6. Percentage distribution of NATES eligible sample and NATES respondents, by booklet condition and selected frame characteristics: 2013—Continued

Selected frame characteristic	Percentage of eligible sample	Percentage of composite-booklet respondents	Percentage of individual-booklet respondents
Dwelling type			
Missing	8.3	6.7*	7.2
Single-family unit	70.0	77.1*	76.1*
Multi-unit	21.7	16.2*	16.7*
Gender of head of household			
Missing or unknown	18.1	13.1*	12.7*
Female	26.1	26.3	24.1*
Male	55.8	60.6*	63.3*
Marital status of head of household			
Missing	31.2	28.5*	24.9*,**
Married	47.1	51.4*	56.0*,**
Single	21.7	20.1*	19.1*

* Significantly different ($p < 0.05$) from the eligible sample.
** Significant difference ($p < 0.05$) between composite-booklet respondents and individual-booklet respondents.
‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.
[1] Race/ethnicity categories were based on the vendor frame variable "ethnicity," which combined race and ethnicity into one variable. "White" includes these categories from the vendor's frame: Czech, Dutch, Eastern European, English, French, German, Greek, Irish, Italian, Jewish, Middle Eastern, Polish, Portuguese, Russian, Scandinavian, Scottish, Swiss, Ukrainian, and Western European. "Black" includes African and African American. "Hispanic" includes Hispanic. "Asian or Pacific Islander" includes Asian, Chinese, Hawaiian, Indonesian, Japanese, Korean, Polynesian, and Vietnamese. "Other, unknown" includes Miscellaneous Other, Native American, and unknown.
NOTE: The figures shown in this table are household-level base-weighted estimates. These estimates represent the proportion of eligible sampled households or responding households with the specified characteristic. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.6A. Standard errors for Table D.6: Percentage distribution of NATES eligible sample and NATES respondents, by booklet condition and selected frame characteristics: 2013

Selected frame characteristic	SE of eligible sample	SE of composite-booklet respondents	SE of individual-booklet respondents
Race/ethnicity stratum			
Black	1.08	1.26	1.18
Hispanic	0.69	0.78	0.80
Other	1.17	1.38	1.31
Ethnicity of head of household			
Missing	0.78	1.06	1.27
White	0.98	1.27	1.39
Black	0.60	0.75	0.67
Hispanic	0.39	0.56	0.52
Asian/Pacific Islander	0.18	0.35	0.29
Other	0.22	0.37	0.37
Household income			
Missing	0.51	0.89	0.73
$0–$10,000	0.30	0.25	0.57
$10,001–$20,000	0.33	0.79	0.44
$20,001–$30,000	0.40	0.80	0.78
$30,001–$40,000	0.47	0.76	0.83
$40,001–$50,000	0.45	0.77	0.93
$50,001–$60,000	0.49	0.81	0.76
$60,001–$75,000	0.47	0.71	0.95
$75,001–$100,000	0.48	0.88	0.77
$100,001–$150,000	0.41	0.64	0.86
$150,001+	0.25	0.50	0.42
Address route type			
High rise	0.48	0.67	0.77
Street	0.65	0.99	1.27
Rural route	†	†	†
P.O. box	0.47	0.69	0.99
Education of head of household			
Missing or unknown	0.49	1.01	1.30
Less than high school diploma	0.81	0.91	0.88
High school diploma	0.65	0.94	1.19
Some college	0.49	0.86	0.93
Bachelor's degree	0.41	0.73	0.74
Graduate degree	0.34	0.59	0.57
Age of head of household			
Missing or unknown	0.92	1.21	1.27

See notes at end of table.

