Same-Sex Unmarried Partners in the Census

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Abstract

The Census began identifying same-sex couple households in 1990. However, issues arise when using data for the Census because it is possible that opposite-sex couples make mistakes while filling out the Census and get recorded as same-sex couple households. Researchers have developed methods to edit the recorded count of same-sex couple households in order to obtain a more accurate count. However, the methods used to edit the data vary. This paper discusses the treatment of same-sex couple households and the different editing procedures used in the Census. The goal of this paper is to allow researchers to confidently use Census data in future analyses on same-sex couple households.

1 Introduction

Proper identification of the LGBTQ+ community is important for accurate research. Literature on displacement due to gentrification (Doan and Higgins, 2011), discrimination in the housing market (Leppel, 2007; Christafore and Leguizamon, 2012), and location choice (Black et al., 2002; Collins, 2004; Spring, 2013) require specific information on where members of the LGBTQ+ community are living in order to understand these phenomena. The main issue in the study of the LGBTQ+ community lies in the identification of such individuals. In the United States, most researchers rely on the Census as these surveys cover the entire country (Gates and Ost, 2004; Anacker and Morrow-Jones, 2005; Hayslett and Kane, 2011; Christafore and Leguizamon, 2017).[1] However, using Census data to identify same-sex couple households can be cumbersome. The goal of this paper is to provide a complete and thorough discussion of using Census data to identify same-sex couple households.

Researchers have developed methods to improve the count of same-sex couple households by identifying and removing opposite-sex couple households from this count. However, these methods vary based on the year and type of Census. The 1990 Census added "unmarried partner" as a response option to describe how Person 1, the head of the house, is related to other household members. Therefore, same-sex couple households are identified when the head of the house says they are living with their unmarried partner who is the same sex as them. All subsequent Censuses after 1990 allow for the identification of same-sex couples that are living together, hence not identifying the entire LGBTQ+ population. In addition, the Census can only identify same-sex couple households when one member of the couple is Person 1, the head of the house, since the Census asks questions about how each person in the house is related to Person 1. Gates (2010) suggests that 5% of same-sex couple households will not be identified as neither are listed as the head of the household. This paper summarizes various editing methods for future researchers to easily and confidently use Census data in their research.

[1] Examples of research in other countries are Goldie (2018) in Australia, Carpenter (2008) in Canada, and Collins (2004) and Collins and Drinkwater (2017) in the UK.

Unfortunately there are issues using the Census to identify same-sex couple households. The possibility that respondents do not understand what an "unmarried partner" is might lead to reporting the wrong relationship to Person 1, the head of the house. In addition, respondents might dislike the concept of disclosing their sexual orientation to the government which would result in respondents purposely misreporting their relationship to Person 1. There are also concerns that opposite-sex couples accidentally misreport their partner's sex so that an opposite-sex couple household is recorded as a same-sex couple household in the Census.

Opposite-sex couple households that miscode their sex might cause the recorded count of same-sex couple households to be inflated, causing problems for researchers relying on Census data. Although the rates of miscoding are likely similar for same-sex couple households and opposite-sex couple households, these errors cannot be ignored due to the relative size of opposite-sex couple households. For illustrative purposes, assume there is a population of 100 coupled households where five households are same-sex couple households and the remaining 95 are opposite-sex couple households. Assume sex miscoding occurs with a 20% probability,[2] then one same-sex couple will have miscoded their sex and 19 opposite-sex couples will have miscoded their sex. Therefore, the Census will have a total of 23 (=5-1+19) recorded same-sex couples when it should have five, and a total of 77 recorded opposite-sex couples when it should have 95. The results of this miscoding can have detrimental effects for researchers using the count or characteristics of recorded same-sex couple households.

To deal with miscoding issues, additional data and calculations are needed to edit the recorded count of same-sex couple households in the Census and the editing method varies based on the Census year and type of Census data. To properly discuss these different methods, a distinction must be made between the short form of the Census, the long form of the Census, and the American Community Survey (ACS). All of these identify same-sex couple households and will collectively be referred to as the *Census*.

There are a few other sources from the Census, not discussed in this paper, that are not as useful for identifying the count or demographics of same-sex couples. The *American Housing Survey (AHS)* is collected by the Census but is sponsored by the Department of Housing and Urban Development (HUD). Starting in 1973, the AHS collects data on housing supply, housing conditions, housing costs, housing size, and demographic data of these households. The *Current Population Survey (CPS)* is collected by the Census but is sponsored by the Bureau of Labor Statistics. The CPS collects data on labor force statistics. The "unmarried partner" category was added to the CPS in 1995. The *Survey of Income and Program Participation (SIPP)* is collected by the Census but is sponsored by HUD. Starting in 1984, the SIPP collects data on economic well-being, family dynamics, education, assets, health insurance, childcare, and food security with the main goal of determining how well government programs work. The "unmarried partner" category was added to the SIPP in 1996. However due to small sample sizes for both CPS and SIPP, data on same-sex couple households is not published but can be found in the raw data files.

The rest of the paper will proceed as follows: section 2 provides additional details on the the short form of the Census, the long form of the Census, and the ACS; section 3 will break down the editing methods used in each version of the Census; while section 4 will discuss other non-Census sources; and section 5 concludes.

2 Census Short-Form, Long-Form, and ACS

The *short form Census* surveys the entire United States population every ten years. Only a few questions are asked and data is publicly available aggregated at different geographic units, such as state, county, or Census tract. Data for the short form Census are available at the data.census.gov website. The smallest unit of geography that the count of same-sex couple households is available is Census tract.

The *long form Census* surveys a subset of the United States population every ten years. There are two long form surveys, the 1% survey, which surveys about 1 in 100 households in the United States, and the 5% survey, which surveys about 1 in 20 households in the United States. The long form Census asks detailed demographic, economic, and labor market questions and is publicly available from ipums.org on an individual level but certain information is withheld for confidentiality.

[2]Errors associated with miscoding sex are estimated to be less than or equal to 1% (O'Connell and Feliz, 2011). The use of 20% is an exaggerated number to illustrate why it is necessary to account for miscoding errors.

The 1990 long form Census is not available on ipums.org but can be found online from the Census.[3] The available data includes information on housing tenure as well as housing characteristics. Since the long form Census does not interview the entire United States population, weights are assigned to each household and each person in order to allow the long form Census to be more representative of the entire United States population. The smallest unit of geography that is identifiable in the long form Census is the Public Use Microdata Area (PUMA), which is larger than a Census tract. If using Census tracts as a unit of observation, a conversion is needed to convert the PUMA-level count of same-sex couple households to the Census tract-level count.[4]

The *American Community Survey (ACS)*, which was fully implemented in 2005, is conducted annually and includes a long form of questions, and was designed to replace the long form of the Census. The ACS asks detailed demographic, economic, and labor market questions and is publicly available from ipums.org on an individual level but certain information is withheld for confidentiality. The available data includes information on housing tenure as well as housing characteristics.

Since the ACS does not interview the entire United States population, weights are assigned to each household and each person in order to allow the ACS to be more representative of the entire United States population. Typically, the ACS is available aggregated in 1-, 3-, or 5-year intervals. The smallest unit of geography that same-sex couple households is available is PUMA. If using Census tracts as a unit of observation, a conversion is needed to convert the PUMA-level count of same-sex couple households to the Census tract-level count.[5] Aggregated data from the ACS is available from data.census.gov and the smallest unit of geography that the count is available is PUMA for 1-year data and Census tracts for 5-year data. Unfortunately, using the aggregated ACS data makes it impossible to remove opposite-sex couple households that might be included in the recorded count of same-sex couple households.

Using the Census to identify and count same-sex couple households has several limitations. The short form and long form Census can only be considered in ten-year intervals and at specific, predefined geographic units. The smallest unit of geography that the Census publicly releases the count of same-sex couple households can be too large of a geographic unit depending on the research question being analyzed. Although the ACS is conducted annually since 2005, it does not survey the entire United States population. In addition, as the discussion below makes clear, methods to remove opposite-sex couples from the recorded count of same-sex couple households require extra data, additional calculations, and several assumptions to be made.

Once opposite-sex couples have been removed from the recorded count of same-sex couple households, we will refer to this as the *edited* count of same-sex couple households, while the *unedited* count of same-sex couple households uses the recorded data from the various Census sources. O'Connell and Gooding (2006) and Gates and Steinberger (2009) suggest that the edited data is necessary for using characteristics associated with same-sex couple households and that the unedited data is appropriate for estimating the count of same-sex couple households. However, the edited count of same-sex couple households from the short form Census appears to be closer to the unedited count of same-sex couple households from the ACS (O'Connell and Feliz, 2011), suggesting that edits are needed even when using the count of same-sex couple households. Although this paper discusses the count of same-sex couple households, most researchers use the percent of households that are same-sex couple households in their analyses.

[3]The data and other related files for the 1990 long form Census can be found at `https://www2.census.gov/census\_1990`. The data can be found by clicking "1990 Public Use Microdata Sample (PUMS) A (5%) sample" or "1990 Public Use Microdata Sample (PUMS) B (1%) sample" for the 5% or 1% sample, respectively. A file to read the data into SAS can be found by continuing to click "TOOLS/" and "sas/." The codebook can be found by clicking "1990 Public Use Microdata Sample (PUMS)" and "Record layouts." If there are issues using these links, please feel free to contact the authors.

[4]In order to convert the 2000 long form Census count of same-sex couple households from PUMA-level to Census tract-level, we suggest the conversion of 2000 PUMAs to 2000 Census tracts from the Missouri Data Center Geocorr 2000, which is available at `http://mcdc.missouri.edu/applications/geocorr2000.html`. In order to convert the 2010 long form Census to Census tract-level, we suggest the conversion of 2012 PUMAs to 2010 Census tracts from the Missouri Data Center Georcorr 2014, which is available at `http://mcdc.missouri.edu/applications/geocorr2014.html`.

[5]In order to convert the 2010 ACS count of same-sex couple households from PUMA-level to Census tract-level, we suggest the conversion from the Missouri Census Data Center Geocorr 2014, which is available at `http://mcdc.missouri.edu/applications/geocorr2014.html`. The 2010 ACS data appears to use PUMA identifier codes from 2000 and the Geocorr 2014 can create a conversion from 2000 PUMAs to 2010 Census tracts.

