COMPARISON OF ACS AND ASEC DATA ON EDUCATIONAL ATTAINMENT: 2004

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INTRODUCTION

This report compares data from the American Community Survey (ACS) with data from the Annual Social and Economic Supplement (ASEC) to the Current Population Survey (CPS). This report focuses on national level comparisons between the 2004 ACS and the 2004 ASEC of the distribution of educational attainment of the population 25 years and over and the proportions of the population 25 years and over with at least a high school diploma or a bachelor's degree by a number of demographic characteristics. This report also compares the proportions of the adult population with a high school diploma or higher and a bachelor's degree or higher, by state, between the two surveys. It then notes variations that are both statistically and substantively different, and for those found, offers possible explanations.

METHODOLOGY

The tables included in this report compare the most commonly tabulated data on educational attainment from the ACS and ASEC. Comparisons consist primarily of percentage-point differences between the two distributions. Tables display the survey estimates, the margins of error from which 90-percent confidence intervals of the estimates can be derived, and the difference between the two estimates. In the case of frequency distributions, the difference is calculated as the percent difference between the two estimates. In the case of relative frequency distributions, the difference is calculated as the percentage-point difference between the two estimates. An asterisk (*) denotes statistically significant differences.

At the national level, the ACS and ASEC variances were quite small, resulting in many statistically significant differences between the ACS and ASEC distributions. In this report, I

focus on statistically significant differences of 0.5 percentage points or more. This yardstick can vary based on the relative size of the category. For example, for population groups constituting a relatively large percentage of the population (for example, people 25 years and over with a high school diploma), a 0.5 percentage-point difference in the estimates might be small, while for population groups constituting a smaller percentage of the population (for example, people 25 years and over with a doctorate degree), a 0.5 percentage-point difference could be quite large. Users may choose statistically significant differences that are smaller or larger than 0.5 percentage points for their own analytical purposes.

The remainder of this section examines differences in methodology between the two surveys.

Sample Frame

The 2004 ACS surveyed a national sample of housing units, both occupied and vacant. An initial sample of 838,000 addresses resulted in 569,000 completed interviews. Data were collected in a total of 1,240 counties out of the 3,141 counties in the United States. The sample is designed to provide estimates of housing and socio-economic characteristics for the nation, all states, most areas with a population of 250,000 or more, and selected areas of 65,000 or more.[1]

The 2004 ASEC surveyed a national sample of households and noninstitutional group quarters. Like the 2004 ACS, the ASEC data were collected in only a subset of counties. The sample is designed primarily to produce estimates of the labor force characteristics of the

[1] For a detailed explanation of the 2004 ACS sampling design, see the following Internet site: <http://www.census.gov/acs/www/Downloads/ACS/accuracy2004.pdf>.

civilian noninstitutionalized population 16 years of age and older for the nation and all states.[2]

Once difference between the two survey universes is that the ASEC includes a small number of individuals living in group quarters, while the ACS did not include group quarters in its survey universe. The group quarters included in the ASEC might include individuals living at addresses that were housing units in 2000 but have since been converted into noninstitutional group quarters (e.g. emergency and transitional shelters and group homes). In order to make the data from the ASEC and the ACS more comparable, all individuals with a detailed household type of "in group quarters" (H_TYPE = 9 and 10) were excluded from the ASEC estimates.

Sample Size and Mode of Data Collection

The 2004 ACS interviewed a total of 534,383 occupied households. Data were collected continuously throughout the year using a combination of mail-out/mail-back questionnaires, Computer-Assisted Telephone Interviewing (CATI), and Computer-Assisted Personal Interviewing (CAPI). Each month a unique national sample of addresses received an ACS questionnaire. Addresses that did not respond were telephoned during the second month of collection if a phone number for the address was available, and personal visits were conducted during the third and last month of data collection for a subsample of the remaining nonresponding units. The 2004 ACS achieved an overall survey response rate of 93.1

[2] For a detailed explanation of the CPS basic monthly survey sampling design, see the following Internet site: <www.bls.census.gov/cps/bsampdes.htm>.

percent, calculated as the initially weighted estimate of interviews divided by the initially weighted estimate of cases eligible to be interviewed.[3]

The 2004 ASEC contained interviews from about 77,000 households and 59 noninstitutional group quarters. The ASEC interviews were collected over a three-month period in February, March, and April 2004 as a supplement to the basic monthly CPS conducted during those months, with most of the data collected in March. All ASEC data are collected via Computer-Assisted Telephone and Personal Interviews (CATI/CAPI), with interviews conducted during one week each month. The response rate for the 2004 ASEC was 91.8 percent. Response rates among eligible households were about 92 percent in February and April 2004 and 91 percent in March 2004.

