Implementation of the Revised Relationship to Householder Item in the American Community Survey[1]

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**Introduction & Background**

After more than a decade of research and an Office of Management and Budget (OMB)-led interagency working group, the American Community Survey (ACS) revised the relationship to householder item. This research led to three areas of improvement to address data quality and collection: additional categories in the relationship to householder item; an additional data validation step that checks for consistency between the reports of sex and relationship in data collection via electronic instruments; and updates to data processing for households where reported sex values do not align with the reported coupled relationship. All three of these changes were implemented in the 2019 ACS. The revised question had previously been implemented in the 2014 Survey of Income and Program Participation (SIPP), the 2019 Annual Social and Economic Supplement to the Current Population Survey (CPS ASEC) and the 2020 decennial census.[3]

Prior to these changes, researchers found that there was a small portion of people in opposite-sex coupled relationships who misreported their sex (as identified by an evaluation of their first name).[4,5] This resulted in some couples being misclassified as same-sex couples. However, because same-sex couple households are a relatively small proportion of all coupled households, this data error affected estimates of same-sex couple households. These changes were implemented to address these inconsistencies and improve estimates of same-sex couple households.

**Changes to the ACS relationship to householder item**

The main changes to the ACS collection and processing of the relationship to householder item were as follows:

> **Relationship item response categories:** Beginning with 2019 data collection, the response categories for the relationship to householder question were expanded for spouses and

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[1] This working paper is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any opinions and conclusions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Census Bureau. The Census Bureau has reviewed this data product to ensure appropriate access, use, and disclosure avoidance protection of the confidential source data used to produce this product (Data Management System (DMS) number: P-001-0000001262, Disclosure Review Board (DRB) approval number: CBDRB-FY22-SEHSD003-031.

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[3] A timeline of the research and implementation of the revised relationship to householder question in the Census Bureau's main demographic surveys is available here: https://www.census.gov/library/visualizations/2020/demo/the_context_and_evolution_of_data_collection_for_same_sex_married_couple_households.html

[4] As part of a larger project, O'Connell & Gooding (2006) examined potential misreports of sex in couples classified as same-sex and opposite-sex in the 2000 census data. They determined that the number of misreports in same-sex couples was not large enough to have an impact on estimates for opposite-sex couples. https://paa2006.princeton.edu/papers/60208

[5] For a discussion of the errors in Census 2010, see: https://www.census.gov/library/working-papers/2011/demo/SEHSD-WP2011-26.html

unmarried partners to distinguish between same-sex and opposite-sex couples across all ACS data collection modes. These categories are now more comparable to those used in other countries (e.g., Canada, the United Kingdom, and New Zealand). The unmarried partner categories were also moved up in the list to come immediately after the two spouse categories. See Figure 1 for a comparison of the item in 2018 and 2019. The Census Bureau conducted focus groups and cognitive testing as part of the process to redevelop the relationship item, and participants requested that the unmarried partner categories be displayed next to the spouse categories. The new placement of the unmarried partner categories should reduce respondent burden when selecting the proper response category for members of the household. These revised answer categories were then tested in several quantitative tests, the largest being the 2015 National Content Test.[6]

**Data validation during collection:** In the electronic collection instruments,[7] when the reported sex values for the householder and the person identified as the householder's spouse or partner do not line up with the selected relationship value, whether "same-sex" or "opposite-sex," the respondent is led through a series of screens designed to confirm the initial information given or allow that information to be changed. The respondent is first asked to confirm the spouse or partner's reported sex, and then to confirm the householder's reported sex. If both values are confirmed and neither is changed, the respondent is asked to confirm the reported relationship. This process is expected to reduce the number of households that misreport sex or relationship information in the final unedited data. Prior to these changes, the ACS used a pop-up box in Computer-Assisted Personal Interviews (CAPI) whenever a same-sex married couple was reported, asking Field Representatives to confirm that the responses to sex and relationship were correct.[8]

**Data processing updates:** When reported information has conflicting values (e.g. male householder and male spouse, with a reported relationship of opposite-sex spouse), the records

