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Abstract

Since 1996, reports on cohabiting same-sex partnerships have been collected in the German Microcensus. However, it is unclear how reliable these reports are. Compared with other data sources, the Microcensus shows only a small number of cohabiting same-sex couples (less than 0.5% of all cohabiting couples in 2016), so under-reporting is assumed. But, because the "true" values are unknown, it is difficult to determine whether under-reporting is actually occurring. In this paper a procedure is proposed where the response behaviour of respondents is analysed depending on the composition of their household. It was found that non-response to the question about a partner in the household is highest among respondents in whose household there is a possible same-sex partner. This indicates under-reporting of cohabiting same-sex couples, and this under-reporting decreased only slightly, at most, over the period considered here (1996 to 2016). This is not the case for registered same-sex partnerships: a comparison with the Census shows that these are reliably recorded in the German Microcensus.

Keywords

Same-sex partnerships, data quality, non-response, under-reporting, German Microcensus

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1 Introduction

In recent years there have been numerous representative studies on same-sex couples based on official data (e.g. Andersson et al. 2006; Baumle et al. 2009; Black et al. 2000; Black et al. 2007b; Cortina 2016; Jaspers & Verbakel 2013; Noack et al. 2005; Schwartz & Graf 2009; Verbakel & Kalmijn 2014). In an increasing number of countries, information on same-sex couples is included in official data. Moreover, official data have large sample sizes, which are necessary for the analysis of the small number of people in same-sex relationships.

In Germany, the Microcensus constitutes an important official data source for research on same-sex couples. The Microcensus is an annual, representative survey with a sample size of 1% of the German population. It has served as the basis for various analyses on the prevalence, development and social structure of same-sex partnerships (e.g. Eggen 2002; Eggen & Rupp 2011; Humpert 2016; Lengerer & Bohr 2019a, 2019b; Rupp & Haag 2016). In addition, the Microcensus is used as a reference for related studies based on survey data (e.g. de Vries et al. 2020; Kroh et al. 2017; Kühne et al. 2019).

However, it is unclear how reliably same-sex couples are recorded in the German Microcensus. The prevalence of same-sex couples measured in the Microcensus is very low, both in international comparison and compared to national survey data. According to the Microcensus, in 2010 only 0.3% of all cohabiting couples were of the same sex (Hammes 2013: 190; Hochgürtel & Rammelt 2018: 49; Rupp & Haag 2016: 331). In other Western countries, official data sources show double to triple these proportions: in the US, about 1% of all cohabiting couples were same-sex in 2010; in Canada, Australia and New Zealand, the figure was between 0.7% and 0.9% at around the same time; and in France, the figure was 0.6% in 2011 (see Lengerer & Bohr 2019a: 138 for an overview). By 2016, the proportion of same-sex couples among all cohabiting couples in the German Microcensus increased to 0.4% (Hochgürtel & Rammelt 2018: 49). Survey data suggest a figure of 0.9% for this point in time (Kroh et al. 2017: 338). Even greater discrepancies can be seen in comparison with survey-based information on sexual orientation: About 2% of the adult population in Germany identified as homosexual or bisexual in 2016 (Kroh et al. 2017: 338). Taken together, this indicates an under-reporting of same-sex couples in the Microcensus.

From a theoretical point of view, under-reporting may be expected, since living with a same-sex partner still diverges from normative expectations. So social desirability is likely to affect responses to the relevant question about a partner in the household. These effects may well be particularly pronounced in the Microcensus, since its data are collected predominantly face-to-face, and response to the question about a partner in the household was voluntary until 2016. This results in item non-response, which may be selective.

This paper therefore addresses the question of whether same-sex couples are underreported in the German Microcensus. Empirically, this assumption cannot be tested directly. No reliable reference data are available, and it is not possible to intervene in the survey, nor can a follow-up survey be conducted. So the question examined here is whether there is indirect evidence of under-reporting of same-sex couples in the Microcensus. The Microcensus is a household survey, i.e. it contains information on the composition of households. On this basis, respondents' willingness to answer is analysed depending on the household context. The study examines whether the willingness to answer the question about a partner in the household differs according to whether there is a possible partner in the household, and whether this possible partner is of the opposite or the same sex as the respondent. This method does not allow a precise assessment of the quality of respondents' reports of same-sex partnerships. But it is the first study to provide empirical evidence of whether or not same-sex couples are being underreported in the Microcensus, and if so, to what approximate extent.

