



Identifying same-sex couples in Census Bureau data

In Census 2010, same-sex couples are identified in households where Person 1 describes his or her relationship with another adult of the same sex as either a “husband/wife” or an “unmarried partner.” Procedures used by the Census Bureau to edit and process same-sex couple data have varied over time. In 1990, same-sex couples who identified a partner as a “husband/wife” were not classified as same-sex couples at all, as it was assumed that these couples were different-sex spouses where one partner’s sex was miscoded. In 2000 and again in 2010, the Census Bureau included same-sex spouses among same-sex couples.

Measurement error within identified same-sex couples

Black, et al. (2007), O’Connell and Gooding (2007), and Gates and Steinberger (2011) all show that the classification of same-sex spouses as same-sex unmarried partners creates a serious measurement problem as evidence suggests that a portion of identified same-sex spouses are actually different-sex married couples who erred and inadvertently miscoded the sex of one of the spouses, thus appearing to be a same-sex couple. Using Census data that provides the probability that a given name is male or female, O’Connell and Feliz (2011) consider all observed same-sex couples from Census 2010 and estimate that 28% are likely miscoded different-sex couples. The report also provides “preferred” estimates for each state and the District of Columbia of the number of same-sex couples by their sex, designated relationship status (“husband/wife” or “unmarried partner”), and whether or not the household included “own” children under age 18 (biological or adopted children of Person 1 in the household). The Census Bureau has not released new estimates for these groups at the county, city, or Census tract level. The procedure described below will rely on the state-level preferred estimates along with the original data documented in the Census 2010 SF-1 files to develop adjusted estimates at these lower levels of geography.

Adjustment procedure

The adjustment procedure involves three steps as follows:

1. Develop estimates of the rate of error (the percent of different-sex couples who miscode the sex of a partner or spouse) for each county, city, or tract.
2. Apply the error to different-sex couples and subtract the number of miscoded different-sex couples from comparable same-sex couples in each county, city, and tract to create an adjusted distribution of same-sex couples across counties, cities, and census tracts in each state.
3. Apply that distribution to the Census state-level preferred estimates of same-sex couples to develop adjusted estimates for each county, city, and Census tract within the state.

Develop county, city, and tract estimates of error rate

In their assessment of changes between the 2007 and 2008 American Community Surveys (ACS), O’Connell and Lofquist (2009) report that the format of the surveys had an impact on the potential for making errors. They note that sex miscoding was more prevalent in the 2007 survey than in the 2008 format. The 2007 survey had respondents providing information about members of the household on a grid. The name of each person in the household was at the beginning of a row and subsequent columns corresponded to questions about that person (e.g., relationship to Person 1, age, sex). The 2008 survey was formatted such that respondents placed the name of each person in the household on a separate page and questions about that person were ordered along columns on that page. On the whole, the 2008 format performed substantially better than the 2007 grid format.

In the 2010 Decennial Census, the original forms mailed to all households in the United States follow the format of the 2008 ACS. Nationally, the Census Bureau reports that 74% of households completed these forms. The remaining 26% of households received a follow-up visit from a Census enumerator. The form completed in this process largely followed the matrix format of the ACS prior to 2008. This implies that the error rate for sex miscoding among different-sex married couples in the 2010 Census is a combination of a relatively low error among those who completed a mail-in form and a higher error among those who completed a follow-up form.

O’Connell and Felix (2011) report a sex miscoding rate among different-sex couples of 3 per 1,000 households when respondents used the mail-in survey and 10 per 1,000 households when they used the non-response follow-up survey. The national participation rate figures imply that 74% of households used the mail-in form with a 3 per 1,000 error rate and 26% of households used the follow-up survey with a 10 per 1,000 error rate. This implies an overall national error rate among different-sex couples of

approximately 4.8 errors per 1,000 households $((3 \times 0.74) + (10 \times 0.26))$. At the completion of the 2010 Census, the Census Bureau released mail-in participation rates for states, counties, cities, and census tracts. So it is possible to calculate an estimated error rate for all of these geographic areas.