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[6] See this graphic for details about which tests were conducted: https://www.census.gov/library/visualizations/2020/demo/the_context_and_evolution_of_data_collection_for_same_sex_married_couple_households.html See this link to access the final report for the 2015 National Content Test: 2020 Research and Testing: 2015 National Content Test Relationship Question Experiment Analysis Report (census.gov)

[7] Electronic collection methods were used in Internet-self response, Telephone Questionnaire Assistance (TQA), Failed-edit Follow Up (FEFU), and Computer-Assisted Personal Interview (CAPI) collection processes TQA occurs when a respondent calls the toll-free telephone number that provides electronic assistance to respondents completing the questionnaire. FEFU cases are those that require additional information after the initial computerized edit processing to meet coverage consistency. The CAPI data collection occurs when the Census Bureau is unable to reach the occupants of a housing unit or if the household refuses to participate. For additional information about ACS data collection modes, see: https://www2.census.gov/programs-surveys/acs/methodology/design_and_methodology/acs_design_methodology_ch07_2014.pdf

[8] Prior to 2018, the Computer-Assisted Telephone Instrument (CATI) also included a sex/relationship consistency soft-check (pop-up box) for same-sex couples. CATI data collection was eliminated in 2017 and replaced by Telephone Questionnaire Assistance (TQA). TQA retained the use of the sex/relationship consistency soft check.

are adjudicated using the sex implied by the person's first name when possible.[9] In addition, when one person in a couple does not have a reported sex (the householder, spouse, or partner), the assignment of sex considers the reported relationship type (same-sex or opposite-sex) and the sex of the other member of the couple. When both people in the coupled relationship do not report sex, the assignment of sex also considers reported relationship type, along with sex implied by first names, when available. Prior to 2019, first name reports were used in the ACS edit to assign sex when it was not reported, but they were not used to validate reported relationship.

**Evaluation Methods**

To evaluate these changes, we use the 2018 ACS 1-year data as a baseline for comparison with the 2019 ACS 1-year data. For some comparisons, we also include 2013 ACS 1-year data, since that was the first year of data in which those who reported as same-sex married couples were shown as married couples.

This report evaluates the impact of data collection and instrument changes on the quality of reported data for householders and their spouses or partners, regardless of type. Since the revised relationship item contains what is essentially an implied sex value for coupled households, this additional information can be used when editing responses in conjunction with the use of first names. This applies to households where reported sex values do not align with their reported coupled relationship. The reported sex values will be compared to the implied sex of the record holder's first name. In addition, we will compare the percentage of coupled households by relationship type who had sex misalignment between 2018 and 2019. This will be measured among the subset of records in each reported relationship category that have both a reported sex, and a reported first name that is reported as either male or female 95 percent of the time.[10] An examination of sex misalignment, i.e. potential sex mismarks, is also broken down by mode.[11] If the updates to the electronic instruments improve data at the time of collection, then we would expect the majority of mismatched records to come from the mail mode in 2019.

We evaluate the data processing updates by looking at the percentage of spouses, unmarried partners, and householders living with a spouse or partner, that have sex misalignment after editing is complete. We will also compare estimates of coupled households and their characteristics with estimates from the CPS ASEC and SIPP, each of which recently implemented the revised relationship question.

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[9] Each name receives a score between 0 and 1000 indicating how often the name is reported as male. If the name 'John' is reported as male 99 percent of the time, the score would be 990. If the name Mary were reported as female 99 percent of the time, the score would be 10. In this way, the value of the ratio for specific names can be used as an implied sex value. See this paper for results when we compared the sex reported on the Social Security record with that reported in decennial and ACS data: https://www.census.gov/library/working-papers/2015/demo/SEHSD-WP2014-36.html. See also: https://www.census.gov/library/working-papers/2011/demo/SEHSD-WP2011-26.html

[10] First names are determined to be 95 percent first names if 95 percent of people who reported the first name, also reported male (or female). Research by Kreider and Lofquist (2015) previously found that 95 percent first names strongly aligned with Numident records from the Social Security Administration. https://www.census.gov/content/dam/Census/library/working-papers/2015/demo/kreider-lofquist-working-paper.pdf

[11].