For the first time, this study also examines whether the presumed under-reporting of same-sex couples has changed over time. Same-sex partnerships have been recorded in the Microcensus since 1996, and since then their social acceptance and legal recognition has steadily increased (e.g. Boele-Woelki & Fuchs 2012; Festy 2006; Steffens & Wagner 2004), which might be expected to lead to more reliable reporting. This is examined for the years up to 2016, in which the number of same-sex couples in the Microcensus rose continuously (e.g. Hammes 2013; Hochgürtel & Rammelt 2018; Lengerer & Bohr 2019a, 2019b). Part of this increase may be caused by an increase in the willingness to respond.

The article begins with an overview of the measurement of same-sex couples in official statistics and of previous research on measurement quality. This is followed by theoretical considerations and hypotheses regarding the quality of respondents' reports of same-sex cohabiting partnerships. The next section describes how cohabiting same-sex couples are measured in the German Microcensus, and looks at possible ways of identifying such couples, before explaining the methods used in this study. The empirical findings on the quality of the data are then presented. The paper concludes with a short summary of the main results and some implications for further research.

2 Measurement of Same-Sex Couples in Official Statistics and Previous Research on Measurement Quality

Same-sex couples are measured in different ways in official censuses and microcensuses. This can lead to different measurement errors. Legally recognized same-sex couples (where this option exists) are measured by the question on marital status. Exactly how this is done depends on the legal situation in the given country (see Cortina & Festy 2014; Festy 2007). In countries where same-sex couples are not allowed to marry but are permitted to register their partnership, as was the case in Germany until 2017, a separate category is added to marital status. Legally recognized same-sex couples are thus measured directly in these countries. Measurement errors may occur if some respondents misreport their marital status.¹ So far, there is no empirical evidence of such errors.

Cohabiting same-sex couples are usually measured indirectly, by two questions: the question about the relationship to other persons in the household, where a couple relationship can be specified regardless of the partners' sex, and the question on the sex of all household members. A combination of both questions allows the ex-post identification of cohabiting same-sex couples. This is the case, for example, in the US Census (until 2010), in the French and Spanish Census, and in the German Microcensus (see Cortina & Festy 2014; Festy 2007). Measurement errors may occur if sex is misreported (a), and/or if a relationship is misreported or not reported at all (b). This results in over- or under-reporting of same-sex couples.

(a) Sex misreporting (or miscoding) leads to an overestimation of same-sex couples. As the number of opposite-sex couples is very large, and the number of same-sex couples is very small, just a few misreports of sex are enough to substantially inflate the number of same-sex couples. Several studies have demonstrated this for the US Census (Black et al. 2007a; DeMaio et al. 2013; O'Connell & Feliz 2011). The French census also appears to be affected by an overreporting of same-sex couples (Banens & LePenven 2016). However, there is no such evidence for the German Microcensus so far. The Microcensus contains a relatively small number of same-sex couples (see Section 1).² In addition, the main data collection method for the Microcensus is the computer-assisted personal interview, in which information is checked for consistency during the interview. In contrast, the censuses of other countries often use self-administered mail questionnaires.

(b) An under-reporting of same-sex couples caused by non-response or misreporting in reply to the relationship question is often assumed, as there is still a stigma attached to homosexuality (e.g. Gates & Sell 2007: 242), but this has yet to be fully investigated. Empirical evidence of under-reporting can be derived from the comparison with survey data (e.g. Badgett & Rogers 2003). Since survey data usually does not include information on the gender of respondents' partners, information on sexual orientation is used. There are considerable differences between the prevalence of homosexuality and the prevalence of same-sex couples: the proportion of cohabiting same-sex couples among all cohabiting couples reported for different countries and years varies, but rarely exceeds 1% (see Section 1). The prevalence of homosexuality, on the other hand, is estimated at around 2% to 10% of the population, depending on how it is defined and measured.³ For example, in the US Census 2010, about 1% of all cohabiting couples were same-sex couples (O'Connell & Feliz 2011),

¹ Non-response on marital status is virtually non-existent in official statistics. The same applies to sex (see below).

² The US Census figures reported in Section 1 already exclude errors due to gender misreporting.

³ The wide range of the data can be explained by the fact that the "rate of homosexuality varies greatly depending on how homosexuality is defined" (Black et al. 2000: 141; see also Laumann et al. 1994; Savin-Williams 2009).

while between 2% and 5% of the adult US population defined themselves as gay, lesbian or bisexual (Black et al. 2000; Gates 2011). In Germany, similar discrepancies can be observed at a somewhat lower level (see Section 1). To some extent, these differences can be explained by differences in partnership behaviour: some studies suggest that partnership and cohabitation rates among gays and lesbians are lower than among heterosexuals (Carpenter & Gates 2008; Cortina & Festy 2014; Lengerer & Bohr 2019a; Strohm et al. 2009). But even taking this into account, it remains “likely that the census greatly undercounts partnered gays and lesbians”, as Black et al. (2000: 146) pointed out.