Table 1: Overview of Census Editing Techniques

Census Year	Census Source	Recommended Data Use Aggregated or Individual?	Editing Technique	Editing Procedure	Extra Information: Allocation or External
1990	short form	Aggregated	No edit	-	-
1990	long form	Individual	Gates and Steinberger (2009) Black et al. (2000)	Exclusion Restriction Exclusion Restriction	Marital Status Relationship to Person 1
2000	short form	Aggregated	DiBennardo and Gates (2014) Christafore and Leguizamon (2012)	Reweigh for sub-state level Exclusion Restriction and Reweigh	O'Connell and Feliz (2011) and other Census data Marital Status
2000	long form	Individual	Gates and Steinberger (2009) Jepsen and Jepsen (2009)	Exclusion Restriction Exclusion Restriction	Marital Status Sex and Relationship to Person 1
2010	short form	Aggregated	Gates (2013)	Reweigh for sub-state level	O'Connell and Feliz (2011) and other Census data
2020	short form	Aggregated	Undetermined	-	-
2005-2012	ACS	Individual	Gates and Steinberger (2009) Virgile (2011) Sansone (2019)	Exclusion Restriction Exclusion Restriction Exclusion Restriction	Marital Status Relationship to Person 1 Sex and Relationship to Person 1
2013-2018	ACS	Individual	Gates and Steinberger (2009)	Exclusion Restriction	Marital Status
2019-2020	ACS	Individual	Undetermined	-	-

In regards to the recommendation on the use of aggregated or individual data in column 3, this is a recommendation on which type of data to download from the Census. The short form Census is not available on an individual basis and the smallest geographic unit that can be downloaded is the Census tract. Although individual data is available, the long form Census and ACS is often aggregated to a researcher's desired geographic level. The smallest geographic identifier in the long form Census and ACS is the PUMA, and researchers often uniformly spread the count of same-sex couples in order to use a smaller geographic area. Edits cannot be made to the long form Census or ACS if aggregated data is downloaded from the Census. Column 4 and 5 briefly discuss the editing techniques used to remove opposite-sex couples from the recorded count of same-sex couple households. The last column helps future researchers identify additional data needed to edit the recorded count of same-sex couple households. Marital status, relationship to Person 1, and sex all come from the long form Census or the ACS.

3 Census Edits and Associated Literature

In this section we discuss how the Census treats same-sex couple households since 1990. The short form Census, long form Census, and ACS will be discussed with a focus on how same-sex couple households are identified, what edits have been used in the literature, and the identification of previous studies using these data. No formal comparison between the various editing methods that are discussed in this paper exist, to the best of our knowledge. By design, all editing techniques introduce some level of error, which can vary according to income, density, urbanization, or other demographics. Thus, without a more reliable source to identify same-sex couple households at a local level, it is not possible to determine the most appropriate editing technique.[6]

Table 1 provides a summary of the Census sources and the respective editing techniques used by different researchers that are discussed in this paper, along with an indication of which type of Census data one must download (aggregated vs individual), details on the editing technique, and which additional data researchers will need. The remainder of this section is broken down by Census year and type.

3.1 1990 Census

The 1990 Census asks a question about how each person in the house is related to Person 1. Prior to 1990, identifying an unmarried partner posed an issue. An unmarried partner is neither a spouse or a roommate as the relationship does not fit either category. In 1990, "unmarried partner" was added as a response option on the question about the relationship to Person 1, which is depicted in Figure 1.

Data from the 1990 short form Census has been used to look at the number of same-sex couple households (Smith and Gates, 2001). Data from the 1990 long form Census has been used to look at concentration (Black et al., 2002; Florida and Gates, 2015), demographics (Black et al., 2000), house price (Fu, 2008), income (Klawitter and Flatt, 1998; Allegretto and Arthur, 2001; Carpenter, 2004; Christafore and Leguizamon, 2013), and partnering patterns (Walther and Poston Jr., 2004) of same-sex couple households.

3.1.1 1990 Short Form Census

In 1990, same-sex marriages were not allowed so an edit was necessary for responses that said that the head of the household lived with their same-sex spouse. Martial status was used to decide how to edit same-sex couple households who responded that they were living with their spouse (Black et al., 2007). Figure 1 displays separate questions for the relationship to the head of the house and for marital status.[7] If the same-sex married couple's marital status indicated that they were "currently married" then the Census edited the sex of the spouse to make the couple an opposite-sex married couple. As the Census considered this a "logical edit," the Census does not flag these allocations,[8] which means it is possible that the Census undercounts the number of same-sex couple households as the Census will not include same-sex couples who consider themselves married in the count of same-sex couple households (Black et al., 2007).

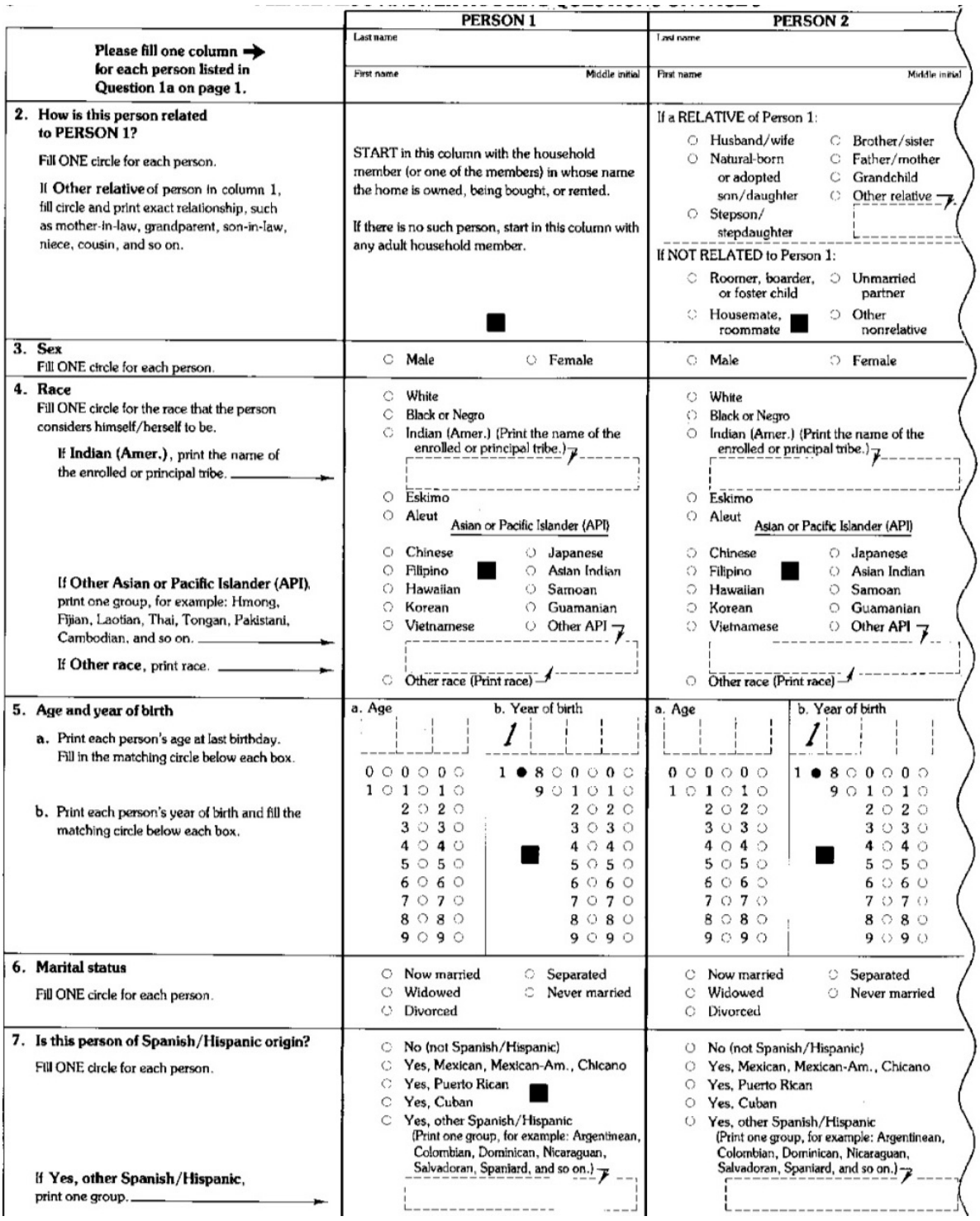
In the 1990 short form Census, opposite-sex married couples that accidentally miscode their sex are not included in the unedited count of same-sex couple households because same-sex married couples are recoded as opposite-sex married couple households. Although there is still the possibility that opposite-sex

[6] Although no formal comparison of the methods is provided, we recommend future researchers use any of the editing techniques discussed in this paper, as they have been validated by the peer-review process on multiple occasions.

[7] Although the identification of same-sex couple households ultimately relies on each respondents' sex and relationship to Person 1, marital status is often used in the editing process. The relationship to Person 1 identifies how each person in the house is related to Person 1, while the marital status identifies the marital status of each respondent. As an illustrative example, assume a household is made of a divorced male father living with his son and the son's wife. The father would have a marital status of "divorced." The son's relationship to Person 1, the father, would be described as "natural-born son/daughter" and have a marital status of "married." The son's wife's relationship to Person 1, the father, would be "son-in-law/daughter-in-law" and have a marital status of "married."

[8] The Census often makes edits to the raw data. Sometimes these edits have an allocation flag that indicates that the Census edited the response. However, sometimes the Census makes edits that they consider to be "logical edits." These edits are not flagged because the Census feels confident that an error occurred on the respondent's part. In the case of the 1990 short form Census, since same-sex marriages were not allowed, the Census decided that these respondents miscoded their sex so an allocation was necessary but that a flag in the data was not necessary.

Figure 1: 1990 Short Form Census Questionnaire Identifying Same-Sex Couple Households



In the 1990 short form Census, same-sex couple households could be identified when another person, in this case Person 2, is the same sex as Person 1 and is considered to be the "unmarried partner" of Person 1, the head of the household.

unmarried partners are recorded in the unedited count of same-sex couple household, edits to the 1990 short form Census are not common.

3.1.2 1990 Long Form Census

Two methods have been used to edit the count of same-sex households from the 1990 long form Census. Gates and Steinberger (2009), Black et al. (2002), and Christafore and Leguizamon (2013) only include same-sex couple households that do not have their marital status allocated by the Census. Black et al. (2000) only exclude same-sex couple households where the relationship to head of household was allocated.

3.2 2000 Census

The 2000 Census, like the 1990 Census, identified same-sex households through the questions about the relationship to Person 1 and sex. Figure 2 and Figure 3 depict the response options to the question about the relationship to Person 1, the head of the household, in the 2000 short form Census and long form Census, respectively.

Data from the 2000 short form Census has been used to look at the concentration of same-sex couple households (Spring, 2013; Florida and Gates, 2015; Madden and Ruther, 2015) and the effect of same-sex couple households on house prices (Florida and Mellander, 2010; Christafore and Leguizamon, 2012; Christafore et al., 2013; Leguizamon and Leguizamon, 2017) and gentrification (Christafore and Leguizamon, 2017; Goodnature et al., 2020). Data from the 2000 long form Census has been used to look at income (Klawitter, 2011; Christafore and Leguizamon, 2013); homeownership rates (Jepsen and Jepsen, 2009); house prices (Fu, 2008); partnership, cohabitation, and demographics (Carpenter and Gates, 2008); and migration (Cooke and Rapino, 2007) of same-sex couple households and the effect of same-sex couples on house prices (Christafore and Leguizamon, 2012).

