Are the *Generations and Gender Surveys* Well Suited for Studying Same-Sex Couples?

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Abstract Different studies of same-sex couples based on the *Generations and Gender Survey* (GSS) have been published in recent years. However, in this survey, people in gay and lesbian couples are not identified via a direct question but by comparing two separate variables: the sex of the respondent and that of the partner. But the identification of same-sex couples by comparing the sex of both partners is very unreliable. The few sex-coding errors of one of the partners in heterosexual couples generate a very high proportion of “false” same-sex couples among all couples considered to be of the same sex. The aim of this paper is to demonstrate the problematic nature of the indicator in order to avoid inappropriate use of GGS data (and other surveys more generally) and to discuss the reliability of analyses of same-sex couples made with these data.

Keywords Same-sex couple · Sex-coding error · Generations and gender surveys (GGS)

1 Introduction

A growing number of studies of same-sex couples based on quantitative data have been published in recent years thanks to the availability of data that, in principle, distinguish between heterosexual and same-sex couples. This is notably the case of the *Generations and Gender Surveys* (GGS), an international programme of surveys

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(Vikat et al. 2007) conducted in 19 countries with a total of 10,000 respondents aged between 18 and 79 in each country.¹

However, despite the large sample size, the number of same-sex couples remains very limited within a single country as they represent a very small proportion of all couples (0.8% in Canada and 0.7% in Australia in 2011, for example: Statistics Canada 2011). While the share of same-sex couples observed in the GGS appears to be quite consistent with that observed in other sources (Fischer et al. 2016), several studies also suggest that such couples are probably under-represented, possibly due to the social stigma associated with homosexuality (Goldani et al. 2013; Cortina and Festy 2014). Consequently, the limited number of cases does not allow statistical analysis at the national level, and researchers must pool several countries to carry out their studies.

In 2016, two papers were published on same-sex couples using GGS data. The first one focuses on “The Division of Domestic Labor in Same-Sex and Different-Sex Couples” (Bauer 2016). Among the 19 countries which conducted a GGS, seven are included (Australia, Austria, Belgium, France, the Netherlands, Norway and Sweden) in order to obtain a large enough sample of cohabiting same-sex couples. In all, the study is based on a sample of 89 gay couples, 93 lesbian couples and 27,415 heterosexual couples.² The second one focuses on “A comparative study of well-being of persons in same-sex and mixed-sex union across nine European countries” (Fischer et al. 2016). The nine countries included are Austria, Belgium, Bulgaria, the Czech Republic, France, Germany, the Netherlands, Norway and Poland. The sample comprises 66,883 persons in heterosexual couples and 518 in same-sex couples, here including non-cohabiting intimate relationships.

The two above-mentioned publications based on GGS data provide an opportunity to highlight certain limitations inherent to the type of data analysed. Indeed, in GGS, people in gay and lesbian couples at the time of the survey are not identified via a direct question, unlike previous intimate partnerships, about which a direct question was asked: “Q337a. (...) *May I ask you, have any of your previous partners been of the same sex as you?*”. The same-sex indicator is derived from the simple comparison between the sex of the respondent, and that of the partner (whether cohabiting or not). Errors in coding the sex of one of the partners can thus lead to a large share of “false” same-sex couples, which might cast doubt upon the robustness of the results.

The purpose of this article is twofold. The first aim is to provide an estimate of the share of “false” same-sex couples due to coding errors and, secondly, to discuss possible consequences this may have on the results. Without seeking to question the interest or the results of the studies mentioned above, our purpose is to contribute to the discussion on the appropriate use of GGS data and offer a word of caution to

¹ In reality, the sample size and the lower and upper limits of the age group may vary slightly from one country to another one (<http://www.ggp-i.org/data/online-codebook>).

² These numbers appear small in relation to the GGS sample. The aggregate number of cohabiting couples in the seven countries concerned is 39,776 including 174 gay couples, 163 lesbian couples and 44 indeterminate couples (sex variable missing for at least one partner). So the article only covers a part of the population concerned, perhaps because of missing values for certain variables of interest.

researchers wishing to study same-sex couples using these data, and those of other surveys more generally.