In addition to these indirect indications of under-reporting of same-sex couples, there is also direct evidence. As has been shown in an – albeit non-representative – follow-up survey to the US Census 2010, not all respondents living together with a same-sex partner had marked this in the questionnaire (Badgett & Rogers 2003). The main reasons given by respondents for not disclosing their living arrangements were concerns about the confidentiality of the data and a lack of fit with the answer category (which was “unmarried partner” in the US Census). This led to a serious undercount of same-sex couples by about 15% to 30%. In a similar study, the undercount of same-sex couples in the US Census 2010 was estimated at about 15% (Gates 2010).

3 Reporting of Same-Sex Partnerships: Theoretical Considerations and Hypotheses

3.1 Theoretical Considerations on Response Behaviour

Various errors may occur when measuring empirical phenomena. One important source of errors in standardized surveys is the response behaviour. A question does not generate a response reaction according to a simple schema. Rather, the response comes about in a process influenced by the characteristics of the respondent and of the survey instrument, and by the circumstances of the survey. In this process, disturbances may occur that impact negatively on the quality of the response.

The cognitive model of the response process distinguishes four phases in the response to a question (Sudman et al. 1996; Tourangeau 1984; Tourangeau et al. 2000). In the first phase, the question must be understood; in the second phase, relevant information must be retrieved from the memory; in the third phase, the answer must be prepared; and in the fourth and final phase the answer must be reported. In the case of questions about partnership, the first and especially the last phase of the response process are susceptible to disturbance.⁴ In the first phase, understanding the question presupposes that the concepts it contains are familiar and can be interpreted unequivocally. If this is not the case, respondents try to deduce the meaning of the question elsewhere, for example from the response categories provided. If they do not succeed in doing so, or if misunderstandings occur, an invalid answer is given – or no answer at all. In the last phase of the response process, when reporting the answer, social desirability effects may occur (e.g. Lee 1993; Lensvelt-Mulders 2008; Tourangeau & Yan 2007). This happens in the case of sensitive questions, that is, questions that are felt to be private and/or that address delicate topics. If the true answer to such a question deviates from what is considered to be socially desirable, reporting this answer is unpleasant for the respondent and associated with costs. Hence, there is an incentive for the respondent to give either no answer at all or a socially desirable answer that deviates to a greater or lesser extent from the true answer. Both phenomena have been empirically proven: sensitive questions elicit a larger degree of non-response and misreporting (see for an overview Tourangeau et al. 2000, 255f.).

The extent to which social desirability effects occur depends on several factors (e.g. Tourangeau & Smith 1996). These factors include the degree of sensitivity of the question, the survey mode, and the characteristics of the respondents. The more sensitive the topic of a question is, the more likely social desirability effects are. Greater social desirability effects are found in face-to-face interviews than in self-administered questionnaires. Awareness of the institution on whose behalf the survey is being conducted and trust in the anonymity of the survey may also be important.

3.2 Response Behaviour in the German Microcensus

The relevance of these considerations to the measurement of same-sex couples in the German Microcensus varies. Registered same-sex partnerships are measured explicitly in the question about legal marital status, which was expanded to include the corresponding response category in 2006. Comprehension difficulties are unlikely to occur, nor is the information that is sought sensitive. As these partnerships have already been registered with the relevant public authority, there is little

⁴ The phases in between appear to be unproblematic because the living arrangement is current, actual behaviour.

reason not to report them in a survey (even in an official survey). The reports of registered same-sex partnerships in the Microcensus should therefore be reliable and valid.

All other cohabiting same-sex couples are measured only implicitly in the Microcensus. For this purpose, a voluntary question about a cohabiting partner in the household has been asked since 1996 (see Section 4.1). It does not contain any reference to the partner's gender and is therefore open to misinterpretation. It is not clear to respondents whether the term partner refers only to opposite-sex partners or also to same-sex partners, nor can this be deduced from the response categories. In a "heterosexual culture" (Schneider et al. 1998: 91) it must be assumed that respondents who have an opposite-sex partner will automatically feel that the question is addressed to them. However, respondents with a same-sex partner do not know whether they are included and will therefore probably be more prone to non-response and (unintentional) misreporting. Since 2006, after a change in the wording of the question, it has been possible to deduce that "registered partners" (who must be of the same sex in Germany) are also addressed.⁵ This change, however, has led to the risk of conceptual confusion, since respondents with a same-sex partner might assume that the question is only asking about registered partners. So the revised wording of the question cannot necessarily be expected to result in a substantial improvement in the quality of responses.