3.2.1 2000 Short Form Census

Same-sex marriages were still not allowed in 2000. Therefore, similar to the 1990 Census, the issue remains on how to edit same-sex married couple households. While the 1990 short form Census changed the sex to record these households as opposite-sex married households, the 2000 short form Census changed the relationship to Person 1, the head of the household, so that these households are recorded as same-sex unmarried partners.[9] Again, the Census considers this a "logical edit" so the Census does not flag these allocations (Black et al., 2007). The Census warns against comparing the count of same-sex couple households from the 1990 Census to all subsequent Census data because same-sex couples who are married, or consider themselves to be married, are not included in the 1990 Census but are included in subsequent Census data. However, the Census is unclear if this also applies to comparisons of demographic, economic, and labor market characteristics of same-sex couple households in the 1990 Census and all subsequent Census datasets (Gates and Steinberger, 2009).

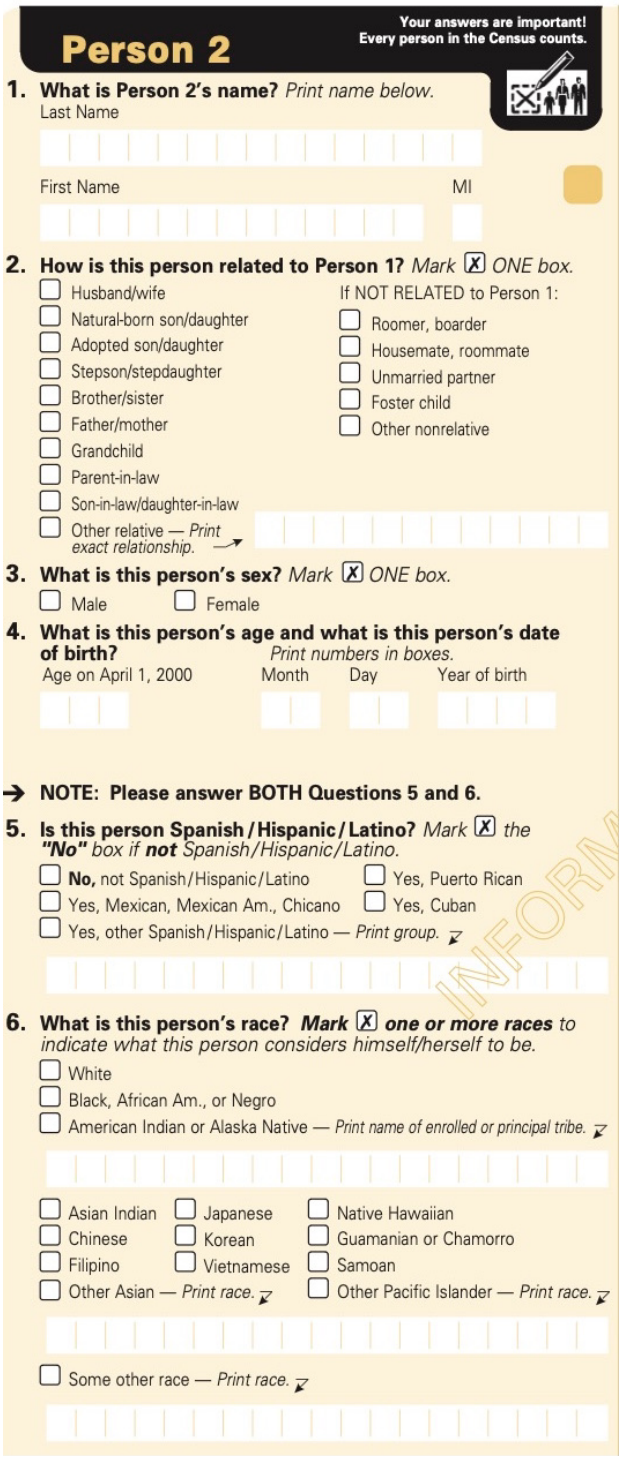
Since the amount of households that identified their opposite-sex partner as the wrong sex in 2000 is nontrivial, there is a concern that an opposite-sex couple accidentally selected the wrong sex and identified their opposite-sex partner as the same sex. This would mean that the count of same-sex couple households recorded by the Census is actually made up of a mixture of same-sex partners and opposite-sex partners.[10] This is particularly important if an opposite-sex married couple accidentally miscodes their sex and are recorded as a same-sex married couple since the 2000 short form Census recodes this couple as a same-sex unmarried partner couple.

To correct for the possible inflation in the unedited count of same-sex couple households, Madden and Ruther (2015) and Christafore and Leguizamon (2017) follow the suggestion from DiBennardo and Gates (2014); on the other hand, Christafore and Leguizamon (2012), Christafore et al. (2013), Leguizamon and Leguizamon (2017), and Goodnature et al. (2020) follow part of the suggestion by Gates and Steinberger (2009). The exact method used by Christafore and Leguizamon (2012), Christafore et al. (2013), Leguizamon

[9] Using data from the American Housing Survey (AHS), Lewis et al. (2015) determined that most errors where due to miscoding sex and not due to miscoding relationship. Therefore, same-sex married couple households are likely opposite-sex married households and not same-sex unmarried couple households.

[10] See O'Connell and Gooding (2006) and Black et al. (2007) for evidence that the unedited count of same-sex unmarried partner households in the 2000 Census is actually a mixture of same-sex and opposite-sex couples.

Figure 2: 2000 Short Form Census Questionnaire Identifying Same-Sex Couple Households



Person 2

Your answers are important! Every person in the Census counts.

1. What is Person 2's name? *Print name below.*
Last Name

First Name MI

2. How is this person related to Person 1? *Mark ☒ ONE box.*

- ☐ Husband/wife
- ☐ Natural-born son/daughter
- ☐ Adopted son/daughter
- ☐ Stepson/stepdaughter
- ☐ Brother/sister
- ☐ Father/mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law/daughter-in-law
- ☐ Other relative — *Print exact relationship.*

If NOT RELATED to Person 1:

- ☐ Roomer, boarder
- ☐ Housemate, roommate
- ☐ Unmarried partner
- ☐ Foster child
- ☐ Other nonrelative

3. What is this person's sex? *Mark ☒ ONE box.*
☐ Male ☐ Female

4. What is this person's age and what is this person's date of birth? *Print numbers in boxes.*
Age on April 1, 2000 Month Day Year of birth

→ **NOTE: Please answer BOTH Questions 5 and 6.**

5. Is this person Spanish/Hispanic/Latino? *Mark ☒ the* ***"No"*** *box if* ***not*** *Spanish/Hispanic/Latino.*

- ☐ **No,** not Spanish/Hispanic/Latino
- ☐ Yes, Mexican, Mexican Am., Chicano
- ☐ Yes, other Spanish/Hispanic/Latino — *Print group.*
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban

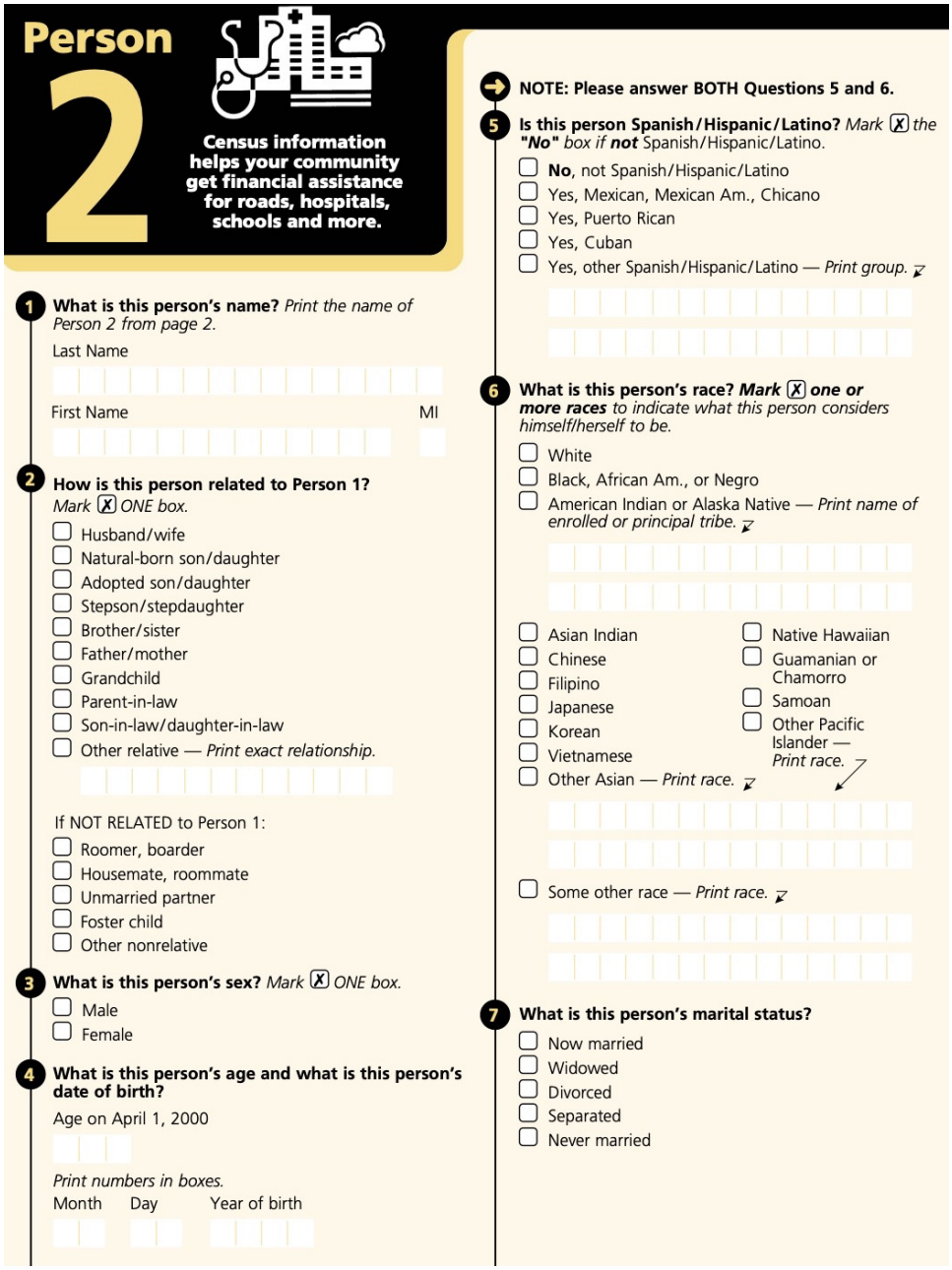
6. What is this person's race? ***Mark ☒ one or more races*** *to indicate what this person considers himself/herself to be.*

- ☐ White
- ☐ Black, African Am., or Negro
- ☐ American Indian or Alaska Native — *Print name of enrolled or principal tribe.*
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Other Asian — *Print race.*
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander — *Print race.*
- ☐ Some other race — *Print race.*

In the 2000 short form Census, same-sex couple households could be identified when another person, in this case Person 2, is the same sex as Person 1 and is considered to be the "unmarried partner" of Person 1, the head of the household.

and Leguizamon (2017), and Goodnature et al. (2020) is not explicitly suggested in Gates and Steinberger (2009) so we will refer to the method as the Christafore and Leguizamon (2012) method in order to avoid

Figure 3: 2000 Long Form Census Questionnaire Identifying Same-Sex Couple Households



Person 2

Census information helps your community get financial assistance for roads, hospitals, schools and more.