2 Incidence of Sex-Coding Errors on the Share of “False” Same-Sex Couples

2.1 Theoretical Illustration

The presence of a significant proportion of “false” same-sex couples among gay and lesbian couples identified in surveys due to sex-coding error has been extensively documented (see, for example, Toulemon et al. 2005; Cortina and Festy 2014; Banens and Le Penven 2016). Such errors are marginal and concern a tiny minority of heterosexual couples. But given the small number of “real” same-sex couples, the “false” same-sex couples resulting from these coding errors on heterosexual couples can represent a large proportion of the total. Let us take, for example, a theoretical sample of 20,000 couples, of whom 100 are same-sex, and in which there is a sex-coding error for one of the partners in 1% of cases (an error rate of 0.5% on sex is sufficient for 1% of heterosexual couples to be mistakenly considered as same-sex couples) (Table 1). This generates 199 “false” same-sex couples, on top of the 99 “real” ones. Hence, among the 298 couples identified in the survey as same-sex, 67% (199/298) are in fact “false” same-sex couples, while the proportion of “false” heterosexual couples is tiny (0.01% in our sample). Assuming that in 0.5% of couples (and not 1%) one of the partners makes a sex-coding error, the proportion of “false” same-sex couples is still 33%.

Several estimates based on real examples give an idea of the scale of error. For instance, the proportion of “false” same-sex couples is estimated at 28% in the 2010 US census, at 31% in the 2001 Canadian census and at 55% in the 2001 UK census (Banens and Le Penven 2016). The GGS surveys are not immune to this risk of error.

While it is understandable that users of available data believe them to be reliable, using the “respondent’s sex” and “partner’s sex” variables to identify gay and lesbian couples calls for prior verification (for example, by cross-checking different items of information) and caution as to the way, this indicator is used. We will see below how the coding errors can affect the results.

Table 1 Theoretical example of effects of coding error on the observation of same-sex couples. *Source:* Fictitious data

	In the sample surveyed	In the database, with hypothesis of 1% of sex-coding error			% of “false”
		“Real”	“False”	ALL	
Straight couples	19,900	19,701	199	19,702	0.01
Same-sex couples	100	99	1	298	66.8
ALL	20,000	19,800	200	20,000	1.0

2.2 What Checks Can be Made?

One of the most reliable ways to detect coding errors is to check the respondent's and the partner's forenames, which are usually sex specific. This information was recorded in most countries, but is not made available in order to guarantee the respondents' anonymity. It is impossible, therefore, for users to detect and correct the sex-coding errors in available data.

But researchers do have various means to assess the quality of the "same-sex couple" indicator that they construct. For example, the couple type can be matched against its marital status (married, unmarried), given that same-sex marriage does not exist in all countries, or has only recently been authorized. Table 2 gives an idea of the inaccuracy of the variable constructed on the basis of the partners' sex in the GGS for five of the seven countries used in Gerrit Bauer's article.

Table 2 Marital status of same-sex couple, by country. *Source:* Generations and gender survey, harmonized datafile, version 4.2

	Homosexual marriage since...	N. Obs.	Marital status			Serious doubt (%)
			Unmarried	Married	O/w married before homosexual marriage became legal	
		(a)			(b)	(b)/(a)
Australia	Not authorized					
Gays		11	Unknown	Unknown	Unknown	–
Lesbians		22	Unknown	Unknown	Unknown	–
Austria	Not authorized					
Gays		4	Unknown	Unknown	Unknown	–
Lesbians		3	Unknown	Unknown	Unknown	–
Belgium	2003					
Gays		30	9	21	16	53.3
Lesbians		30	14	16	12	40.0
France	2013					
Gays		37	15	22	22	59.5
Lesbians		22	13	9	9	40.9
Norway	2009					
Gays		32	16	16	14	43.8
Lesbians		24	11	13	8	33.3
Sweden	2009					
Gays		13	9	4	2	15.4
Lesbians		18	10	8	3	16.7
The Netherlands	2001					
Gays		43	20	23	16	37.2
Lesbians		44	27	17	13	29.5