Social desirability effects are to be expected when the answer is being reported. Despite increased acceptance in recent years, same-sex couple relationships are still far from the norm. Same-sex couples are subject to social discrimination, and they are neither socially nor legally recognized to the same extent as opposite-sex couples (e.g. Matthias-Bleck 2006; Steffens & Wagner 2004). People with a same-sex partner are therefore more likely to give no answer or to (intentionally) give an incorrect answer. This tendency may be exacerbated by the fact that the Microcensus is an official survey: respondents may be concerned that the State might collect and store personal information about sexual orientation (as was done in Germany during the Nazi regime, see Grau & Schoppmann 2004). These effects are likely to be particularly pronounced among respondents who are interviewed face-to-face, and they may be expected to occur less among those who complete a self-administered questionnaire.

Social desirability effects can be expected to weaken over time because public attitudes to homosexuality have become more liberal in recent years and the legal situation of same-sex partnerships has improved (e.g. Festy 2006; Gerhards 2010; Scott 1998). We can therefore expect respondents to be more inclined now than in the past to report an existing same-sex partnership – even in an official survey.

3.3 Hypotheses

The first hypothesis to be tested here is that registered registered same-sex partnerships will be measured reliably in the German Microcensus. The second hypothesis is that all other (i.e. unregistered) cohabiting same-sex partnerships will be underreported. For one thing, the question about a partner in the household does not explicitly include respondents with a same-sex partner. For another thing, this is a sensitive question for these respondents, leading to socially desirable response behaviour. Respondents with a same-sex partner will therefore be less inclined than other respondents to answer the question about a partner in the household. Among respondents with same-sex partners, there will probably also be a greater tendency to give incorrect answers, but this cannot be tested here without knowledge of the correct answer. Since the question about a partner in the

⁵ Registered partners have thus been recorded twice since 2006: with the question about legal marital status and with that about a partner in the household.

household is voluntary, it can be assumed that incorrect answers are less likely to occur than non-response.

Moreover, it is hypothesized that the extent of socially desirable response behaviour varies with the mode of data collection. Face-to-face interviews are likely to increase the probability of non-response among those living with a same-sex partner, whereas in self-administered mode only minor differences between respondents are to be expected. Note, however, that the survey mode in the Microcensus is not randomly assigned (see Section 4.1), which may lead to a generally higher non-response rate in the self-administered mode.

Finally, it is expected that the under-reporting of cohabiting same-sex couples is likely to have decreased over time. As social acceptance of same-sex couples has grown, people with same-sex partners will probably have become more willing to respond, to the point where their response rate becomes similar to that of people with opposite-sex partners. This should be especially true in face-to-face mode, where the decline in socially desirable answering behaviour will be particularly apparent.

4 Data and Methods

4.1 Data

The Microcensus is an annual, representative official survey of 1% of the total population of Germany (e.g. Schwarz 2001). The survey units are households. In other words, households are selected into the sample, and every person in these households is surveyed. In the Microcensus, “household” is defined on the basis of co-residence and common housekeeping. Hence, only people who live together and share their living expenses constitute a household. Otherwise they are assigned to separate households.

The Microcensus is conducted as a repeated cross-sectional survey, in which one quarter of the selected households is replaced every year. Since participation in the Microcensus is mandatory, unit non-response is very low (about 3%). As a rule, interviews are conducted face-to-face (PAPI or CAPI). If the respondents so wish, or if repeated attempts to make face-to-face contact with them at home are unsuccessful, a self-administered questionnaire is used. Depending on the survey year, this happens in around 10% to 30% of all cases. In a few cases (about 4%), telephone interviews are conducted.

Same-sex partnerships are measured in different ways in the Microcensus. Registered partnerships are included in the question about legal marital status, to which a corresponding category was added in 2006. All same-sex partnerships, irrespective of their formal status, are recorded with the question about whether a partner (*Lebenspartner* or *Lebenspartnerin*, the masculine and feminine forms of *partner*) is living in the household. This question has been asked since 1996. In contrast to almost all the other questions in the Microcensus, response is (up to and including 2016) voluntary. The construction and design of the question and the routing have changed over time (see Figure 1). Up to and including 2004, other members of the household were asked whether they were a partner of Person 1 (provided they were neither married nor related by birth, adoption, or marriage to that person). Hence, only a small proportion of respondents were asked about a partner, and only those partnerships involving the first person were reported.⁶ Since 2005, all persons aged 16 years and over in the household have been asked whether they are the partner of another person in the household (unless they are the spouse of a person in the household). As a result, a much larger proportion of respondents are asked about a partner, and all partnerships in the household are recorded.