1 What is this person's name? *Print the name of Person 2 from page 2.*

Last Name

First Name MI

2 How is this person related to Person 1? *Mark ☒ ONE box.*

- ☐ Husband/wife
- ☐ Natural-born son/daughter
- ☐ Adopted son/daughter
- ☐ Stepson/stepdaughter
- ☐ Brother/sister
- ☐ Father/mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law/daughter-in-law
- ☐ Other relative — *Print exact relationship.*

If NOT RELATED to Person 1:

- ☐ Roomer, boarder
- ☐ Housemate, roommate
- ☐ Unmarried partner
- ☐ Foster child
- ☐ Other nonrelative

3 What is this person's sex? *Mark ☒ ONE box.*

- ☐ Male
- ☐ Female

4 What is this person's age and what is this person's date of birth?

Age on April 1, 2000

Print numbers in boxes.

Month Day Year of birth

NOTE: Please answer BOTH Questions 5 and 6.

5 Is this person Spanish/Hispanic/Latino? *Mark ☒ the* ***"No"*** *box if* ***not*** Spanish/Hispanic/Latino.

- ☐ **No**, not Spanish/Hispanic/Latino
- ☐ Yes, Mexican, Mexican Am., Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latino — *Print group.*

6 What is this person's race? ***Mark ☒ one or more races*** *to indicate what this person considers himself/herself to be.*

- ☐ White
- ☐ Black, African Am., or Negro
- ☐ American Indian or Alaska Native — *Print name of enrolled or principal tribe.*
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian — *Print race.*
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander — *Print race.*
- ☐ Some other race — *Print race.*

7 What is this person's marital status?

- ☐ Now married
- ☐ Widowed
- ☐ Divorced
- ☐ Separated
- ☐ Never married

In the 2000 long form Census, same-sex couple households could be identified when another person, in this case Person 2, is the same sex as Person 1 and is considered to be the "unmarried partner" of Person 1, the head of the household.

confusion with the Gates and Steinberger (2009) method applied to the long form Census and ACS.

The method suggested by DiBennardo and Gates (2014) involves two steps and data from O'Connell and Feliz (2011). We will discuss how to use this method to determine the count of same-sex couple households in each Census tract, although this method can be used to find other sub-state counts. The first step requires finding the temporary number of same-sex couple households for Census tract i, *temporary adjusted same-sex couples*$_i$:

$$\begin{aligned} \textit{temporary adjusted same-sex couples}_i = \textit{same-sex unmarried partners}_i \\ - ((\textit{opposite-sex married partners}_i \times \textit{state-level married error}) \\ + (\textit{opposite-sex unmarried partners}_i \times \textit{state-level unmarried error})) \end{aligned}$$

where *same-sex unmarried partners*$_i$, *opposite-sex married partners*$_i$, and *opposite-sex unmarried partners*$_i$ are Census tract-level unedited counts of these couples reported in the 2000 short form Census. The *state-level married error* is the state-level estimate for the rate of sex miscoding among married couples and the *state-level unmarried error* is the state-level rate of sex miscoding among unmarried couples. Both the *state-level married error* and the *state-level unmarried error* are available in O'Connell and Feliz (2011), but are presented in Table 2. These miscoding rates are based on the 2010 Census but are applied to the 2000 Census. If *temporary adjusted same-sex couples*$_i$ is negative, then it is recoded as zero.

Table 2: Rate of Sex Miscoding Among Married and Unmarried in the 2010 Census

State	Miscoding Rate among Married	Miscoding Rate among Unmarried	State	Miscoding Rate among Married	Miscoding Rate among Unmarried
Alabama	0.00270	0.00359	Montana	0.00236	0.00265
Alaska	0.00203	0.00256	Nebraska	0.00218	0.00304
Arizona	0.00220	0.00308	Nevada	0.00238	0.00311
Arkansas	0.00222	0.00343	New Hampshire	0.00255	0.00293
California	0.00240	0.00372	New Jersey	0.00247	0.00374
Colorado	0.00209	0.00308	New Mexico	0.00231	0.00341
Connecticut	0.00258	0.00326	New York	0.00262	0.00358
Delaware	0.00229	0.00339	North Carolina	0.00249	0.00355
Florida	0.00277	0.00361	North Dakota	0.00202	0.00235
Georgia	0.00248	0.00412	Ohio	0.00210	0.00295
Hawaii	0.00271	0.00269	Oklahoma	0.00244	0.00358
Idaho	0.00177	0.00328	Oregon	0.00208	0.00394
Illinois	0.00225	0.00334	Pennsylvania	0.00260	0.00307
Indiana	0.00247	0.00325	Rhode Island	0.00261	0.00330
Iowa	0.00222	0.00233	South Carolina	0.00283	0.00376
Kansas	0.00207	0.00243	South Dakota	0.00200	0.00293
Kentucky	0.00251	0.00384	Tennessee	0.00235	0.00387
Louisiana	0.00291	0.00352	Texas	0.00239	0.00396
Maine	0.00264	0.00390	Utah	0.00218	0.00354
Maryland	0.00245	0.00362	Vermont	0.00264	0.00249
Massachusetts	0.00274	0.00360	Virginia	0.00231	0.00323
Michigan	0.00224	0.00283	Washington	0.00208	0.00327
Minnesota	0.00186	0.00250	West Virginia	0.00272	0.00376
Mississippi	0.00271	0.00378	Wisconsin	0.00194	0.00252
Missouri	0.00206	0.00306	Wyoming	0.00206	0.00294
			District of Columbia	0.00306	0.00442

The miscoding rates in the 2010 Census are from O'Connell and Feliz (2011), which are in Appendix Table 4 and can be obtained at https://www.census.gov/library/working-papers/2011/demo/SEHSD-WP2011-26.html. These rates are based on inconsistent name-to-sex reporting per 100 opposite-sex unmarried partners and the numbers displayed in this table are the numbers in O'Connell and Feliz (2011) divided by 100.

The second step in the DiBennardo and Gates (2014) method requires finding the final adjusted number of same-sex couple households for Census tract i, *adjusted same-sex couples*$_i$:

$$\begin{aligned} \textit{adjusted same-sex couples}_i = \textit{state-level preferred \# of same-sex couples} \\ \times \frac{\textit{temporary adjusted same-sex couples}_i}{\sum_{i=1}^{S} \textit{temporary adjusted same-sex couples}_i} \end{aligned}$$

where *state-level preferred # of same-sex couples*$_i$ is determined by O'Connell and Feliz (2011) through the

use of unedited, unreleased data from the Census.[11] The *state-level preferred # of same-sex couples*$_i$ are available in O'Connell and Feliz (2011), but are presented in Table 3. Table 3 displays the state-level preferred counts of same-sex unmarried partner households and same-sex married partner households separately, but the *state-level preferred # of same-sex couples* is the addition of these two counts. This last step insures that the Census tract-level counts sum up to the official preferred count of same-sex couples in each state. Note that the denominator must contain every Census tract in the entire state S, even if researchers are not interested in finding the edited count of same-sex couple households in every Census tract in the state.