Coverage Cohabiting couples identified as same-sex couples

Table 3 Distribution of number of children (%) by category of couples. *Source:* Generations and gender survey, harmonized datafile, version 4.2 (France, the Netherlands, Norway, Austria, Belgium, Australia, Sweden)

	Number of children of the respondent			
	0	1	2+	Total
Gays	59.8	12.6	27.6	100.0
Lesbians	50.3	12.9	36.8	100.0
Heterosexual	14.8	16.3	68.9	100.0
Unknown (sex missing for one partner)	61.4	6.8	31.8	100.0

Coverage cohabiting couples

In four out of ten cases (39%), when matching is possible, a serious doubt is revealed: either the couple is married although same-sex marriage was not legal at the time of the survey, or the reported date of marriage precedes legalization in the country concerned. The phenomenon is even more marked in Germany (other countries considered in Fischer et al. 2006), where 84% of the 57 gay couples and 55% of the 38 lesbian couples are coded as married even though same-sex marriage is not legal. These proportions are, respectively, 43 and 40% for the Czech Republic.³ Of course, we cannot exclude errors in reporting the date of marriage; likewise, a few same-sex couples may have married outside their country of residence. But the proportion of suspect cases is so large that the presence of false same-sex couples is unquestionable.

Another way of checking is to look at the respondent's number of children, since same-sex couples with children are rare. Table 3 shows that four in ten men and five in ten women identified as having a cohabiting same-sex partner have at least one child. Here again, one could argue that these are children of a previous union, adopted children or children conceived by ART, but again, the proportion appears to be much too high. On the basis of the *Famille et logements* (family and housing) survey conducted in France by INSEE in 2011 and corrected in detail to reliably identify same-sex couples, only one in ten adults with a same-sex partner reported living at least part of the time with a child (Buisson and Lapinte 2013).

We made more detailed checks for France using the partners' forenames (in compliance with the rules of confidentiality).⁴ In all, of the 59 cohabiting couples identified as same sex, only 17 could be confirmed via their forenames, 32 certainly correspond to a sex-coding error of one of the partners, and there is no clear conclusion for the 10 others (the survey was conducted face-to-face, and the respondent verbally gave the forenames of the dwelling occupants. In the case of first names pronounced in the same way for women and men, the error may be either in the spelling (e.g. Michelle instead of Michel) or in the sex coding). In all, an error appears in more than half of cases, confirming the trends observed in Table 1.

³ In Bulgaria and Poland, the number of gay and lesbian cohabiting couples is too small (9 and 8 couples, respectively). The variability of the share of errors may be due to different factors (for example, data collection method and post-collection checks) whose specific effects are difficult to estimate.

⁴ My thanks to Benjamin Marteau (an INED Ph.D. student) for making these checks.

3 Consequences of Indicator Quality on the Reliability of Published Findings

The poor quality of the indicator constructed to identify same-sex couples—which is certainly the case in France, and probably also for other countries—raises two questions about the reliability of published findings: Can the characteristics of same-sex couples be considered as significantly different from those of straight couples when the former category contains a significant proportion of “false” same-sex couples? Is it possible to compare the characteristics of same-sex couples between countries?

3.1 What Credit Should be Given to the Significance of Specific Traits of Same-Sex Couples?

As it seems reasonable to assume that sex-coding error is random and independent of the variables of interest, the fact that the category of couples considered to be same-sex includes a large share of “false” same-sex couples probably leads to underestimation of the traits identified by the authors. To illustrate this, we examine the four domestic tasks considered in Gerrit Bauer’s study (preparing meals, repairs, shopping for food and vacuum cleaning) and compare the proportions of egalitarian couples⁵ in four categories:

- Couples identified in the survey as heterosexual (“straight couples”),
- “False same-sex couples”, i.e. gay or lesbian couples who were married, while marriage was not permitted (see “Serious doubt”, Table 2),
- “Real same-sex couples” (i.e. unmarried or married same-sex couples for which the date of marriage is consistent with legislation in each country),⁶
- “ALL same-sex couples” which includes all couples in the two previous categories.