⁶ Since the first person in the questionnaire has to be an adult, it is usually – but probably not always – the case that a partnership involves the first person.

Figure 1: Question about a partner in the household

a) Microcensus 1996 to 2004

freiwillig [voluntary]	13	Sind Sie Lebenspartner(in) der ersten Person? [Are you the partner of the first person?]	
		Bitte weiter mit 14 [Please go to 14] ←	Ja [Yes] <input type="checkbox"/> 1
			Nein [No]..... <input type="checkbox"/> 8
		Bitte weiter mit 14 [Please go to 14] ←	Keine Angabe [No answer] <input type="checkbox"/> 9

b) Microcensus as of 2005

freiwillig [voluntary]	15	Sind Sie Lebenspartner/-in (auch eingetragene/-r Lebenspartner/-in) einer Person dieses Haushalts? [Are you the partner (including registered partner) of a member of this household?]^a	
		Ja [Yes]	<input type="checkbox"/> 1
		Falls „Ja“, tragen Sie bitte die Personnummer der Lebenspartnerin / des Lebenspartners (z.B. „01“, „02“) ein. [If „Yes“, please enter the person number of the partner (e.g., „01“, „02“).]	<input type="text"/>
		Nein [No]	<input type="checkbox"/> 8
		Keine Angabe [No answer]	<input type="checkbox"/> 9

^a Registered partners have been explicitly mentioned in the question text since 2006.

Source: Microcensus questionnaire (self-administered), own translation (in square brackets), note that the German language source questions use the feminine and masculine forms of the nouns “Lebenspartner” (partner) and “eingetragener Lebenspartner” (registered partner)

4.2 Methods

The following analyses are based on the Microcensus Scientific Use Files (SUFs), which are anonymized subsamples of 70% of households from the original data. To observe as long a period as possible, all currently available SUFs from the years 1996 to 2016 were used. These were first put into a comparable form and then cumulated (see Lengerer et al. 2012). The target population was limited to the population in private households aged 16 years and over, resulting in a total data set of around 8.7 million cases.

The quality of reports of registered same-sex partnerships was examined using external data, specifically the 2011 German Census. This provides information about the legal marital status of the population, as recorded in the population registers, and these values are thus very close to the “true values.” They were compared at the aggregate level with those of the Microcensus. If they matched, this indicated that registered partnerships were reliably reported in the Microcensus.

When it came to unregistered cohabiting same-sex couples, the lack of reliable reference data meant that a different method was needed to investigate the quality of reporting. The approach chosen here was to examine the willingness to respond to the question about a partner in the household. If an unwillingness to respond (i.e. non-response) occurred randomly, and regardless of the presence and the sex of a partner in the household, systematic bias was not present.

Because the “real” living arrangements of the respondents were unknown, an estimate was undertaken, incorporating information about the composition of the household, the relationships of the

household members to one another, and their ages (see Lengerer 2019).⁷ Broadly speaking, a cohabiting couple was assumed to be present if exactly two persons aged 16 years and over, neither married nor related by birth, adoption, or marriage, were living in the same household. Their age difference was irrelevant, and was only taken into account if parents and/or adult children of a possible partner were also living in the household and could also have been partners. If this was the case, those persons were classed as partners whose age difference was smallest and whose age difference vis-à-vis all other possible partners was considerably greater (ten years or more). And finally, the reported sex of both possible partners served as the basis for distinguishing same-sex and opposite-sex couples.