Table D.6A. Standard errors for Table D.6: Percentage distribution of NATES eligible sample and NATES respondents, by booklet condition and selected frame characteristics: 2013—Continued

Selected frame characteristic	SE of eligible sample	SE of composite booklet-respondents	SE of individual-booklet respondents
18–24	0.13	0.16	0.21
25–34	0.13	0.65	0.60
35–44	0.59	0.93	0.86
45–54	0.52	0.86	0.90
55–65	0.63	0.93	0.96
Over 65	0.53	0.93	1.14
Poverty			
High	0.80	1.22	0.97
Not high	0.80	1.22	0.97
Phone number matched on sampling frame			
Matched	0.89	1.35	1.40
Not matched	0.89	1.35	1.40
Number of adults in household			
Missing	0.52	0.89	0.73
1	0.66	1.48	1.15
2	0.75	1.30	1.28
3	0.54	0.97	1.00
4	0.37	0.58	0.85
5	0.25	0.37	0.55
6	0.10	0.23	0.18
7	0.04	0.09	0.09
8	†	†	†
Home tenure			
Missing	0.61	0.94	0.87
Own	0.86	1.19	1.20
Rent	0.59	0.89	0.84
Census region			
Northeast	1.80	2.12	2.14
South	2.70	2.96	2.81
Midwest	2.23	2.63	2.58
West	2.08	2.34	2.40
Dwelling type			
Missing	0.47	0.69	0.99
Single-family unit	0.54	0.82	1.28
Multi-unit	0.46	0.64	0.81
Gender of head of household			
Missing or unknown	0.56	0.87	0.84
Female	0.56	1.11	1.05

See notes at end of table.

Table D.6A. Standard errors for Table D.6: Percentage distribution of NATES eligible sample and NATES respondents, by booklet condition and selected frame characteristics: 2013—Continued

Selected frame characteristic	SE of eligible sample	SE of composite-booklet respondents	SE of individual-booklet respondents
Male	0.75	1.19	1.24
Marital status of head of household			
Missing	0.69	0.94	1.04
Married	0.78	1.03	1.35
Single	0.55	0.90	0.95

† Not applicable.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.7. Percentage distribution of respondents, by survey, booklet condition, and selected characteristics: 2013

Respondent characteristic	NATES		CPS
	Composite booklet	Individual booklet	
Sex			
Male	46.8*	45.8*	49.0
Female	53.2*	54.2*	51.0
Age			
18–24	9.6*	10.2*	15.2
25–34	16.8*	17.2*	21.1
35–44	19.9	18.2*	20.2
45–54	25.3*	26.2*	22.1
55–65	28.5*	28.3*	21.5
Race/ethnicity			
White, non-Hispanic	70.4*	70.4*	63.3
Black, non-Hispanic	9.8*	9.0*	12.3
Hispanic	10.9*	12.2*	16.5
Other race, non-Hispanic	8.9	8.5	8.0
Highest degree or school completed			
Less than high school	9.0	9.3	9.9
High school completion	24.8*	23.5*	30.1
Some college or associate's degree	32.3	32.6*	30.2
Bachelor's degree	20.6	21.3	19.7
Graduate or professional degree	13.3*	13.3*	10.1
Household income			
$0–$30,000	21.9	24.9*	20.9
$30,001–$75,000	38.8*	34.9	35.4
$75,001+	39.2*	40.2*	43.7

* Significantly different ($p < .05$) from the CPS.
** Significant difference ($p < .05$) between the composite-booklet condition and the individual-booklet condition.
NOTE: Only respondents ages 18-65 were included in this analysis in order to maximize comparability between the NATES and CPS datasets. The figures in this table are person-level base-weighted estimates. Observations with missing data for a given variable are excluded from that analysis. Detail may not sum to totals because of rounding.
SOURCE: U.S. Census Bureau, Current Population Survey (CPS), March 2013; and U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.7A. Standard errors for Table D.7: Percentage distribution of respondents, by survey, booklet condition, and selected characteristics: 2013