Whatever the task, there are no significant differences between the “false same-sex couples” and “straight couples” (Fig. 1), confirming that it is useful to clean the same-sex indicator by cross-checking with other variables. Furthermore, the proportion of egalitarian couples is significantly higher among “Real same-sex couples” than among all other categories, especially that of “false same-sex couples”. This result leads to two observations.

First, this result reveals that the percentages describing the characteristics of the couples identified in the survey as same sex are not accurate when there is a large share of “false same-sex couples”. This is the case here concerning the division of

⁵ The question was: “Who does the following tasks in your household... preparing daily meals; shopping for food; vacuum cleaning the house; doing small repairs in and around the house: Always Respondent/ Usually R/R and Partner equally/Usually P/Always P/Other”. We consider here as “egalitarian” couples for whom the answer was “R and P equally”.

⁶ Although this group probably still includes some “false” same-sex couples.

Fig. 1 Proportion of “egalitarian” couples by category of couples. *Coverage:* Cohabiting couples. *Note:* Confidence intervals (CI) at a 5% significance level. *Interpretation:* The proportion of egalitarian couples is 39% among “Real same-sex couples”. *Source:* Generations and gender survey, harmonized datafile, version 4.2 (Australia, Austria, Belgium, France, the Netherlands, Norway and Sweden)

housework:⁷ the share of egalitarian same-sex couples appears to be largely underestimated.

Second, the differences revealed in Gerrit Bauer’s study probably underestimate the specificity of same-sex couples because of the presence of “false same-sex couples”, which in a certain respect reinforces the study’s findings. However, the statistical significance of its results would have been clearer if only “Real same-sex couples” had been taken into account: although the confidence interval is wider due to smaller numbers, the lower bound of the “Real same-sex couple” confidence interval is systematically higher than that observed for the “ALL same-sex couples” category.

To illustrate the mechanism, let us take vacuum cleaning for example. There are 151 “Real same-sex couples” (noted *nr*) among the 255 couples identified in the GGS as same sex (noted *ns*) and 28,935 heterosexual couples (noted *nh*). The possibility that some persons in a same-sex couple were coded as being in a straight couple is ignored (see illustration, Table 1). Here, the proportion of “Real same-sex couples”, denoted *a*, is 59%.⁸

The proportions of egalitarian couples for this task are as follows (Fig. 1):

- 43% of “ALL same-sex couples” (noted *ps*).
- 51% of “Real same-sex couples” (noted *pr*).

⁷ Table 2 of Gerrit Bauer’s article (p. 108) describing the variables used in his study according to the sexual orientation of the couple should be considered with caution.

⁸ $(151/255) \times 100$.

Fig. 2 Proportion of “egalitarian” couples for vacuum cleaning and confidence interval by share of same-sex couples (a). Coverage: Cohabiting couples. Note: Confidence intervals (CI) at a 5% significance level. Source: Generations and Gender Survey, harmonized datafile, version 4.2 (Australia, Austria, Belgium, France, the Netherlands, Norway and Sweden)

- 32% of “heterosexual couples” (noted ph).
- and we assume, in order to simplify the demonstration, that this proportion is also 32% for the “false same-sex couples” category (noted pf).⁹

A Student’s t test of the difference ($ps - ph$) would give:

$$T = \frac{ps - ph}{\sqrt{\frac{ps(1-ps)}{ns} + \frac{ph(1-ph)}{nh}}}$$

Let nh denote the number of heterosexual couples, ns the number of same-sex couples and nr the number of “real” same-sex couples. If the number of straight couples (nh) is very large compared to the number of all couples identified as same sex (ns), then $ph = P$ (observed proportion for the whole sample). Under the null hypothesis H_0 , $ph = ps$ and we have:

$$T \approx \frac{a(pr - ph)}{\sqrt{ph(1-ph)\left(\frac{1}{ns} + \frac{1}{nh}\right)}} = \frac{a(pr - ph)}{\sqrt{ph(1-ph)\left(\frac{a}{nr}\right)}} \approx \sqrt{a} \frac{(pr - ph)}{\sqrt{ph(1-ph)\left(\frac{1}{nr}\right)}}$$