Table 3: "Preferred" Counts of Same-Sex Couples by State from the 2000 Census

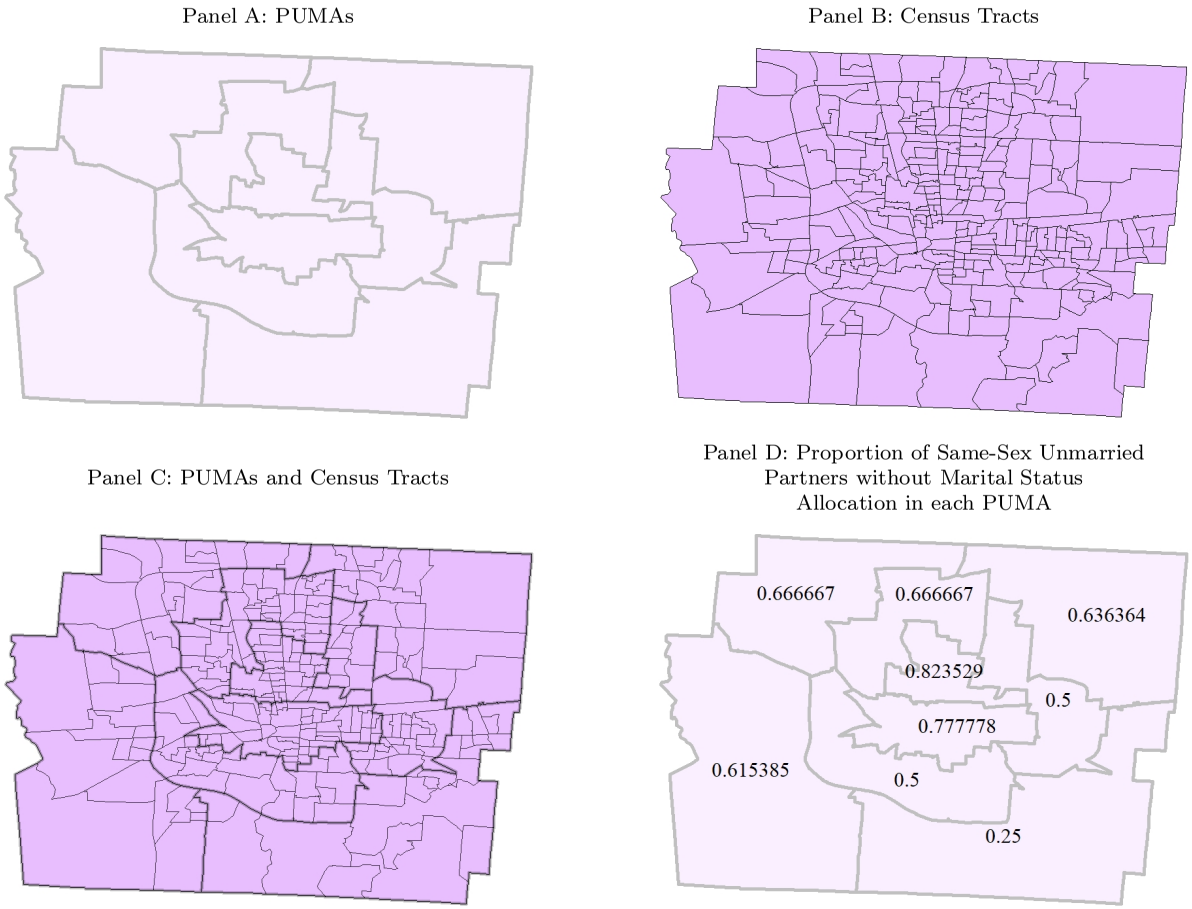
State	Same-Sex Married	Same-Sex Unmarried	State	Same-Sex Married	Same-Sex Unmarried
Alabama	821	2,766	Montana	0	397
Alaska	69	559	Nebraska	5	1,015
Arizona	1,201	6,903	Nevada	638	2,648
Arkansas	320	1,471	New Hampshire	0	1,482
California	9,080	57,957	New Jersey	1,686	7,892
Colorado	543	6,321	New Mexico	288	2,444
Connecticut	563	3,999	New York	4,694	25,592
Delaware	132	1,102	North Carolina	1,451	6,929
Florida	3,309	22,582	North Dakota	2	174
Georgia	1,563	10,269	Ohio	722	9,285
Hawaii	235	1,233	Oklahoma	7	2,290
Idaho	200	676	Oregon	326	5,717
Illinois	2,115	11,684	Pennsylvania	189	9,964
Indiana	57	4,984	Rhode Island	205	1,377
Iowa	0	1,564	South Carolina	1,068	2,726
Kansas	178	1,722	South Dakota	0	232
Kentucky	125	2,775	Tennessee	1,019	4,187
Louisiana	996	3,734	Texas	4,708	20,402
Maine	28	1,983	Utah	300	1,536
Maryland	780	6,255	Vermont	87	1,210
Massachusetts	741	10,711	Virginia	881	7,224
Michigan	681	7,383	Washington	935	10,320
Minnesota	139	5,769	West Virginia	0	825
Mississippi	561	1,449	Wisconsin	0	4,264
Missouri	273	4,721	Wyoming	131	247
			District of Columbia	284	3,101

The "preferred" counts of same-sex couple households in the 2000 Census is from O'Connell and Feliz (2011), which are in Appendix Table 7 and can be obtained at https://www.census.gov/library/working-papers/2011/demo/SEHSD-WP2011-26.html.

The method suggested by Christafore and Leguizamon (2012) requires finding the proportion of same-sex unmarried partners that did not have their marital status allocated in each PUMA from the 2000 5% long form Census and multiply those PUMA-level proportions by the unedited count of same-sex unmarried partner households in the 2000 short form Census. Gates and Steinberger (2009) suggest not including same-sex unmarried partners that had their marital status allocated when using the the 1990 long form Census, 2000 long form Census, and the ACS, but make no suggestion about applying these proportions to the data from the short form Census.

[11] O'Connell and Feliz (2011) created inconsistency ratios for each state for unmarried partners and spouses based on data from the 2010 Census. These inconsistency ratios were applied to the 2000 Census count of opposite-sex married couple households and opposite-sex unmarried couple households to estimate the number of opposite-sex couple households accidentally included in the count of same-sex couple households. The estimates of opposite-sex couple households are subtracted from the raw, unreleased count of same-sex married couples and same-sex unmarried couples.

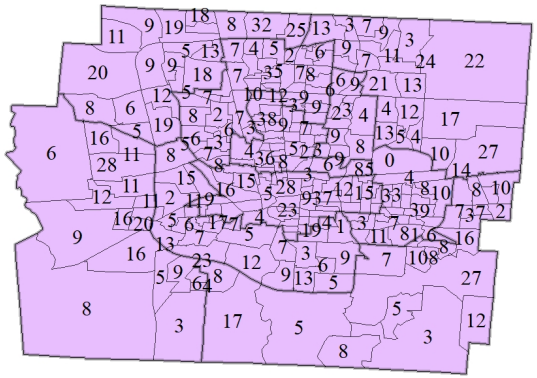
Figure 4: Illustrative Example of the Christafore and Leguizamon (2012) Method of Correcting the 2000 Short Form Census Data - Franklin County, Ohio 2000

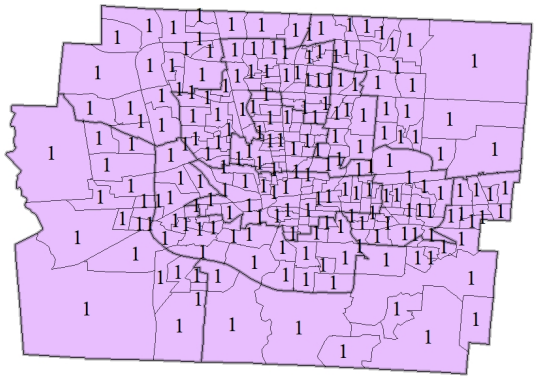


All shapefiles used to create maps for the Census tracts and PUMAs are from the Census Cartographic Boundary Files Shapefile, available at https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.2000.html. Panel A shows the PUMA in the Franklin County, Ohio; Panel B shows the Census tracts in the Franklin County, Ohio; and Panel C shows both the Census tracts and PUMA. Panel D shows the proportion of same-sex unmarried partner households where neither couple had their marital status allocated in each PUMA.

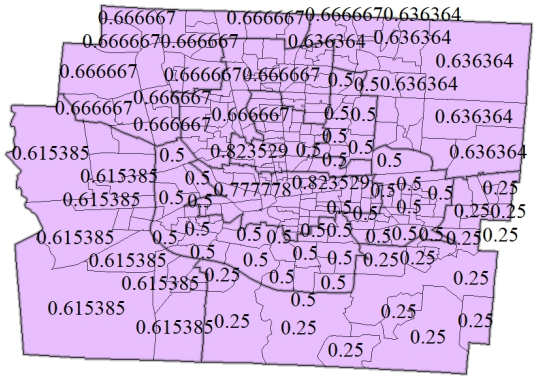
Figure 4: Illustrative Example of the Christafore and Leguizamon (2012) Method of Correcting the 2000 Short Form Census Data - Franklin County, Ohio 2000 (continued)

Panel E: Unedited Same-Sex
in each Census Tract

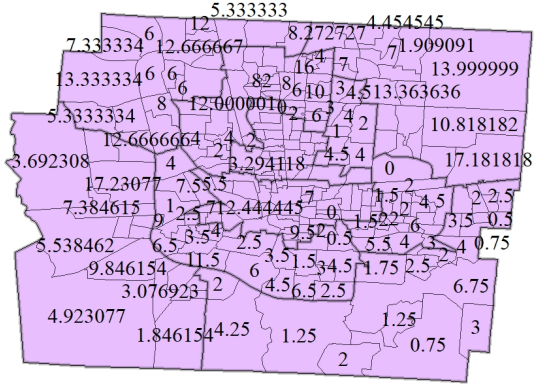




Panel G: Proportion of Same-Sex Unmarried
Partners without Marital Status
Allocated in each Census Tract



Panel H: Edited Same-Sex
Unmarried Partners
in each Census Tract



Panel E is the unedited number of same-sex unmarried partner households in each Census tract. Panel F shows how much of each Census tract is in each PUMA - this should be a number between 0 and 1. Panel G is the proportion of same-sex unmarried partner households without their marital status allocated from PUMA in each Census tract. Panel H is the edited number of same-sex unmarried partner households in each Census tract, which is found by multiplying the numbers from Panel E and Panel G.

Figure 4 provides an illustrative example of the method suggested by Christafore and Leguizamon (2012). Panel A shows the PUMAs in Franklin County, Ohio; Panel B shows the Census tracts in Franklin County, Ohio; and Panel C shows both the Census tracts and PUMAs. Panel D shows the proportion of same-sex unmarried partner households where neither couple had their marital status allocated in each PUMA, which is obtained from the 2000 5% long form Census. Panel E is the unedited number of same-sex unmarried partner households in each Census tract available from the 2000 short form Census. Panel F shows how much of each Census tract is in different PUMAs, which should be a number between 0 and 1 and sum to 1 for each Census tract. The conversion from Census tract to PUMA is from the Missouri Census Data Center Geocorr 2000 application. Although each Census tract is in exactly one PUMA in Franklin County, this need not be the case, but often is. Panel G is the proportion of same-sex unmarried partner households without their marital status allocated from PUMA in each Census tract. For each Census tract i this proportion is found by finding $\sum_{p=1}^{P} proportion_p \times conversion_p$ where $proportion_p$ is the proportion from Panel D, $conversion_p$ is the conversion in Panel F, and P is the total number of PUMAs that Census tract i is part of, which is 1 for each Census tract in Franklin County. Panel H is the edited count of same-sex unmarried partner households in each Census tract, which is found by multiplying the numbers from Panel E and Panel G.

3.2.2 2000 Long Form Census

Similar to the 1990 Census, the 2000 Census would not allow an "unmarried partner" couple to be "currently married," so the Census allocated the marital status.[12] Since these allocations are flagged in the 2000 long form Census, Black et al. (2007) and Gates and Steinberger (2009) suggest not including same-sex unmarried partner couples with an allocated marital status.

Following the method suggested by Gates and Steinberger (2009); Klawitter (2011), Christafore and Leguizamon (2012), and Christafore and Leguizamon (2013) only include same-sex couple households that did not have their marital status allocated by the Census. As an alternative editing procedure, Jepsen and Jepsen (2009) exclude same-sex couples that had their sex or relationship to the head of the household allocated and same-sex couples that have more than two people in an unmarried partnership or marriage.