Respondent characteristic	NATES		CPS
	Composite booklet	Individual booklet	
Sex			
Male	0.78	0.90	0.20
Female	0.78	0.90	0.20
Age			
18–24	0.91	0.58	0.15
25–34	1.07	0.91	0.16
35–44	1.18	0.85	0.16
45–54	1.10	1.20	0.16
55–65	1.25	1.20	0.16
Race/ethnicity			
White, non-Hispanic	1.52	1.32	0.20
Black, non-Hispanic	1.00	1.00	0.14
Hispanic	0.89	0.98	0.16
Other race, non-Hispanic	0.79	0.58	0.11
Highest degree or school completed			
Less than high school	0.72	0.74	0.12
High school completion	1.18	1.22	0.18
Some college or associate's degree	1.11	1.20	0.18
Bachelor's degree	0.83	0.88	0.16
Graduate or professional degree	0.80	0.68	0.12
Household income			
$0–30,000	1.28	1.37	0.16
$30,001–75,000	1.64	1.38	0.19
$75,001+	1.66	1.54	0.20

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and U.S. Census Bureau, Current Population Survey (CPS), March 2013.

Table D.8. Percentage distribution of responses to key items, by survey, booklet condition, and items: 2010 and 2013

Key items	NATES		ATES pilot study
	Composite booklet	Individual booklets	
Q1 (highest degree or school completed)			
Less than high school	9.0*	9.3*	14.8
High school completion	24.8*	23.5*	29.7
Some college or associate's degree	32.3*	32.6*	26.8
Bachelor's degree	20.6*	21.3*	17.8
Graduate or professional degree	13.3*	13.3*	10.9
Q4 (certification/license)			
Has a certification/license	30.5	28.0*	31.5
Does not have a certification/license	69.5	72.0*	68.5
Q20 (educational certificate)			
Has an educational certificate	14.2	13.1	13.6
Does not have an educational certificate	85.8	86.9	86.4
Q29 (apprenticeship)			
Completed apprenticeship	6.7	7.0	†
Currently participating in apprenticeship	0.5	0.5	†
Never participated in apprenticeship	92.8	92.5	†
Q35 (college courses)			
Enrolled in college courses	9.6	10.1	†
Not enrolled in college courses	90.4	89.9	†
Q46 (other work-related instruction or training)			
Participated in last 12 months	33.0	32.2	†
Did not participate in the last 12 months	67.0	67.8	†
Q52 (employment status)			
Employed last week	69.6	69.2	†
Not employed last week	30.4	30.8	†

* Significantly different ($p < 0.05$) from the ATES pilot study.
** Significant difference ($p < .05$) between the composite-booklet condition and the individual-booklet condition.
† Not applicable. Equivalent item not included in the ATES pilot study.
NOTE: Only respondents ages 18-65 were included in this analysis in order to maximize comparability between the NATES and ATES datasets. The figures shown in the table are person-level, nonresponse-adjusted weighted estimates. Observations with missing data for a given variable are excluded from that analysis. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and Adult Training and Education Survey (ATES) pilot study, 2010.

Table D.8A. Standard errors for Table D.8: Percentage distribution of responses to key items, by survey, booklet condition, and items: 2010 and 2013

Key items	NATES		ATES pilot study
	Composite booklet	Individual booklets	
Q1 (highest degree or level of school completed)			
Less than high school	0.72	0.74	0.36
High school completion	1.18	1.22	0.96
Some college or associate's degree	1.11	1.20	0.90
Bachelor's degree	0.83	0.88	0.56
Graduate or professional degree	0.80	0.68	0.49
Q4 (certification/license)			
Has a certification/license	1.24	0.91	0.95
Does not have a certification/license	1.24	0.91	0.95
Q20 (educational certificate)			
Has an educational certificate	0.86	0.74	0.69
Does not have an educational certificate	0.86	0.74	0.69
Q29 (apprenticeship)			
Completed apprenticeship	0.52	0.69	†
Currently participating in apprenticeship	0.13	0.10	†
Never participated in apprenticeship	0.53	0.68	†
Q35 (college courses)			
Enrolled in college courses	0.68	0.59	†
Not enrolled in college courses	0.68	0.59	†
Q46 (other work-related instruction or training)			
Participated in last 12 months	1.11	1.16	†
Did not participate in the last 12 months	1.11	1.16	†
Q52 (employment status)			
Employed last week	1.19	1.17	†
Not employed last week	1.19	1.17	†

† Not applicable. Equivalent item not included in the ATES pilot study.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and Adult Training and Education Survey (ATES) pilot study, 2010.