Both the ACS and ASEC employ experienced permanent interviewers for CATI and CAPI data collection.

Residence Rules

The ACS and the ASEC employ different residence rules to determine which individuals in a household are eligible for interview; the ACS uses the concept of current residence, while the ASEC uses a version of usual residence. This difference may contribute to variation in the universes on which social characteristics depend.

[3] As a result of a reduction in funding in 2004, ACS dropped the telephone and personal visit follow-up operations for the January 2004 panel, thus only allowing mail respondents to contribute to the overall response for that panel. Dropping the nonresponse follow-up operations for that single panel month reduced the annual response rate by about four percentage points. If we exclude the January panel from the calculation, the annual response rate rises to 97.3%. More discussion of this can be found at the following internet site: <http://www.census.gov/acs/www/acs-php/quality_measures_response_2005.php>.

The ACS interviews everyone in the housing unit on the day of interview who is living or staying there for more than two months, regardless of whether or not they maintain a usual residence elsewhere, or if they did not have a usual residence elsewhere. If a person who usually lived in the housing unit was away for more than two months at the time of the survey contact, he or she was not considered to be a current resident of that unit. This rule recognizes that people can have more than one place where they live or stay over the course of a year, and these people affect that estimate of the characteristics of the population for some areas.

The ASEC interviews everyone staying in the housing unit at the time of the interview who consider the housing unit as their usual residence or who have no usual residence elsewhere. In addition, the ASEC also includes temporarily absent individuals who consider the housing unit as their usual residence.

The different residence rules result in one notable difference in the universe of the two surveys. Because the 2004 ACS excluded group quarters from the sample frame and interviewed individuals at their current residence, college students living in dormitories are not included in the ACS universe. In contrast, the ASEC interviewers were instructed to include as household members any college students who were temporarily absent from the household, including those who were currently residing in college dormitories. The result being that the ASEC sample universe should include more college students than the 2004 ACS sample universe.

Question Wording and Presentation

Differences between the ACS and the ASEC in the wording and presentation of questions may contribute to differences in estimates. While the educational attainment question in the ACS and the ASEC are almost identical, the answer categories are slightly different.

The 2004 American Community Survey asked the educational attainment item as follows:

> What is the highest degree or level of school this person has COMPLETED?
> *Mark (X) ONE box. If currently enrolled, mark the previous grade or highest degree received.*
>
> No schooling completed
> Nursery school to 4th grade
> 5th grade or 6th grade
> 7th grade or 8th grade
> 9th grade
> 10th grade
> 11th grade
> 12th grade – **NO DIPLOMA**
> **HIGH SCHOOL GRADUATE** – high school DIPLOMA or the equivalent (for example: GED)
> Some college credit, but less than 1 year
> 1 or more years of college, no degree
> Associate degree (for example: AA, AS)
> Bachelor's degree (for example: BA, AB, BS)
> Master's degree (for example: MA, MS, Meng, MEd, MSW, MBA)
> Professional degree (for example: MD, DDS, DVM, LLB, JD)
> Doctorate degree (for example: PhD, EdD)

The 2004 ASEC asked the educational attainment item as follows:

> What is the highest level of school . . . completed or the highest degree . . . received?
>
> Less than 1st grade
> 1st, 2nd, 3rd or 4th grade
> 5th or 6th grade
> 7th or 8th grade
> 9th grade
> 10th grade
> 11th grade

12th grade NO DIPLOMA
HIGH SCHOOL GRADUATE – high school DIPLOMA or the equivalent (For example: GED)
Some college but no degree
Associate degree in college – Occupational/vocational program
Associate degree in college – Academic program
Bachelor's degree (For example: BA, AB, BS)
Master's degree (For example: MA, MS, Meng, Med, MSW, MBA)
Professional degree (For example: MD, DDS, DVM, LLB, JD)
Doctorate degree (For example: PhD, EdD)

While there are 16 attainment categories in both surveys, they differ slightly in their content, mainly at the lowest level of attainment and at the some college/associate degree level. The ACS has a specific category for those with no schooling completed, while the ASEC groups those with no schooling completed with those who completed any schooling below the first grade. Also, while both surveys contain 3 categories that cover "some college" and "associate degree" the ACS contains 2 categories for some college and one category for associate degree and the ASEC has one category for some college and two categories for associate degree. It should be noted that both surveys collect information on schooling completed in the "regular" school system.[4] Training in specific trades or from vocational, technical, or business schools is not counted toward educational attainment in either survey. Also, interviewers for both surveys are instructed to count schooling completed in foreign or ungraded school systems as the equivalent level of schooling in the regular American system. Honorary degrees are not counted in either survey.