3.3 2010 Short Form Census

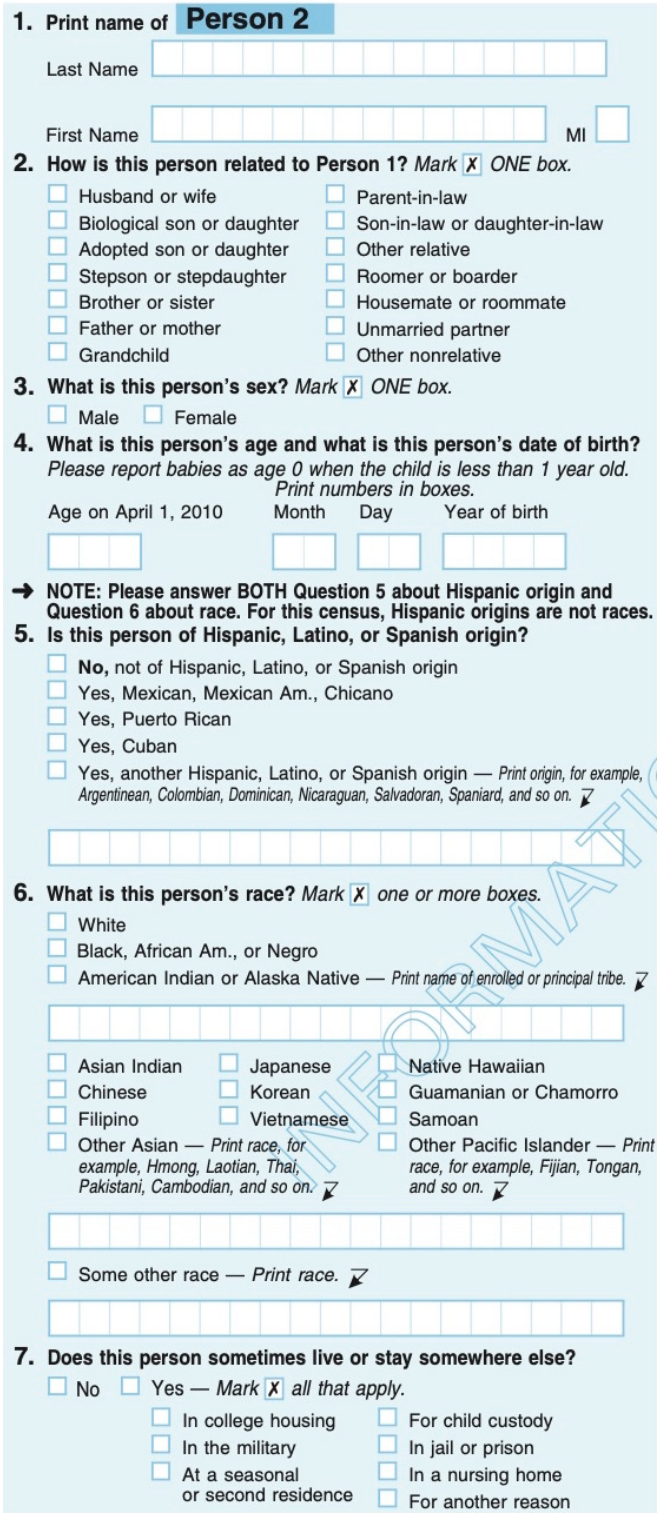
By 2010, several states allowed some recognition of same-sex marriages (Gates, 2010).[13] However, since all states did not recognize same-sex marriages and the Defense of Marriage Act was not ruled unconstitutional until 2013,[14] the Census decided to recode all same-sex married couples as same-sex unmarried couples (Lofquist et al., 2012). Again, the Census considers this a "logical edit" so the Census does not flag these allocations. Figure 5 depicts the response options to the question about the relationship to Person 1 in the 2010 Census. Data from the 2010 short form Census has been used to look at concentration (Spring, 2013; Madden and Ruther, 2015) and partnering (Poston and Chang, 2016) of same-sex couple households and the effect of same-sex couple households on gentrification (Goodnature et al., 2020).

[12]The question about marital status was included in the 1990 short form Census, the 1990 long form Census, and the 2000 long form Census, but not the 2000 short form Census (Black et al., 2007). The marital status question in 2000, or the lack thereof, can be seen in Figure 2 and Figure 3.

[13]By 2010, Connecticut, Iowa, Massachusetts, New Hampshire, Vermont, and the District of Columbia allowed same-sex marriages. In May 2008, the California Supreme Court allowed same-sex marriages but overturned this decision in November 2008 (O'Connell and Feliz, 2011). California, Connecticut, Maine, Maryland, Nevada, New Hampshire, New Jersey, Oregon, Vermont, Wisconsin, Washington, and the District of Columbia allowed same-sex civil unions or domestic partnerships. Colorado and Hawaii allowed benefits (Gates, 2010). Maryland, New York, and Rhode Island did not perform same-sex marriages or recognize them from other states. There were 37 states that explicitly defined marriage as between one man and one woman while 10 states prohibited same-sex marriages (O'Connell and Feliz, 2011).

[14]The Defense of Marriage Act (DOMA) was a federal law passed on September 21, 1996, which defined marriage solely as the union between one man and one woman and allowed states to pass a law refusing to recognize same-sex marriages. Although DOMA was ruled unconstitutional in 2013, following its passage in 1996, many states passed laws that banned same-sex marriages or clarified the language used in DOMA (McVeigh and Diaz, 2009). With DOMA being deemed unconstitutional in 2013, this meant that same-sex married couples can not be banned from receiving federal benefits based on DOMA. However, even without DOMA, individual states still have the right to choose whether to recognize same-sex marriages or not (Lewis et al., 2015).

Figure 5: 2010 Short Form Census Questionnaire Identifying Same-Sex Couple Households



1. **Print name of** **Person 2**

Last Name

First Name MI

2. **How is this person related to Person 1?** *Mark ✗ ONE box.*

- ☐ Husband or wife
- ☐ Biological son or daughter
- ☐ Adopted son or daughter
- ☐ Stepson or stepdaughter
- ☐ Brother or sister
- ☐ Father or mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law or daughter-in-law
- ☐ Other relative
- ☐ Roomer or boarder
- ☐ Housemate or roommate
- ☐ Unmarried partner
- ☐ Other nonrelative

3. **What is this person's sex?** *Mark ✗ ONE box.*

☐ Male ☐ Female

4. **What is this person's age and what is this person's date of birth?**
Please report babies as age 0 when the child is less than 1 year old.
Print numbers in boxes.

Age on April 1, 2010 | Month | Day | Year of birth

➜ **NOTE: Please answer BOTH Question 5 about Hispanic origin and Question 6 about race. For this census, Hispanic origins are not races.**

5. **Is this person of Hispanic, Latino, or Spanish origin?**

- ☐ **No,** not of Hispanic, Latino, or Spanish origin
- ☐ Yes, Mexican, Mexican Am., Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, another Hispanic, Latino, or Spanish origin — *Print origin, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

6. **What is this person's race?** *Mark ✗ one or more boxes.*

- ☐ White
- ☐ Black, African Am., or Negro
- ☐ American Indian or Alaska Native — *Print name of enrolled or principal tribe.*
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian — *Print race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander — *Print race, for example, Fijian, Tongan, and so on.*
- ☐ Some other race — *Print race.*

7. **Does this person sometimes live or stay somewhere else?**

☐ No ☐ Yes — *Mark ✗ all that apply.*

- ☐ In college housing
- ☐ In the military
- ☐ At a seasonal or second residence
- ☐ For child custody
- ☐ In jail or prison
- ☐ In a nursing home
- ☐ For another reason

In the 2010 short form Census, same-sex couple households could be identified when another person, in this case Person 2, is the same sex as Person 1 and is considered to be the "unmarried partner" of Person 1.

For the 2010 short form Census a new method was developed to deal with the possibility that opposite-sex couples are incorrectly recorded as same-sex unmarried couples. The Census edited respondents's sex based on their first name to obtain a "preferred" count of same-sex couples (Census, 2011). The Census changed the sex of respondents if there was a 95 percent chance or higher that the name was specific to the opposite sex. The probabilities are obtained by using files from internal micro-data of first names in the Census and the associated probability that the name is associated with an individual who identifies as male or female (O'Connell and Feliz, 2011).

For instance, the Census would only change the sex of a recorded female named Michael if the name Michael had a 95 percent chance or higher that the name is male. Kreider and Lofquist (2015) find that determining sex based off name is highly effective.[15] After editing sex based on the name of respondents, the count of same-sex couple households is referred to as the "preferred" count of same-sex couple households in the 2010 Census. The "preferred" count can be found in O'Connell and Feliz (2011), but is displayed in Table 4.

Table 4: "Preferred" Counts of Same-Sex Couples by State from the 2010 Census

State	Same-Sex Married	Same-Sex Unmarried	State	Same-Sex Married	Same-Sex Unmarried
Alabama	1,704	4,878	Montana	286	1,062
Alaska	278	950	Nebraska	510	1,846
Arizona	2,265	13,552	Nevada	1,252	5,888
Arkansas	1,040	3,186	New Hampshire	1,016	2,244
California	28,312	69,841	New Jersey	4,447	12,428
Colorado	1,618	10,806	New Mexico	858	4,967
Connecticut	2,704	5,148	New York	10,125	38,807
Delaware	380	2,266	North Carolina	3,224	15,085
Florida	6,784	41,712	North Dakota	146	413
Georgia	3,661	17,657	Ohio	2,661	17,023
Hawaii	580	2,659	Oklahoma	1,335	4,799
Idaho	446	1,596	Oregon	2,002	9,771
Illinois	3,607	19,442	Pennsylvania	3,228	19,108
Indiana	1,603	9,471	Rhode Island	592	2,193
Iowa	1,373	2,720	South Carolina	1,596	5,618
Kansas	833	3,176	South Dakota	175	539
Kentucky	1,328	5,867	Tennessee	1,959	8,939
Louisiana	1,731	6,345	Texas	8,397	38,004
Maine	407	3,551	Utah	809	3,100
Maryland	2,321	10,217	Vermont	755	1,388
Massachusetts	8,863	11,393	Virginia	2,474	11,769
Michigan	2,202	12,396	Washington	3,072	15,931
Minnesota	1,330	8,877	West Virginia	680	2,168
Mississippi	1,050	2,434	Wisconsin	1,194	7,985
Missouri	1,592	8,965	Wyoming	179	478
			District of Columbia	745	4,077

The "preferred" counts of same-sex couple households in the 2010 Census is from O'Connell and Feliz (2011), which are in Appendix Table 6b and can be obtained at https://www.census.gov/library/working-papers/2011/demo/SEHSD-WP2011-26.html.

Unfortunately, the "preferred" count of same-sex couple households for the 2010 Census was only released at the state level so any sub-state level of "preferred" counts are not available. Gates (2013) describes a method to obtain the "preferred" counts of same-sex couple households on a sub-state counts. We will discuss

[15]Kreider and Lofquist (2015) match 2010 short form Census data to data from the Social Security Administration. They match respondents based on name, age, and address because they are unable to match by social security number. They compare the sex determined using the 95 percent rule and internal Census data to the sex recorded by the Social Security Administration. For the cases that the 95 percent rule was used, sexes matched in the Census and Social Security Administration database 97.4 to 99.5 percent of the time. The names deemed "ambiguous" with the 95 percent rule and internal Census data are names that had neither a 95 percent chance they were male nor a 95 percent change they were female. According to the Social Security Administration database, these ambiguous names were female slightly more than 50 percent of the time and male slightly less than 50 percent of the time, which solidifies that these names are ambiguous and sex cannot be determined solely based on name. Using the 95 percent rule, sex can be determined in about 85 percent of names, meaning ambiguous names occurred in about 15 percent of names.

how to determine the "preferred" count of same-sex couple households in each Census tract, although this method can be used to find other sub-state levels. The method outlined in Gates (2013) requires data from the 2010 "preferred" count of same-sex couple households, unedited data from the 2010 short form Census, and the 2010 Census mail-in participation rates.