Table D.9. Item nonresponse rates in NATES, by booklet condition and key survey items: 2013

Key survey items	Composite booklet	Individual booklet
Q1 (educational attainment)	1.2	1.4
Q4 (certification /license)	1.8	2.2
Q20 (educational certificate)	2.3	1.8
Q29 (apprenticeship)	2.9	2.6
Q35 (enrollment in college courses)	2.4	2.0
Q46 (other work-related instruction or training)	2.3	1.9
Q52 (employment status)	2.8	2.2

* Significantly different ($p < .05$) from the composite-booklet condition.
NOTE: The figures shown in this table are person-level base-weighted estimates. The rate of item nonresponse was determined by dividing the number of survey respondents who did not answer the question by the number of respondents who should have answered the question.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.9A. Standard errors for Table D.9: Item nonresponse rates in NATES, by booklet condition and key survey items: 2013

Key survey items	Composite booklet	Individual booklet
Q1 (educational attainment)	0.25	0.20
Q4 (certification /license)	0.33	0.36
Q20 (educational certificate)	0.34	0.28
Q29 (apprenticeship)	0.36	0.37
Q35 (enrollment in college courses)	0.38	0.37
Q46 (other work-related instruction or training)	0.33	0.28
Q52 (employment status)	0.41	0.38

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.10. Percentage of skip errors of omission in NATES, by booklet condition and key survey items: 2013

Key survey items	Composite booklet	Individual booklet
Q1 (educational attainment)	2.0	2.3
Q4 (certification /license)	4.2	3.2
Q20 (educational certificate)	4.7	3.9
Q29 (apprenticeship)	3.2	2.8
Q35 (enrollment in college courses)	2.4	2.2
Q46 (other work-related instruction or training)	2.9	2.8
Q52 (employment status)	5.0	5.2

* Significantly different ($p < .05$) from the composite-booklet condition.
NOTE: The figures shown in this table are person-level base-weighted estimates. The rate of skip errors of omission was determined by dividing the number of survey respondents who did not answer the correct follow-up question after the branching item divided by the number of respondents who were asked that branching item.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table D.10A. Standard errors for Table D.10: Percentage of skip errors of omission in NATES, by booklet condition and key survey items: 2013

Key survey items	Composite booklet	Individual booklets
Q1 (educational attainment)	0.27	0.29
Q4 (certification /license)	0.47	0.36
Q20 (educational certificate)	0.48	0.41
Q29 (apprenticeship)	0.39	0.38
Q35 (enrollment in college courses)	0.42	0.29
Q46 (other work-related instruction or training)	0.38	0.46
Q52 (employment status)	0.49	0.52

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

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APPENDIX E: STANDARD ERROR TABLES

Table E.1. Standard errors for Table 2.3: Percentage distribution of responding households, by survey and number of eligible adults: 2013

	Overall		With at least one eligible adult	
Number of eligible adults	NATES	CPS	NATES	CPS
0	0.66	0.18	†	†
1	0.76	0.21	0.85	0.24
2	0.84	0.22	0.95	0.25
3	0.66	0.15	0.77	0.17
4+	0.22	0.15	0.26	0.18

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and U.S. Census Bureau, Current Population Survey (CPS), March 2013.