Table 1: Reports and estimates of partner in the household (N and in %)^a

		Estimate						N
		In same-sex p.		In opposite-sex p.		Without partner		
Report		N	%	N	%	N	%	N
		In same-sex p.	14,510	94.2	12	0.1	886	
	In opposite-sex p.	48	0.0	573,822	97.1	16,962	2.9	590,832
	Without partner	23,221	2.8	25,879	3.2	768,092	94.0	817,192
	No answer	3,972	5.6	38,244	54.0	28,599	40.4	70,775

^a The few cases in the cells that should not be occupied (i.e., persons who according to their report were living in an opposite-sex partnership, but who, according to the estimate, were living in a same-sex partnership, and vice versa) are due to errors in the original data.

p. = partnership

Data source: Microcensus Scientific Use Files 1996 to 2016, population in private households aged 16 years and over who were asked the question about a partner in the household

In Table 1, the reports on the question about a partner in the household are compared to the estimates.⁸ Assuming that the reports were true, the estimates proved to be fairly reliable. Of the 1,423,432 persons in total (sum of the marginal frequencies of rows 1 to 3) who answered the question about a partner in the household, 1,356,424 persons were assigned correctly by the estimate. This is an accuracy rate of 95%, varying only slightly between the different living arrangements.

Of the 70,775 persons without a valid answer, it was estimated that nearly 6% had a same-sex partner, 54% a different-sex partner and 40% no partner. Of course it cannot be assumed that the estimate is always correct. Not all possible cohabiting couples are actually couples. In some cases two people share a dwelling and have common housekeeping but are not in a couple relationship with each other.⁹ However, this is not a serious limitation for the analysis of item non-response. The response behaviour of people living in a shared flat is unlikely to differ systematically from that of

⁷ This approach is based on that of the Federal Statistical Office for estimating the prevalence of non-marital partnerships in the years before 1996 (e.g. Heidenreich & Nöthen 2002).

⁸ Up to 2004, the first person in the household (Person 1) was not asked this question. Rather, it was addressed only to the other members of the household. However, their reports referred to the first person, and were recorded accordingly. For example, the report “without a partner” was assigned to the first person if there were other people in the household who were asked the question about a partner, and if they all answered “no.” Non-response on the part of the first person was assumed if at least one other person in the household was asked the question about a partner and that person did not answer (and if no other person in the household answered “yes”).

⁹ It is not possible to determine the exact extent to which flat-shares are included in the Microcensus. Usually, flat-sharers live together without common housekeeping and should therefore be counted as several single households (see Section 4.1). In practice, however, the classification is probably not so clear.

other people. The fact that some of the estimated same-sex partners are flatmates should therefore reduce the effect of living in a same-sex partnership on the willingness to respond, and thus lead to rather conservative estimates.

Logistic regression models were used to examine the determinants of item non-response. The dependent variable was the presence of a valid answer in response to the question about a partner in the household (yes/no). The main independent variable was the estimated living arrangement. The survey mode was included in the model as a further independent variable, with face-to-face and telephone interviews being grouped together (because the latter were rarely conducted and were not introduced until 2004). As no information about the survey mode was available for 2005, that year was excluded from the analysis of non-response. Finally, age (grouped), gender, education (measured by the highest school-leaving qualification), size of the place of residence (grouped), and region (West/East) were used as control variables.

Interaction effects were studied to establish whether the under-reporting of cohabiting same-sex couples as a result of item non-response had decreased over time. Because non-response did not display any linear change over time, year ranges were formed. The boundaries between them were marked by changes in the survey design (see Section 4.1) and the implementation of the German Act on Registered Partnerships (LPartG). The year ranges identified on this basis were 1996 to 2001, 2002 to 2004 (LPartG entered into force), 2006 to 2010 (change in the question construction and the routing) and 2011 to 2016.¹⁰

¹⁰ As the yearly samples of the Microcensus are not independent (see Section 4.1), sensitivity analyses with reduced datasets were performed (i.e. with an gap of at least four years in-between to avoid any overlapping). Since the results were very robust, only those based on all available datasets are presented here.

5 Results

5.1 Reports of Registered Partnerships: Comparison Between the German Microcensus and the Census

The validity of reports of registered partnerships in the Microcensus (MC) was examined by comparing these data with those of the 2011 Census (C). First, the number of persons living in a registered partnership was determined on the basis of both data sources. The total deviation between the two data sources was then considered, based on the relative difference, i.e. $(N_{MC} - N_C) / N_C$. Moreover, 95% confidence intervals were calculated for the proportional values of the Microcensus. If the corresponding proportional values of the Census lie within these confidence intervals, the deviations between the Microcensus and the Census are due to sampling error. Otherwise, systematic errors must be assumed. As the proportional values were very small, Wilson confidence intervals were calculated. These intervals are more exact than standard confidence intervals, are not symmetric, and are very suitable for extreme proportional values (e.g. Brown et al. 2001).

As can be seen from Table 2, there are deviations between the Microcensus and the Census data. Compared to the Census, registered partnerships are underreported in the Microcensus. For the year 2011, the Microcensus showed a total of 61,251 persons living in a registered partnership, which corresponds to 0.08% of the population. The figure in the Census was 68,268, or 0.09% of the population. Thus the relative difference between the two data sources amounts to -10.3%.