**Findings**

As stated previously, this paper uses the sex implied by the first name to assess whether the reported sex matches the sex implied by the first name for members of coupled households. This is done as a proxy for mismarks. As an example, respondents in 2019 may have reported John (male) as the householder and Mary (male) as his opposite-sex spouse. This example would be counted as a sex misalignment, or potential mismark, for an opposite-sex coupled household since the name Mary is reported as female at least 95 percent of the time. This method allows us to use edited data to assess change in ACS data collection over time by using three time points. We use 2013, which was the first year the ACS showed those who reported as same-sex married couples as married couples, and 2018, which is the year before the revised relationship question was implemented, and 2019, the first year of its implementation. [12, 13]

Table 1 shows the percentage of adults who are either the householder (who has a spouse or partner), or the spouse or unmarried partner of the householder, whose reported sex is a potential mismark based on the sex implied by their first name. Keep in mind that not all cases have a first name that can be assessed, and that we are defining 'inconsistent' as not matching the sex implied by the first name 95 percent of the time. Again, this is a proxy for those who inadvertently mismarked responses, so we are most interested in the change over time, rather than the exact levels. While 17.9 percent of adults in same-sex married couple relationships in 2013 had potential sex mismarks, this was true for only about 1.9 percent of same-sex partners, and less than 1 percent of those in opposite-sex married or unmarried couples. In 2019, we see that while adults in same-sex married couples still have the highest potential sex mismark rate (1.5 percent), it is greatly reduced from what it was in 2013 (see Table 1). [14]

Table 2 displays the percentage of couples in which at least one member has a potential sex mismark. Same-sex married couples have the highest rate of mismatches. [15] This is the pattern we expected, since mismarks by a very small percentage of opposite-sex married couples (the largest group by far) can result in inflation of the estimates of same-sex married couples. The rates of potential sex mismarks for those in same-sex married couples in 2018 was 19.2 percent, an intermediate step between the high rate in 2013 (44.0 percent) and very low rate in 2019 (3.2 percent). So, it is clear that a change in the direction of cleaner data had already taken place before the implementation of the revised relationship question and edit in 2019, likely due to the move toward internet response.

While the internet was introduced as a data collection mode in 2013, it was more heavily used by 2018. Figure 2 details the growth in the use of internet and decline of mail and CATI. The electronic nature of

[12] Prior to 2013, those who reported as same-sex spouses of the householder were edited and shown as unmarried partners.

[13] Due to the revisions in the response categories, the edit was also revised since the relationship response categories now include an implied sex value for coupled households.

[14] Table A in the appendix shows the corresponding percentages for coupled households in Puerto Rico.

[15] Table B in the appendix shows the corresponding percentages for adults in Puerto Rico.

the internet mode allows for an automated check sequence, while the use of the paper questionnaire in the mail mode does not. So, the move toward internet responses, and away from mail, could, by itself, move the data in the direction of reduced potential sex mismarks. In the 2019 ACS internet data collection instrument, if, for example, the respondent reports that John is the householder and Mary is John's same-sex spouse, but reports that John is male and Mary is female, a series of questions will pop up asking the respondent to confirm their responses to the sex and relationship items. While these are soft checks that the respondent can easily bypass, they are meant as a reminder that allows respondents to correct an inadvertent mismark. Even in the 2013 internet instrument, there was a soft check that would pop up whenever a same-sex spouse was reported. The intent was to confirm that the response was not an inadvertent mismark, given that the estimate of same-sex married couples was most prone to be affected. Of course, it is also important to keep in mind that the sex question in ACS has only two response categories, male and female, so marking the responses to the sex question in coordination with the relationship question may present challenges to couples that include someone who does not prefer either category.

Table 3 takes a more detailed look at the potential sex mismark rates for coupled households, both by type of couple and by data collection mode.[16] Even a quick look at the table makes it obvious that same-sex married couples have the highest potential sex mismark rates. The shift in the potential sex mismark rate for this group in the internet mode, which is now the largest mode of data collection, is dramatic: from 35.5 percent to 1.9 percent. The shift for same-sex married couples in all modes was from 35.5 percent to 2.9 percent, still much lower than for any mode of data collection for same-sex married couples in 2018, when the overall sex mismark rate for this group was still 16.3 percent.