Table E.2. Standard errors for Table 2.4: Percentage distribution of responding households with at least one eligible adult, by number of eligible, complete sets of topical item responses returned: 2013

Number of eligible, complete sets of topical item responses returned	Overall
1	0.95
2	0.95
3	0.77
4+	0.08

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.3. Standard errors for Table 2.5: Percentage of responding households with at least one eligible adult, by proportion of eligible adults who responded and number of eligible adults in household: 2013

Total number of eligible adults in household	All eligible adults responded	Some eligible adults responded
Overall	0.65	0.65
1	0.00	0.00
2	0.47	0.47
3	1.33	1.33
4+	3.42	3.42

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.4. Standard errors for Table 2.6: Percentage of identical responses within responding households that returned at least two sets of eligible, complete topical item responses, by number of eligible, complete sets of topical item responses returned and selected items: 2013

Selected items	Overall	Number of eligible, complete sets of topical item responses returned	
		2	3+
Q1 (educational attainment)	1.13	1.31	3.04
Q4 (certification/license)	1.17	1.36	2.62
Q20 (educational certificate)	1.33	1.43	2.99
Q29 (apprenticeship)	1.14	1.25	2.64
Q35 (college courses)	0.83	0.95	2.68
Q46 (other work-related instruction or training)	1.28	1.36	3.01
Q52 (employment status)	1.34	1.52	2.78
Q70 (sex)	0.84	0.87	1.50
Q71 (age category)	1.28	1.44	0.86
Q74/75 (race/ethnicity)	0.95	1.05	2.07

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.5. Standard errors for Table 2.7: Percentage distribution of respondents, by survey and selected characteristics: 2013

Respondent characteristic	NATES	CPS
Sex		
Male	0.60	0.20
Female	0.60	0.20
Age		
18–24	0.56	0.15
25–34	0.79	0.16
35–44	0.68	0.16
45–54	0.81	0.16
55–65	0.85	0.16
Race/ethnicity		
White, non-Hispanic	1.16	0.20
Black, non-Hispanic	0.80	0.14
Hispanic	0.79	0.16
Other race, non-Hispanic	0.55	0.11
Highest degree or school completed		
Less than high school	0.57	0.12
High school completion	0.92	0.18
Some college or associate's degree	0.85	0.18
Bachelor's degree	0.64	0.16
Graduate or professional degree	0.49	0.12
Household income		
$0–30,000	0.91	0.16
$30,001–75,000	1.04	0.19
$75,001+	1.10	0.20

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and U.S. Census Bureau, Current Population Survey (CPS), March 2013.

Table E.6. Standard errors for Table 2.8: Percentage distribution of responses to selected key survey items, by survey and item: 2010 and 2013

Selected key survey items	NATES	ATES pilot study
Q1 (highest degree or level of school completed)		
Less than high school	0.57	0.36
High school completion	0.92	0.96
Some college or associate's degree	0.85	0.90
Bachelor's degree	0.64	0.56
Graduate or professional degree	0.49	0.49
Q4 (certification/license)		
Has a certification/license	0.76	0.95
Does not have a certification/license	0.76	0.95
Q20 (educational certificate)		
Has an educational certificate	0.52	0.69
Does not have an educational certificate	0.52	0.69

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013; and Adult Training and Education Survey (ATES) pilot study, 2010.

Table E.7. Standard errors for Table 2.9: Item nonresponse rates in NATES, by key survey items: 2013

Key survey items	Overall
Q1 (educational attainment)	0.15
Q4 (certification/license)	0.26
Q20 (educational certificate)	0.26
Q29 (apprenticeship)	0.30
Q35 (enrollment in college courses)	0.28
Q46 (other work-related instruction or training)	0.21
Q52 (employment status)	0.31

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.8. Standard errors for Table 2.10: Percentage of skip errors of omission in NATES, by key survey items: 2013

Selected survey items	Overall
Q1 (educational attainment)	0.18
Q4 (certification/license)	0.31
Q20 (educational certificate)	0.30
Q29 (apprenticeship)	0.29
Q35 (enrolled in college courses)	0.25
Q46 (other work-related instruction or training)	0.32
Q52 (employment status)	0.37