Thus, if we observe a significant difference between same-sex couples and straight couples, we can conclude that this difference would be greater if the data did not contain “false same-sex couples”. The pm confidence interval can be approximated as follows:

⁹ In reality, the observed proportion is 29% (see Fig. 1).

$$IC \approx ph \pm 1,96\sqrt{a}\sqrt{\frac{ph(1-ph)}{nr}}$$

When a decreases, the difference between ps and ph always decreases faster than the width of the confidence interval (Fig. 2). In conclusion, although the presence of false same-sex couple does not change the overall trends, it is always preferable to correct for sex-coding errors.

3.2 Is It Possible to Compare the Specific Traits of Same-Sex Couples Between Countries?

Let us now consider two countries which differ both in terms of the behaviours of “Real same-sex couples” (pr) and straight couples (ph), and in terms of the proportions of “Real same-sex couples” (a). To the extent that the comparison between the two countries is based on the proportions observed for the couples identified as same-sex (ps) and that a differs, there is no evidence that the differences between same-sex and straight couples are larger in one country than in the other.

To illustrate this, let us take a theoretical example of two countries, A and B. We want to compare the proportions of egalitarian couples for a given domestic task. In both countries, 10,000 couples were interviewed and 200 of them are “Real same-sex couples”. In A, the data were cleaned and there are no “false” same-sex couples. In B, however, there are 300 “false” same-sex couples.

The shares of egalitarian couples are as follows:

- 10% among “straight couples”, denoted $ph(A)$ and $ph(B)$.
- 30% among “Real same-sex couples” in A, denoted $pr(A)$ and 40% in B, denoted $pr(B)$.

The proportion for “All same-sex couples” (ps) is therefore 30% in A (since there are no “false same-sex couples”) and 22%¹⁰ in B (since the proportion of “Real same-sex couples” is 40%). If coding errors are not cleaned in B, this leads to a greater gap between “All same-sex couples” and “straight couples” in A (20 points)¹¹ than in B (12 points).¹² In contrast, if the data are cleaned in B, this leads to the opposite conclusion: the difference is then greater in B (30 points)¹³ than in A (Fig. 3).

In conclusion, if for a given country the errors “only” result in a loss of statistical power, the comparison between countries becomes very risky insofar as the level of error varies from one country to another and can therefore lead to an erroneous

¹⁰ $22\% = \{10\% (ph(A)) \times 40\% (\text{share of “real” same sex couples})\} + \{30\% (pr(A)) \times 60\% (\text{share of “false” same sex couples})\}$.

¹¹ $Pr - ph = 30 - 10\%$.

¹² $pr - ph = 22 - 10\%$.

¹³ $pr - ph = 40 - 10\%$.

Fig. 3 Proportion of egalitarian couples in two fictitious countries (A and B) and confidence intervals depending on whether “false same-sex couples” are taken into account. *Note:* Confidence intervals (CI) at a 5% significance level. *Source:* Fictitious data

conclusion. In this vein, the reliability of the results of Fisher et al.’s comparative study (2016) could be questioned.

4 Discussion: What Data Should be Made Available? How Should the Data be Used?

The disseminated data are reputed to be reliable, and researchers are right, within limits, to consider them as such. In reality, they are indeed reliable, but there is always a slight risk of error inherent to the statistics themselves and to the data collection. While very rare, coding errors exist in all surveys and concern not only the partners’ sex variable, but other variables such as dates. In most cases, their effect is totally negligible. The problem here arises from the fact that the research focuses on a very small minority sub-population, which is highly sensitive to the few coding errors that occur.

Whatever the survey used, researchers must be very careful when seeking to count, characterize or study the specific behaviours of same-sex couples. The harmonized data of the GGS survey allow certain types of analysis but others are to be avoided.