The method suggested by Gates (2013) to obtain the "preferred" count of same-sex couples households in each Census tract begins with developing a rate of miscoding error for Census tract i, $error_i$:

$$error_i = \left(0.003 \times \frac{mail\ in\ participation\ rate_i}{100}\right) + \left(0.01 \times \left(1 - \frac{mail\ in\ participation\ rate_i}{100}\right)\right)$$

where the $mail\ in\ participation\ rate_i$ for Census tract i, a number between 0 and 1, can be found online from the Census.[16] The 0.003 and 0.01 come from the sex miscoding rate developed by O'Connell and Feliz (2011) of 3 per 1,000 households when respondents used the mail-in-survey and 10 per 1,000 households when respondents used the non-response follow-up survey, respectively.

The second step in the Gates (2013) method involves finding the $preferred\ \#\ of\ same\text{-}sex\ male\ couples_i$ and $preferred\ \#\ of\ same\text{-}sex\ female\ couples_i$ for Census tract i:

$$\begin{aligned} preferred\ \#\ of\ same\text{-}sex\ male\ couples_i = \\ same\text{-}sex\ male\ unmarried\ partners_i - (error_i \times \\ (opposite\text{-}sex\ married\ couples\ with\ male\ householder_i + \\ opposite\text{-}sex\ unmarried\ couples\ with\ male\ householder_i)) \end{aligned}$$

and

$$\begin{aligned} preferred\ \#\ of\ same\text{-}sex\ female\ couples_i = \\ same\text{-}sex\ female\ unmarried\ partners_i - (error_i \times \\ (opposite\text{-}sex\ married\ couples\ with\ female\ householder_i + \\ opposite\text{-}sex\ unmarried\ couples\ with\ female\ householder_i)) \end{aligned}$$

where $same\text{-}sex\ male\ unmarried\ partners_i$, $opposite\text{-}sex\ married\ couples\ with\ male\ householder_i$, $opposite\text{-}sex\ unmarried\ couples\ with\ male\ householder_i$, $same\text{-}sex\ female\ unmarried\ partners_i$, $opposite\text{-}sex\ married\ couples\ with\ female\ householder_i$, and $opposite\text{-}sex\ unmarried\ couples\ with\ female\ householder_i$ are Census tract-level unedited counts of these couples reported in the 2010 short form Census. If either $preferred\ \#\ of\ same\text{-}sex\ male\ couples_i$ or $preferred\ \#\ of\ same\text{-}sex\ female\ couples_i$ are negative, then they are recorded as zero.

The third step in the Gates (2013) method involves finding the $proportion\ of\ preferred\ \#\ of\ same\text{-}sex\ couples_i$ for Census tract i:

$$\begin{aligned} &proportion\ of\ preferred\ \#\ of same\text{-}sex\ couples_i = \\ &\frac{preferred\ \#\ of\ same\ sex\ male\ couples_i + preferred\ \#\ of\ same\ sex\ female\ couples_i}{\sum_{i=1}^{S} preferred\ \#\ of\ same\ sex\ male\ couples_i + preferred\ \#\ of\ same\ sex\ female\ couples_i} \end{aligned}$$

which calculates the proportion of same-sex couple households, adjusted according to the estimated error rate in each Census tract i. Note that the denominator must contain every Census tract in the entire state

[16]The mail-in participation rates are available in an interactive map at `https://www.census.gov/censusexplorer/2010ratemap.html`, but can be obtained in a downloadable file at `https://www.census.gov/data/datasets/2010/dec/2010-participation-rates.html`. Unfortunately, the interactive map and the downloadable file defines Census tracts using 2000 Census tracts, so a conversion file is necessary. A 2000 to 2010 Census tract conversion file can be found from the Census at `https://www.census.gov/geographies/reference-files/time-series/geo/relationship-files.html`.

S, even if researchers are not interested in finding the "preferred" count of same-sex couple households in every Census tract in the state.

The final step in the Gates (2013) method finds the number of same-sex couple households for Census tract i, *tract-level preferred # of same-sex couples*$_i$:

$$\begin{aligned} \textit{tract-level preferred \# of same-sex couples}_i = \\ \textit{state-level preferred \# of same-sex couples} \\ \times \textit{proportion of preferred \# of same-sex couples}_i \end{aligned}$$

where *state-level preferred # of same-sex couples* is the sex-corrected state-level "preferred" count of same-sex couple households, which are available in O'Connell and Feliz (2011) but are displayed in Table 4. Table 4 displays the "preferred" counts for same-sex unmarried partner households and same-sex married partner households separately, but *state-level preferred # of same-sex couples* is the addition of these two counts. The *tract-level preferred # of same-sex couples*$_i$ is the edited count of same-sex couple households in Census tract i. This correction method suggested by Gates (2013) is used by Spring (2013), Poston and Chang (2016), and Goodnature et al. (2020).

3.4 2020 Short Form Census

At the time this paper was written, the 2020 Census had not concluded so it has not yet been determined what edits the Census will make and how researchers will handle potential miscoding issues. However, the 2000 short form Census marked a change in the response options to the question about the relationship to the head of the household. The 2020 short form Census split husband/wife relationship into opposite-sex husband/wife and same-sex husband/wife. Similarly, unmarried partner has been split into opposite-sex unmarried partner and same-sex unmarried partner. These clear designation of "opposite-sex" and "same-sex" should help with errors in miscoding the relationship to the head of the household. The 2020 short form Census will likely identify same-sex couple households (married or unmarried) when any person is the same sex as Person 1, the head of the household, and selects "same-sex husband/wife" or "same-sex unmarried partner" as their relationship to Person 1. A sample of the 2020 short form Census is displayed in Figure 6.

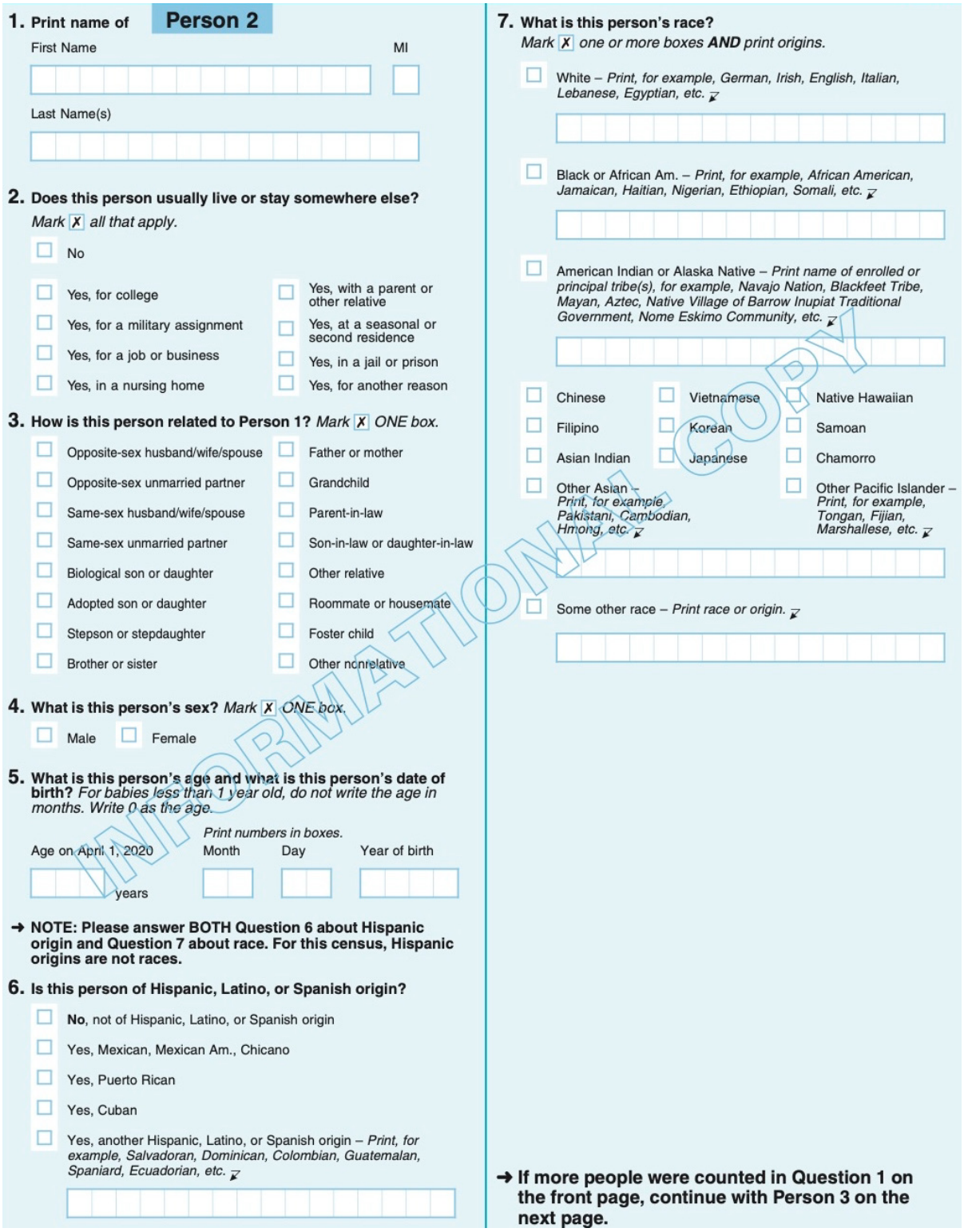
It is yet to be determined how the Census will deal with same-sex couples that select "opposite-sex husband/wife" or "opposite-sex unmarried partner" or how the Census will deal with opposite-sex couples that select "same-sex husband/wife" or "same-sex unmarried partner."[17] In addition, it is yet to be determined how the Census will handle same-sex married couples who reside in states that do not allow or recognize same-sex marriages. With this uncertainty, future researchers should explore how the 2020 short form Census counts, edits, and allocates (with or without a flag) the count of same-sex couples. In addition, future researchers should explore what editing techniques are available based on how the Census edits same-sex couple households.