[4] Such schools include graded public, private, and parochial elementary and high schools (both junior and senior high), colleges, universities, and professional schools, whether day schools or night schools. Thus, regular schooling is that which may advance a person toward an elementary school certificate or high school diploma, or a college, university, or professional school degree. Schooling in other than regular schools is counted only if the credits obtained are regarded as transferable to a school in the regular school system. Note, however, that this definition is not strictly applied in the interview setting, where respondents' judgment of what constitutes a regular school determines the response.

The way the question is presented and administered in each survey may also affect the estimates. Most of the ACS interviews are conducted through the mail where respondents choose and mark their educational attainment from a printed list on the ACS questionnaire. All of the ASEC interviews are conducted via Computer-Assisted Telephone and Personal Interviews (CATI/CAPI).

Item Nonresponse

Item nonresponse occurs when an individual does not provide complete and usable information for a data item. Item allocation rates are often used as a measure of the level of item nonresponse. These rates are computed as the ratio of the number of eligible people for which a value was allocated during the editing process for a specific item to the number of people eligible to have responded to that item.

For the population 15 years and over, the allocation rate for the educational attainment item in the 2004 ASEC was 3.1 percent compared with 2.9 percent for the 2004 ACS.[5]

[5] Educational attainment data are tabulated for the population 15 years and over in the ASEC, so the allocation rate for the ACS is also shown for the population 15 years and over for comparability. The standard universe for the educational attainment data in the ACS is the population 3 years and over. The allocation rate for educational attainment for the population 3 years and over in the ACS is 3.3 percent.

Data Editing and Imputation Procedures

ACS and ASEC edit and imputation rules are designed to ensure that the final edited data are as consistent and complete as possible. These rules are used to identify and account for missing, incomplete, and contradictory responses. In each case where a problem is detected, pre-established edit rules govern its resolution.

The ACS and the ASEC employ two principal imputation methods: relational imputation and hot deck allocation. Relational imputation assigns values for blank or inconsistent responses on the basis of other characteristics on the person's record or within the household. Hot deck allocation supplies responses for missing or inconsistent data from similar responding housing units or people in the sample.

Both the ACS and ASEC editing procedures employ logical checking routines to produce consistency for respondents. When answers cannot be logically assigned or when inconsistencies or missing data are encountered, allocation routines using hot decks generally stratify the donors and recipients of the hot deck by their personal characteristics, primarily their age, sex, race, occupation, and school enrollment characteristics.

Controls and Weighting

There are notable differences among the surveys in the selection of controls and the calculation of weights that may lead to differences in estimates. The ACS and ASEC are both weighted to account for the probability of selection and housing unit nonresponse.

After the initial weighting, data from the ACS and ASEC are both controlled to be consistent with independent population estimates. Data from the 2004 ACS are controlled, at the county level, to independent estimates of the population of individuals and housing units in July 2004.[6] The 2004 ASEC is controlled to independent national estimates of the civilian noninstitutionalized population of individuals in March 2004. In addition, the ACS presents the average responses over a 12-month period, while the ASEC shows the living arrangements of people for the February-April time period, although the population is controlled to March estimates. Because the ACS controls to both the total population and the total number of housing units, the ACS files contain both person weights and housing unit weights. The ASEC does not control to the total number of housing units and, thus, the ASEC files do not contain an independent housing unit weight but instead use the weight of the householder as the weight of the housing unit.