First, it is not possible to quantify same-sex couples on the basis of GGS data: on the one hand, sex-coding errors are too numerous; on the other, it is very likely that same-sex couples are under-represented. Second, the same-sex couple indicator is too imprecise to characterize their behaviours (for example, it is not possible to

determine precisely the proportion of egalitarian same-sex couples). Thirdly, the use of the “same-sex couple” variable as an indicator, as in Gerrit Bauer’s article, is conceivable, but preliminary cleaning of the data is necessary: if the observation was limited to the “Real same-sex couples”, the sample size would be smaller (which would increase confidence intervals), but the observed trends would be more marked: the robustness of the results would therefore not be called into question. Fourth, comparison between countries should be avoided, as the share of “false same-sex couples” is likely to vary greatly from one country to another (depending on the method of data collection, checks and corrections made to the data).

In the disseminated GGS data, the presence of indicators of same-sex relationships in the respondent’s past conjugal history, obtained via a direct question (see introduction), may mislead users into thinking that same-sex couples (intact at the time of the survey) can be identified reliably and simply by comparing the two partners’ sex variables. To avoid this risk of confusion, it will be important in discussions about a future round of GGS to clarify the purpose of recording the sex of respondents and their partners. If the aim is to filter sets of questions (the module on fertility intentions, for example, was only administered to heterosexual couples), the procedure used in the current questionnaire is sufficient (the proportion of errors is negligible), but if the aim is to provide data for specific studies of same-sex couples, adjustments to the questionnaire would be necessary. At the data collection level, a more direct question could be addressed to respondents in a couple at the time of the survey, as was done in the “relationship history” module of the questionnaire (see wording in introduction). In particular, during the data collection process, when both partners are coded as having the same sex, a solution might be to ask the interviewer to check this information. This solution, adopted in the Canadian Census, would be easy to implement in the case of sample surveys with computer-assisted data collection. At the data cleaning level, the “*Guidelines for cleaning and harmonization of generations and gender survey data*” should emphasize the need to check precisely the sex coding of the two partners, using their forenames, for example.

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Compliance with Ethical Standards

Conflict of interest The author declare that they have no conflict of interest.

References

- Banens, M., & Le Penven, É. (2016). Sex miscoding in the census and its effects on the enumeration of same-sex couples. *Population English Edition*, 71(1), 135–148.
- Bauer, G. (2016). Gender roles, comparative advantages and the life course: the division of domestic labor in same-sex and different-sex couples. *European Journal of Population*, 32(1), 99–128.
- Buisson, G., & Lapinte, A. (2013). Le couple dans tous ses états. Non-cohabitation, conjoints de même sexe, Pacs... *Insee Première*, 1435.

- Cortina, C., & Festy, P. (2014). *Identification of same-sex couples and families in censuses, registers and surveys*. Families and Societies Working Paper Series, 8. <http://www.familiesandsocieties.eu/wp-content/uploads/2014/12/WP8CortinaFesty2014.pdf>.
- Fischer, M. M., Kalmijn, M., & Steinmetz, S. (2016). Does tolerance matter? A comparative study of well-being of persons in same-sex and mixed-sex unions across nine European countries. *European Societies*. doi:10.1080/14616696.2016.1207793.
- Goldani, A., M., Esteve, A., Turu, A. (2013). *Coming out in the 2010 census: Same-sex couples in Brazil and Uruguay*. Paper presented at the IUSSP XXVII International Population Conference, Buzan, North Korea.
- Statistique Canada, (2011). Portrait des familles et situation des particuliers dans les ménages au Canada. Familles, ménages et état matrimonial, Recensement de la population de 2011. Document analytique. <http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-312-x/98-312-x2011001-fra.pdf>.
- Toulemon, L., Vitrac, J., & Cassan, F. (2005). Le difficile comptage des couples homosexuels d'après l'enquête EHF. In Lefèvre C. et Filhon A. (dir.), *Histoires de familles, histoires familiales* (pp. 589–602). Coll. Les cahiers de l'Ined, PUF-Ined.
- Vikat, A., Spéder, Z., Beets, G., Billari, F. C., Bühler, C., Désesquelles, A., et al. (2007). Generations and gender survey (GGS): towards a better understanding of relationships and processes in the life course. *Demographic Research*, 17(14), 389–440.