3.5 American Community Survey

Data from the ACS has been used to look at concentration (Hardman and Kertz, 2014), income (Christafore and Leguizamon, 2013, 2019; Martell and Nash, 2020), and labor market outcomes (Sansone, 2019; Martell, 2018) of same-sex couple households; tax effects of legalizing same-sex marriage (Alm et al., 2014); and why same-sex couple respondents choose "husband/wife" or "unmarried partner" as their relationship to the head of the household (Virgile, 2011).

[17]The Current Population Survey (CPS) has similar relationship status options. When the relationship status and reported sex are inconsistent, an algorithm is used to randomly assign cases as opposite-sex couples 70 percent of the time and same-sex couples 30 percent of the time. This is achieved by editing either the relationship status or the sex of one member of the couple. Analysis of the 2020 short form Census and the 2019 and 2020 ACS will need to be conducted to see if this editing technique is appropriate (Kreider and Gurrentz, 2019).

Figure 6: 2020 Short Form Census Questionnaire Identifying Same-Sex Couple Households



1. Print name of **Person 2**

First Name MI

Last Name(s)

2. Does this person usually live or stay somewhere else?
Mark ✗ all that apply.

- No
- Yes, for college
- Yes, for a military assignment
- Yes, for a job or business
- Yes, in a nursing home
- Yes, with a parent or other relative
- Yes, at a seasonal or second residence
- Yes, in a jail or prison
- Yes, for another reason

3. How is this person related to Person 1? *Mark ✗ ONE box.*

- Opposite-sex husband/wife/spouse
- Opposite-sex unmarried partner
- Same-sex husband/wife/spouse
- Same-sex unmarried partner
- Biological son or daughter
- Adopted son or daughter
- Stepson or stepdaughter
- Brother or sister
- Father or mother
- Grandchild
- Parent-in-law
- Son-in-law or daughter-in-law
- Other relative
- Roommate or housemate
- Foster child
- Other nonrelative

4. What is this person's sex? *Mark ✗ ONE box.*

- Male
- Female

5. What is this person's age and what is this person's date of birth? *For babies less than 1 year old, do not write the age in months. Write 0 as the age.*

Print numbers in boxes.

Age on April 1, 2020 — years | Month | Day | Year of birth

➜ NOTE: Please answer BOTH Question 6 about Hispanic origin and Question 7 about race. For this census, Hispanic origins are not races.

6. Is this person of Hispanic, Latino, or Spanish origin?

- **No**, not of Hispanic, Latino, or Spanish origin
- Yes, Mexican, Mexican Am., Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, another Hispanic, Latino, or Spanish origin – *Print, for example, Salvadoran, Dominican, Colombian, Guatemalan, Spaniard, Ecuadorian, etc.*

7. What is this person's race?
Mark ✗ one or more boxes ***AND*** *print origins.*

- White – *Print, for example, German, Irish, English, Italian, Lebanese, Egyptian, etc.*
- Black or African Am. – *Print, for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, etc.*
- American Indian or Alaska Native – *Print name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.*
- Chinese
- Filipino
- Asian Indian
- Other Asian – *Print, for example, Pakistani, Cambodian, Hmong, etc.*
- Vietnamese
- Korean
- Japanese
- Native Hawaiian
- Samoan
- Chamorro
- Other Pacific Islander – *Print, for example, Tongan, Fijian, Marshallese, etc.*
- Some other race – *Print race or origin.*

➜ If more people were counted in Question 1 on the front page, continue with Person 3 on the next page.

The 2020 short form Census has slightly different response options than the 1990, 2000, and 2010 short form Census. Previously there was "husband/wife" and "unmarried partner", but "opposite-sex" and "same-sex" designations have been added.

3.5.1 ACS 2005-2012

The ACS used the 2000 Census method to deal with same-sex married couples until 2013 - all same-sex married households are recorded as same-sex unmarried household (Gates and Steinberger, 2009). Again, this allocation is considered a "logical edit" and is not flagged in the data. The ACS is administered through a paper form in the mail and those that do not respond get a follow up interview through the phone or in-person interviews, Computer Assisted Telephone Interview (CATI) or Computer Assisted Personal Interview (CAPI), respectively. More than a third of ACS respondents use the CATI or CAPI. In all of these computer assisted interviews, respondents are asked to verify the sex of their same-sex spouse, which helps eliminate the possibility of miscoding the sex of a partner. Like the long form Census, the ACS does not allow an unmarried partner to have a marital status of "currently married" so the ACS changes the marital status of these households and flags these allocations (Gates and Steinberger, 2009).

To correct for the possible inflation in the recorded count of same-sex couples, most researchers follow the suggestion from Gates and Steinberger (2009). For ACS responses submitted by mail, Gates and Steinberger (2009) suggest removing same-sex couple households that have had one or both of their marital statuses allocated. For ACS responses submitted by CATI or CAPI, regardless of marital status allocation, Gates and Steinberger (2009) suggest including them as these responses includes same-sex couples who consider themselves as married. However, Gates and Steinberger (2009) later suggest to exclude all same-sex couple households that have had their marital status allocated regardless of how the these couples responded to the ACS.[18] This later suggestion is used by Christafore and Leguizamon (2013) and Christafore and Leguizamon (2019), who only include same-sex couple households that did not have their marital status allocated by the Census. These correction methods can only be applied to data obtained from ipums.org because data from data.census.gov is aggregated making it unclear which same-sex unmarried households had their marital status allocated.

Although Gates (2009) claims the ACS in 2008 and later allowed same-sex couples to be recorded as same-sex married households, this is not true. Similar to the 2000 and 2010 Census, the ACS continued to recode same-sex married couple households as same-sex unmarried partner households. However, the 2008 ACS did redesign the survey and post-data collection editing techniques,[19] which likely reduced the amount of opposite-sex couples that are recorded as same-sex couples (Gates, 2009). Lofquist (2012) finds differences between same-sex spouses who report as married and same-sex unmarried partners who report as married and O'Connell et al. (2010) discuss that opposite-sex couples might be included in the unedited count of same-sex couple households. Therefore, it is still likely that opposite-sex couples are accidentally recorded as same-sex couple households. Alm et al. (2014) and Christafore and Leguizamon (2019) follow the Gates and Steinberger (2009) procedure and exclude same-sex couples who have had their marital status allocated. As an alternative editing procedure, Virgile (2011) excludes same-sex couple households that have had their relationship to Person 1 allocated while Sansone (2019) excludes same-sex couple households that have had their sex or relationship to Person 1 allocated.

3.5.2 ACS 2013-2018

The ACS in 2013 and later finally allowed same-sex married couples to be recorded as same-sex married couples, meaning that same-sex married couples would not be recoded as same-sex unmarried partners. Therefore, same-sex couple households will be a combination of same-sex married couple households and same-sex unmarried couple households. Starting in the 2014 ACS, two parents and two parents-in-law of the same sex were also allowed to be recorded without allocations. Christafore and Leguizamon (2019) and Martell and Nash (2020) follow the Gates and Steinberger (2009) procedure and exclude same-sex couples who have had their marital status allocated.

[18] Although Gates and Steinberger (2009) suggest excluding all same-sex couple households with allocated marital statuses in the 1990 long form Census, 2000 long form Census, and ACS, they make a point to say that any form of edits to the unedited data should be made extremely clear by researchers. This particularly matters if comparing same-sex couples to some other group as the method suggested by Gates and Steinberger (2009) might exclude same-sex couples that consider themselves as married.

[19] See O'Connell et al. (2010) for a discussion of changes to the 2008 ACS.

3.5.3 ACS 2019-2020

The 2019 and 2020 ACS will mirror the relationship question asked in the 2020 short form Census as "opposite-sex" and "same-sex" designations have been added to the "husband/wife" and "unmarried partner" response options to describe the relationship to Person 1. Similar to the 2020 short form Census, it is yet to be determined at this point in time how the ACS will count, edit, and allocate (with or without flags) same-sex couples.[20]

4 Non-Census Sources

A variety of other surveys are used to identify members of the LGBTQ+ community. Some of these surveys include the Behavioral Risk Factor Surveillance System (BRFSS) (Carpenter, 2004; Buchmueller and Carpenter, 2010); California's Health Interview Survey (CHIS) (Carpenter, 2005; Black et al., 2007; Carpenter and Gates, 2008); California's Lesbian, Gay, Bisexual, and Transgender Tobacco Survey (Tobacco Survey) (Carpenter and Gates, 2008); the Current Population Survey (Black et al., 2007); the General Social Survey (GSS) (Black et al., 2000, 2003; Blandford, 2003; Martell, 2014); the Harvard College Alcohol Study (CAS) (Carpenter, 2009); the National Health and Social Life Survey (NHSLS) (Black et al., 2000); the National Health Interview Survey (NHIS) (Martell and Nash, 2020); the National Survey of Family Growth (NSFG) Carpenter (2009); the Third National Health and Nutrition Examination Surveys (NHANES III) (Carpenter, 2007); and other small surveys (Herek, 2009; Gates, 2010). Some of these surveys rely on self-reported data, which could allow ambiguity in the definition of being "gay" or "bisexual." Other surveys can only identify same-sex couples who are living together. In addition, these surveys are limited to pre-determined geographic areas and pre-determined time periods.

Whittemore and Smart (2016) and Smart and Whittemore (2017) study the spatial distribution of same-sex couple households, but use a novel approach. The authors use the advertisement for rent and sale of property in the gay-oriented newspaper *Dallas Voice*. This approach allows the authors to have a more granular level data, but is still bounded by a pre-determined geographic area over a specific time interval. In addition, since the authors only observe the advertisement for the property, they are unable to distinguish who is purchasing and who is moving into these properties.

5 Conclusion

Research on same-sex households usually rely on Census data. In this paper, we discuss the identification of same-sex household in the different versions of the Census and different years of the Census. In addition, we summarize the different methods used in the literature to deal with potential miscoding and edits made by the Census. Although several editing techniques exist, Gates and Steinberger (2009) suggest researchers be extremely clear in their editing techniques.

While the issues discussed in this paper put limitations on the use of same-sex couple households research, it is important that current and future researchers are able to understand the different available data from the Census and how to deal with these limitations. As applied economists continue to delve into research related to the LGBTQ+ community, new methods for identification of same-sex couple households may emerge. This should be especially true, with the increasing availability of "big data," which should allow for an easier identification of these individuals, improving the quantity and quality of work on the LGBTQ+ community.

[20]The Current Population Survey (CPS) has similar relationship status options. When the relationship status and reported sex are inconsistent, an algorithm is used to randomly assign cases as opposite-sex couples 70 percent of the time and same-sex couples 30 percent of the time. This is achieved by editing either the relationship status or the sex of one member of the couple. Analysis of the 2020 short form Census and the 2019 and 2020 ACS will need to be conducted to see if this editing technique is appropriate (Kreider and Gurrentz, 2019).

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