Table 2: Persons in registered partnerships in 2011, by data source (N and in %)

		Microcensus			Census		Difference	
		N	%	(95% CI) ^a	N	%	relative (%)	sig.
Overall		61,251	0.08	(0.07-0.08)	68,268	0.09	-10.3	*
Sex	male	35,468	0.09	(0.08-0.10)	40,601	0.10	-12.6	*
	female	25,783	0.06	(0.05-0.07)	27,667	0.07	-6.8	
Age	18 to 29	4,646	0.04	(0.03-0.06)	5,555	0.05	-16.4	
	30 to 49	34,917	0.15	(0.14-0.17)	39,093	0.17	-10.7	
	50 to 64	14,428	0.09	(0.07-0.11)	16,647	0.10	-13.3	
	65 and over	7,088	0.04	(0.03-0.06)	6,973	0.04	1.6	
Nationality	German	54,724	0.07	(0.07-0.08)	61,127	0.08	-10.5	*
	non-German	6,527	0.09	(0.07-0.12)	7,141	0.12	-8.6	

^a Wilson confidence interval

Data sources: Microcensus Scientific Use File 2011, Population at principal place of residence, weighted and extrapolated to the total population (according to the Census); Census database of the 2011 Census (<https://ergebnisse.zensus2011.de>), enumeration from adjusted register data

The under-reporting of registered partnerships in the Microcensus is universal – that is, it is not limited to individual population groups. Measured against the relative difference, the under-reporting is more pronounced among men than women, and among young people than elderly people. It is slightly more pronounced among people of German nationality than non-nationals. The only group in which slight overreporting of registered partnerships in the Microcensus was observed is the elderly population (aged 65 years and over).

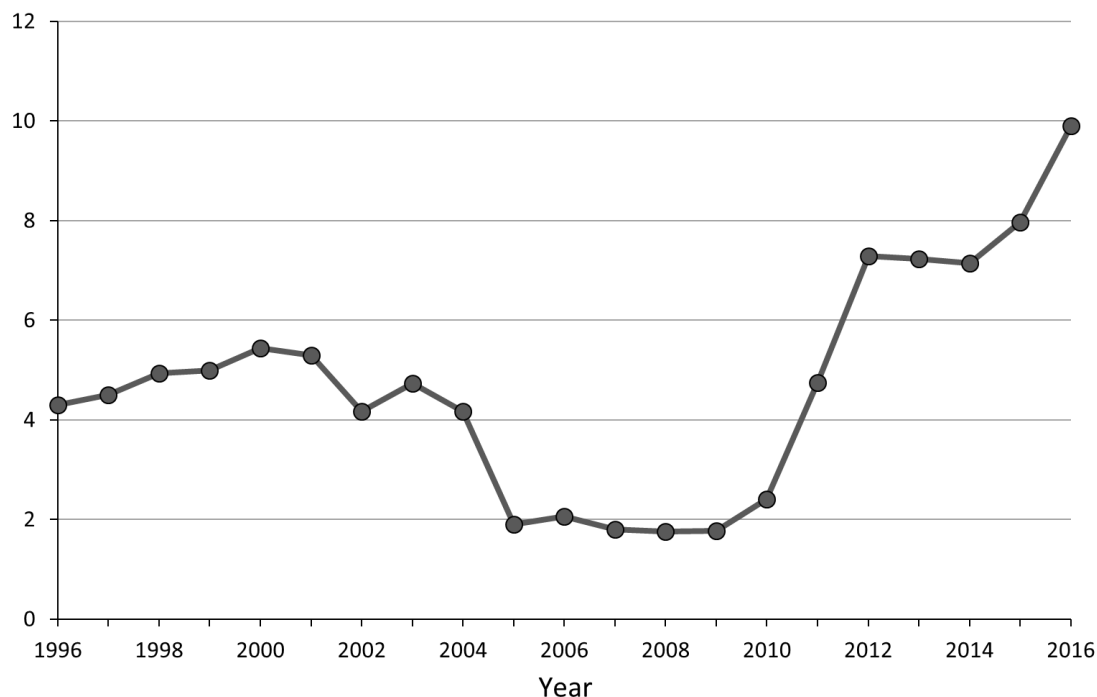
The deviations between the two data sources cannot be explained by sampling error alone. There are also systematic deviations, but these are minor and should not be overstated. Although some of the proportional values of the Census do not lie within the confidence intervals of the corresponding proportional values of the Microcensus, they lie just outside them (a fact partly obscured by the rounding of the values). However, if we nonetheless assume that there is a tendency towards systematic under-reporting of registered partnerships in the Microcensus, there are several conceivable reasons for this. Firstly, socially desirable responding probably occurs in the question about legal marital status as well as in other questions. Despite state registration, not all respondents wish to disclose their living arrangements to an interviewer. Secondly, some registered partnerships are reported as “dissolved” after a separation, although they still exist officially and are recorded as such in the population register.