RESULTS

Educational Attainment of the Adult Population

Table 1 presents a detailed distribution of the educational attainment of the population 25 years and over. Most of the variation in the distribution of attainment between the ACS and the ASEC is relatively small and not statistically significant, but there are several noticeable and statistically significant differences. The ASEC shows higher proportions of adults who have completed a high school diploma, an associate degree, and a bachelor's degree (32.0 percent, 8.4 percent, and 18.1 percent, respectively) than the ACS (29.5 percent, 7.1 percent, and 17.2 percent). These differences may be due in part to the way the interviews are

[6] For smaller counties, the 2004 ACS formed weighting areas with a minimum population of 250,000. The population controls were implemented at the weighting area level.

conducted. It is possible that respondents may answer the educational attainment question differently due to the presence of an interviewer. However, it is difficult to determine this mode effect because of the difference in when each survey uses CATI and CAPI interviews. The ACS conducts CATI and CAPI interviews only for follow-up nonrespondent households, whereas every interview in the ASEC is CATI or CAPI.

There were four attainment levels that were higher proportionally in the ACS than the ASEC: 'no schooling completed to 4th grade', '12th grade, no diploma', 'some college, no degree', and 'professional school degree'. The difference in those with some college, but no degree was the largest. In the ACS, 20.3 percent of adults had some college, but no degree compared with 17.0 in the ASEC. The variation between the surveys for these categories may be due to the educational attainment categories available on each questionnaire and how they are presented to respondents. The ACS has two categories for 'some college'; the ASEC has one. Also, respondents who are not presented with a list of the educational attainment categories, as they are in the ACS, may not be as likely to report a more detailed category, such as 'some college, no degree' because it is less intuitive than reporting a completed degree.

Another possible explanation for differences in attainment levels between the two surveys is coverage, which is how well and to what extent each survey is able to capture the population. If one survey did a better job of capturing the population, we might, for example, expect to see slightly lower attainment levels from that survey because people who are typically more difficult to capture tend to have lower educational attainment.

It is possible that the 2004 ACS obtained better coverage of the U.S. population because of two factors: a large sample size and the mandatory status of the survey. As mentioned earlier, the 2004 ACS interviewed a total of 534,383 occupied households, compared to the approximately 77,000 households and 59 noninstitutional group quarters interviewed in the 2004 ASEC. Another aspect of the ACS that could affect coverage is the fact that it is a mandatory survey. People are required by law to fill out the ACS questionnaire, whereas the ASEC is voluntary. The 2004 ACS achieved a response rate of 93.1 percent compared with 91.8 percent in the 2004 ASEC.

Educational Attainment by Age and Sex

Table 2 and Table 3 show the proportions of the population 25 years and over with a high school diploma or more and a bachelor's degree or more, respectively, by a number of demographic characteristics. The proportions of the adult population with a high school diploma or more and a bachelor's degree or more were higher in the ASEC compared with the ACS. In the ASEC, 85.2 percent of the population 25 years and over had a high school diploma compared with 83.9 percent in the ACS. At the bachelor's degree level, the difference between the ACS (27.0 percent) and the ASEC (27.7 percent) was smaller, but statistically significant.

Again, it is possible that these differences exist due to differences in coverage or how each survey is administered.

The ASEC also had higher levels of high school completion for every age group shown in Table 2. The differences ranged from 0.7 percentage points to 2.0 percentage points. The ASEC also showed higher proportions of people with a bachelor's degree or higher for all of the age groups shown in Table 3, except for 25 to 29 years and 30 to 34 years.[7] The statistically significant differences ranged from 0.6 percentage points to 1.4 percentage points.[8]

The proportions of men and women 25 years and over with a high school diploma or more and a bachelor's degree or more were higher in the ASEC than in the ACS. The percentage of men with a high school diploma or higher was 84.9 percent in the ASEC and 83.6 in the ACS. The percentage of women with a high school diploma or higher was 85.4 in the ASEC and 84.3 in the ACS. The percentage of men with a bachelor's degree or higher was 29.4 in the ASEC and 28.6 in the ACS. The percentage of women with a bachelor's degree or higher was 26.1 in the ASEC and 25.6 in the ACS.

Educational Attainment by Race and Hispanic Origin

The proportions of adults with a high school diploma or higher were statistically different between the ASEC and the ACS for every race and the Hispanic origin group in Table 2. The proportions of Non-Hispanic Whites, Blacks, and Asians with a high school diploma were higher in the ASEC than in the ACS.

[7] There was no significant difference between the two surveys for the 25 to 29 year age group and the 30 to 34 year age group.

[8] The differences mentioned were not intended to imply that the differences for the high school diploma level were different from the differences for the bachelor's degree level. The differences shown as the starting points of the ranges (0.6 and 0.7) were not statistically different from each other, and the differences shown as the end points of the ranges (2.0 and 1.4) were not statistically different.