Develop adjusted distribution of same-sex couples across counties, cities, and Census tracts

The procedure for developing an adjusted distribution of same-sex couples across counties, cities, and Census tracts relies on the following assumptions:

- The overall participation rate for a given geography is the same as the participation rate for different-sex couples
- Gates and Steinberger (2011) also show that most errors are likely in the sex of the non-householder spouse. The procedure assumes that the sex miscodes occur only in the coding of the “husband/wife” or “unmarried partner”, not of the householder.
- The probability of miscoding sex among different-sex married couples does not vary by the sex of the householder.

The data adjustment procedure begins with the following variables derived from official Census Bureau tabulations from the Census 2010 SF-1, PCT15 (with the exception of the mail-in participation rate).

Mailinpct	% of households who used the Census 2010 mail-in survey
SS	Same-sex couples
SSM	Same-sex male couples
SSM_ch	Same-sex male couples raising own children
SSF	Same-sex female couples
SSF_ch	Same-sex female couples raising own children
DSMARM	Different-sex married couples where the householder was male
DSMARM_ch	Different-sex married couples raising own children where the householder was male
DSMARF	Different-sex married couples where the householder was female
DSMARF_ch	Different-sex married couples raising own children where the householder was female
DSUMPM	Different-sex unmarried couples where the householder was male
DSUMPM_ch	Different-sex unmarried couples raising own children where the householder was male
DSUMPF	Different-sex unmarried couples where the householder was female
DSUMPF_ch	Different-sex unmarried couples raising own children where the householder was female

These variables are used to create a set of temporary variables. These temporary variables all reduce official estimates by the rate at which different-sex couples in a given geographic area (g) miscode the sex of the spouse or partner. Of note, calculations that yield a negative result are coded as zero.

$$\text{error}_g = (0.003 * \text{Mailinpct}_g) + (0.01 * (1 - \text{Mailinpct}_g))$$

Error rate among different sex couples in a given level of geography (g)

$$\text{SSMt}_g = \text{SSM}_g - (\text{error}_g * (\text{DSMARM}_g + \text{DSUMPM}_g))$$

Official tabulation of same-sex male couples reduced by the error rate applied to the official tabulation of comparable different-sex couples with a male householder

$$\text{SSFt}_g = \text{SSF}_g - (\text{error}_g * (\text{DSMARF}_g + \text{DSUMPF}_g))$$

Official tabulation of same-sex female couples reduced by the error rate applied to the official tabulation of comparable different-sex couples with a female householder

$$\text{SSMt}_g = \text{SSM}_g - (\text{error}_g * (\text{DSMARM}_g + \text{DSUMPM}_g))$$

Official tabulation of same-sex male couples with children reduced by the error rate applied to the official tabulation of comparable different-sex couples with children and a male householder

$$\text{SSFt}_g = \text{SSF}_g - (\text{error}_g * (\text{DSMARF}_g + \text{DSUMPF}_g))$$

Official tabulation of same-sex female couples with children reduced by the error rate applied to the official tabulation of comparable different-sex couples with children and a female householder

The temporary variables are used to calculate the distribution of same-sex couples, adjusted according to the estimated error rate in a given geographic area(g), across all such geographic areas in the state as follows:

$$pSS_a^g = \frac{(SSMt_a^g + SSFt_a^g)}{\sum_g (SSMt_a^g + SSFt_a^g)}$$

Apply adjusted distribution to Census preferred estimates

This adjusted distribution is then applied to the [preferred estimates of same-sex couples](#) (by sex and child-rearing) in the state. So, for example, if 15% of the total number of adjusted same-sex couples ($SSMt_a + SSFt_a$) lived in City Y and the Census Bureau reported a preferred estimate of 1000 same-sex couples in the state, then the adjusted figures would assume that 150 same-sex couples live in City Y.

For each geographic area (g), the number of same-sex couples per 1,000 households is then determined as follows:

$$SSper1000^g = \left(\frac{pSS_a^g * SS_{preferred}}{Households^g} \right) * 1000$$

The calculation applies the distribution of the adjusted same-sex couples over geographic areas (counties, cities, or tracts) to the preferred estimate of same-sex couples in the state to get an adjusted number of same-sex couples in each geographic area. It then divides that by the total number of households in the area and multiplies by 1,000 to get the adjusted number of same-sex couples per 1,000 households in each geographic area. This basic procedure is applied to male couples, female couples, and couples with children to get adjusted figures for all of these groups within counties, cities, and Census tracts.

References

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