Another aspect of data collection mode to consider is which mode contributes the largest number of potentially mismarked cases. Figure 3 illustrates this by showing a distribution, by mode, of all the couples with at least one person who has a reported sex that is a potential sex mismark based on the sex value implied by their first name. While we see in Figure 2 that 51.6 percent of the 2019 cases were collected via internet, Figure 3 shows that 29.9 percent of the coupled households that were mismatched came from internet mode. On the other hand, while CAPI cases comprise 28.5 percent of the total cases in 2019 (Figure 2), they account for 48.4 percent of the mismatched coupled households (Figure 3). Though respondents who fill out the questionnaire on the internet are only answering for their own household, the Field Representatives (FRs) who collect the data via personal interview have many cases they are working to complete.[17] This may contribute to higher inadvertent mismarks by FRs than by those who respond for their own households. Both collection instruments contain an electronic check sequence intended to help reduce inadvertent mismarks, but the questions in the check are soft checks, meaning that they can be skipped over without providing a response.

One advantage of the new design of the relationship question is that we can edit cases in which the sex for the householders and their spouse or partner do not seem to be consistent with the relationship. On the internal allocation flag variables, we have specific values that track cases in which the value was edited to achieve consistency. Figures 4 looks at these flags for the couples where the sex value of one member did not align with the relationship value—either because sex was inconsistent with the

[16] Table C in the appendix shows the corresponding estimates for Puerto Rico.

[17] Another difference is that FRs must type '1' or '2' for male or female to answer the sex question. This is unlike the internet self-response mode where there are radio buttons next to 'male' or 'female.'

relationship or because sex was not reported for at least one member of the couple. These flagged couples were compared with couples that did not receive internal allocation flag for consistency. Figure 4 answers the question: Were more sex values or relationship values edited for consistency in cases where there was a sex-relationship misalignment? While about 331,000 adults in these partnerships had their sex value edited for consistency, roughly 226,000 had their value of relationship edited for consistency. So, while more cases had their sex value changed, the changes for consistency were not overwhelmingly disproportionate to one of the variables.

Figure 5 shows that, of householders, spouses, or partners that were allocated on either sex or relationship to achieve consistency within the couple, the sex value implied by their first name was mismatched with their sex report for 1.5 percent of cases. This was higher than the 0.4 percent of those who did not have sex or relationship allocated for consistency yet had a potential sex mismark based on their name. Put another way, 98.5 percent of the people where the allocation was done to achieve consistency either did not have a 95% name or had sex values implied by their first name consistent with their reported, assigned, or allocated sex, in essence, meaning that the allocation process was successful.

**Comparing the estimates with CPS**

Another way to evaluate the implementation of the revised relationship question in ACS is to see how well the estimates compare with those generated by the Current Population Survey (CPS), and the Survey of Income and Program Participation (SIPP) in which the relationship question and edit were updated beginning in 2019 (CPS) and 2014 (SIPP). Table 4 compares the percentage of coupled households, by type, across the three data sets. While the CPS and SIPP collect data on all couples, regardless of whether they include the householder, we include only couples that do include the householder, to make estimates more comparable with the ACS estimates. Though the editing processes, data collection, weighting, and many other operational processes differ among the surveys, the results are substantively the same between ACS and CPS. The SIPP distribution diverges a bit, but it is also the smallest of the surveys in terms of sample size.[18]

Table 5 makes more detailed comparisons across these surveys by showing characteristics of coupled households. The table includes asterisks which indicate whether the ACS and CPS estimates differ statistically at the 90 percent confidence level. As expected, the largest groups--opposite-sex couples, whether married or cohabiting, have more categories that differ statistically than do same-sex couples. While the proportion of householders in opposite-sex married couples who were age 35 to 44 and age