In contrast, the proportions of high school graduates among Whites and Hispanics were higher in the ACS. In the ACS, 59.6 percent of Hispanics had a high school diploma or higher compared with 58.4 percent in the ASEC. The proportion of Whites with a high school diploma or higher was also higher in the ACS, but the difference was very small (0.3 percentage points). The difference in high school attainment for Whites between the two surveys is essentially due to the difference in high school attainment for Hispanics because the White category includes White Hispanics.

At the bachelor's degree level, only three of the five race and Hispanic origin groups experienced a difference between the two surveys: non-Hispanic Whites, Asians, and Hispanics. The proportions of college graduates among Asians and non-Hispanic Whites were higher in the ASEC. In the ASEC, 49.5 percent of Asians had a college degree compared with 48.2 percent of Asians in the ACS. The proportion of college graduates was also higher in the ASEC for non-Hispanic Whites (30.6 percent compared with 29.7 percent).

Similar to the high school level, the proportion of college graduates among Hispanics was higher in the ACS (12.7 percent) compared to the ASEC (12.1 percent). The differences between the two surveys for Hispanics and Whites were the only statistically significant measures in Tables 2 and 3 where the ACS was higher than the ASEC.

Educational Attainment by Nativity

The proportion of native adults with a high school diploma or more was higher in the ASEC (88.3 percent) compared with the ACS (86.8 percent). This was also the case for native adults with a bachelor's degree or higher. The proportion of native adults with a bachelor's degree or more was 27.0 in the ACS and 27.8 in the ASEC. The educational attainment of the foreign-born population was not statistically different between the two surveys.

Educational Attainment by Marital Status

Differences in attainment by marital status were evident at both the high school level and the bachelor's degree level between the two surveys. The proportion of divorced adults with a high school diploma was higher in the ASEC (87.2 percent) than in the ACS (85.2 percent). Another notable difference was the greater proportion of widowed adults with a high school diploma in the ASEC (68.4 percent) compared with the ACS (66.9 percent). At the bachelor's degree level, the only statistically significant differences between the two surveys were for never married individuals and married individuals with a spouse present. A higher proportion of never married individuals had a bachelor's degree in the ACS (30.0 percent) than in the ASEC (29.2 percent). For married individuals with a spouse present, a higher proportion had a bachelor's degree in the ASEC (30.9 percent) than in the ACS (30.0 percent).

The Proportion of High School Graduates by State

Table 4 shows the proportion of high school and college graduates in each state and the District of Columbia from both the ACS and the ASEC. As expected, the margins of error

around the state-level data were larger than those at the national level; however, there were still some significant differences between the two surveys. There were thirty-two states that differed statistically in the proportion of high school graduates in the population 25 years and over between the ACS and the ASEC. At the high school level, the significant differences ranged from 0.9 percentage points to 5.7 percentage points. However, due to the large standard errors around the state-level numbers, the difference between the two surveys was significantly larger than 3 percentage points in only one state, Mississippi (5.7 percentage points).

In nearly all of the states with a statistical difference, the proportion of high school graduates was higher in the ASEC. The proportion was higher in the ACS in only three states (Massachusetts, Rhode Island, and South Dakota).

The Proportion of College Graduates by State

There were also statistical differences between the ACS and the ASEC at the state-level for the proportions of college graduates. Overall, 19 states had statistically different proportions of bachelor's degree holders between the two surveys. Again, the ASEC estimates were higher than the ACS estimates in most of the states with a statistically significant difference and the differences were small (ranging from 1.2 to 5.3 percentage points). Similar to the state-level estimates of high school completion, there was only one state with a difference significantly larger than 2 percentage points; Nevada (5.3 percentage points).

Summary

Data from the American Community Survey (ACS) on the educational attainment of the population are generally consistent with those from the Annual Social and Economic Supplement to the Current Population Survey (ASEC). The principal difference noted in this paper is the slightly higher level of educational attainment, particularly high school attainment, in the ASEC compared with the ACS. It is possible that this variation is at least partly attributable to differences in the attainment categories presented to respondents and the way each survey is administered. Coverage of the population may also contribute to these differences. While there was variability in the educational attainment of the adult population at the state-level, most of the differences were reasonable. Sampling variability must be taken into account when analyzing characteristics, such as educational attainment, below the national level.

References

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