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.9. Standard errors for Table 3.1: Percentage distribution of responses to screener items, by item, booklet condition, and number of eligible adults: 2013

	First screener item			Second screener item		
Number of eligible adults	Overall	Composite booklet	Individual booklet	Overall	Composite booklet	Individual booklet
0	0.87	0.92	1.20	0.35	0.49	0.47
1	0.84	1.37	1.12	0.93	1.64	1.14
2	0.96	1.39	1.11	1.14	1.88	1.33
3	0.68	0.85	0.91	0.90	1.12	1.22
4+	0.44	0.71	0.62	0.35	0.50	0.55

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.10. Standard errors for Table 3.2: Percentage of households with at least one eligible responding adult in which all respondents skipped one or both screener items, by booklet condition and item: 2013

Screener item	Overall	Composite-booklet households	Individual-booklet households
First item, number of household members ages 16–65	0.57	1.08	0.63
Second item, number of eligible household members (ages 16–65 and no longer in high school)	1.18	1.51	1.49
Both items	0.58	1.08	0.63

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.11. Standard errors for Table 3.3: Rate of within-household inconsistency in screener information in individual-booklet households that returned at least two eligible, complete sets of topical item responses, by number of eligible questionnaires returned and screener item: 2013

		Number of eligible questionnaires returned	
Screener item	Overall	2	3+
First item, number of household members ages 16–65	0.67	0.58	2.24
Second item, number of eligible household members (ages 16–65 and no longer in high school)	0.75	0.76	2.14
Both items	0.65	0.45	2.12

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.12. Standard errors for Table 3.4: Percentage of screener item responses for which the reported number of eligible adults was less than the number of eligible, complete sets of topical item responses returned, by booklet condition: 2013

	Overall	Composite-booklet households	Individual-booklet households
Inconsistency in number of questionnaires returned	0.64	0.79	0.80

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.13. Standard errors for Table 3.5: Percentage of responding households in which screener item responses required editing, by booklet condition and reason for editing: 2013

Reason for editing	Overall	Composite-booklet households	Individual-Booklet households
Total	1.14	1.48	1.39
Due to incomplete screener item response	1.18	1.50	1.49
Due to questionable responses	0.45	0.47	0.72

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.14. Standard errors for Table 4.1: Overall response rate of surveyed NATES households and individuals, by booklet condition and response rate: 2013

Response rate	Composite booklet	Individual booklets
Overall	†	†
Household level	†	†
Person level	0.45	0.68

† Not applicable.
NOTE: It was not possible to calculate the standard error for the overall response rate or household-level response rate. The statistical significance of the difference between the household-level response rates in the two conditions was assessed using the standard error of the difference, which was 1.57.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.15. Standard errors for Table 4.2: Percentage distribution of responding households, by booklet condition and number of eligible adults: 2013

	Overall		With at least one eligible adult	
Number of eligible adults	Composite booklet	Individual booklet	Composite booklet	Individual booklet
0	0.71	1.06	†	†
1	1.27	1.15	1.54	1.26
2	1.25	1.13	1.45	1.26
3	0.79	0.99	0.92	1.17
4+	0.27	0.39	0.32	0.46

† Not applicable.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.

Table E.16. Standard errors for Table 4.3: Percentage of responding households with at least one eligible adult, by booklet condition, proportion of eligible adults who responded, and number of eligible adults in household: 2013

	Composite booklet		Individual booklet	
Total number of eligible adults in household	All eligible adults responded	Some eligible adults responded	All eligible adults responded	Some eligible adults responded
Overall	0.98	0.98	1.04	1.04
1	0.00	0.00	0.00	0.00
2	0.59	0.59	0.74	0.74
3	1.97	1.97	1.75	1.75
4+	4.79	4.79	5.17	5.17

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Adult Training and Education Survey (NATES), 2013.