[18] While we provide the SIPP estimates for comparison, we do not spend time discussing them as the structure of SIPP is quite different from ACS and is processed quite differently. While the comparisons are interesting, we do not see SIPP as a benchmark for ACS since it is based on a much smaller sample and there are quite a few differences in the way it is collected and processed. SIPP has no self-response option—it is collected via field representatives either in person or via the phone. Since SIPP collects data about where all current household members lived throughout the reference year, it does not show a householder, which may affect weighting for various household members since the ACS estimate of householders is controlled to occupied housing units. The SIPP data collection instrument does not allow reported relationship and sex data for couples to be reported inconsistently. It's difficult to know exactly how these relatively small differences may work together to affect the overall estimate, though perhaps the largest difference between the two surveys is the large gap in sample size, since SIPP is closer to 50,000 while ACS is roughly 3.5 million.

65 and over did not differ between ACS and CPS, ACS had a lower proportion who were age 25 to 34: 12.6 percent compared with 13.7 percent for CPS.

While the distribution of the age of the householder differs between ACS and CPS among opposite-sex couples, which are the larger groups, and thus have more statistical power, just one age group differs significantly between ACS and CPS among same-sex couples. A higher percentage of householders among same-sex unmarried couples were age 15 to 24: 13.4 percent in CPS compared with 9.0 percent in ACS. Among opposite-sex couples, CPS showed higher proportions of householders who were age 15 to 24 and age 25 to 34 than were found in ACS. This is in contrast to the larger shares within older categories for the ACS compared to the CPS. The 45 to 54 category comprised 20.5 percent in the ACS compared with 19.9 percent in the CPS. The 55 to 64 age categories comprised 21.3 percent in the ACS compared to 20.5 percent in the CPS. Keep in mind that the weighting procedures in the two surveys are handled differently, with ACS estimates of householders essentially being controlled to the total of occupied housing units, while in CPS, they are not. This might affect the distribution of characteristics among householders.

Due to its much larger sample size, ACS can show estimates for relatively smaller race groups for which CPS cannot provide estimates. When comparing the distributions across surveys for the categories that do overlap, we see again that among same-sex couples, the proportion of householders in specific race or Hispanic origin groups did not differ at the 90 percent confidence level. For opposite-sex couples, the proportion who are White alone is higher in CPS. However, it is important to note that ACS reports a category 'Some Other Race,' which is selected by many people of Hispanic origin, who are likely reported as White alone in the CPS. For opposite-sex married couples, 80.6 percent were White alone and 3.5 percent were Some Other Race, which would be a total of 84.1 percent, which is closer to the 83.3 percent reported as White alone in CPS. In addition to differences in the race/Hispanic origin composition of opposite-sex couple households, the CPS sample also had higher percentages of couples where each spouse or partner had at least a bachelor's degree. While the broad pattern for the educational attainment, employment, and the presence of children are substantively comparable, the specific estimates differ across the two surveys at the 90 percent confidence level.

**Conclusion**

This paper took a closer look at the implementation of the revised relationship to householder question in ACS to evaluate whether the changes improved data quality. The first part of the paper used the sex value implied by the first name as a proxy for mismarks by couple type. By comparing to earlier years of ACS, we concluded that the rate of potential sex mismarks has dropped dramatically, so that it no longer has a significant effect on the estimates. While some of this change happened before the revised question was implemented, the revisions to the question further reduced the error to the point where it is no longer a concern. Modes that involve a Field Representative have the highest rates of inconsistencies, indicating that additional training may be warranted.

The paper also compared estimates of coupled households and their characteristics across the two largest surveys in which the revised relationship question was recently implemented, the ACS and CPS. The two surveys have many differences in data collection and in editing and weighting procedures, which are likely playing out in the differences between the estimates for specific types of coupled households. Since the ACS is based on a much larger sample, we encourage researchers to use it for projects that focus on same-sex couple households. Users should be aware that characteristics of

couples in CPS may appear to differ from those in ACS. For same-sex couples, these apparent differences are often not statistically significant at the 90 percent confidence level.

In summary, the implementation of the revised relationship question in ACS has resulted in higher quality estimates of coupled households, especially for same-sex couples. However, users should exercise caution when using the relatively smaller surveys such as CPS or SIPP to look at same-sex couple households, and keep in mind that their profiles may differ from those in ACS.