5.2 Reports of Cohabiting Same-Sex Partnerships: Analysis of Item Non-response

In contrast to the question about legal marital status, response to the question about a partner in the household is voluntary, leading to non-response. This section examines this phenomenon, first considering the extent of item non-response to the question about a partner in the household, and its development over time, then analysing the determinants of item non-response.

As can be seen from Figure 2, item non-response to the question about a partner in the household is fairly low. On average, less than 5% of respondents declined to answer. Over time, the extent of non-response varied considerably. First, there was a decrease in the years until 2010. However, this trend was not linear; rather, it began abruptly in 2005, the year in which the construction of the question underwent fundamental change. Since then, a larger number of respondents have been asked about a partner in the household (including numerous persons who did not have a partner and who reported this accordingly), whereas in the years before 2005, only a small number of people were asked. The decline in non-response is thus due less to an increase in the willingness to respond than to a change in the survey method. In the years after 2010, the extent of non-response increased again, more or less continuously from 2% up to 10%, although there was no further revision of the questionnaire. This indicates that the willingness to respond declined sharply in this period, as was also the case for some other voluntary questions in the Microcensus.

Figure 2: Item non-response to the question about a partner in the household, by year (in %)



Data source: Microcensus Scientific Use Files 1996 to 2016, population in private households aged 16 years and over who were asked the question about a partner in the household

A logistic regression model was used to examine whether item non-response was random, or whether it followed a pattern. To this end, various independent variables relating to characteristics of both the respondents and the survey were incorporated into the model. The central independent variable was the estimated living arrangement of the respondents, based on the presence and the sex of a possible partner in the household, which was used as a proxy for the actual living arrangement. If this variable was linked to non-response, systematic bias must be assumed.

The results are presented in Table 3. Beta coefficients are shown. Although these are difficult to interpret, their signs (+, -) indicate the direction of an effect.¹¹ Where the strength of the effects is what counts, predicted probabilities have been computed and graphically illustrated.

¹¹ Average marginal effects were not calculated here. Although these effects are influenced less by unobserved heterogeneity and are easier to interpret than beta coefficients, their usefulness is limited in models with interaction effects (e.g. Best and Wolf 2010, 848).

Table 3: Determinants of item non-response to the question about a partner in the household (logistic regression, beta coefficients)

	Model 1	Model 2	Model 3	Model 4	Model 5
Year group (Ref.: 1996-2001)					
2002-2004	-0.147***	-0.127***	-0.122***	-0.123***	-0.079*
2006-2010	-0.836***	-1.035***	-0.751***	-0.758***	-1.319***
2011-2016	0.526***	0.309***	0.592***	0.589***	-0.044
West/East (Ref.: West)					
East	-1.022***	-1.064***	-1.104***	-1.106***	-1.118***
Municipality size (Ref.: under 20k inhabitants)					
between 20k and under 500k inhabitants	-0.172***	-0.281***	-0.315***	-0.316***	-0.312***
500k and more inhabitants	0.208***	0.043***	-0.031**	-0.030*	-0.025*
Age group (Ref.: 16 to 29 years)					
30 to 59 years	0.231***	0.160***	-0.011	-0.012	-0.015
60 years and more	0.131***	0.260***	0.133***	0.138***	0.126***
Sex (Ref.: men)					
Women	-0.070***	-0.087***	-0.059***	-0.058***	-0.057***
School education ^a (Ref.: lower secondary)					
Intermediate secondary	0.177***	0.061***	0.029*	0.027*	0.028*
Higher education entrance qualification	0.333***	0.116***	0.061***	0.058***	0.060***
No answer	1.527***	0.465***	0.471***	0.454***	0.627***
Survey mode (Ref.: face-to-face interviewing)					
Self-administered questionnaire		2.435***	2.415***	2.615***	1.867***
Estimated living arrangement (Ref.: in opp.-sex p.)					
Without partner			-0.584***	-0.378***	0.604***
In same-sex partnership (p.)			0.260***	1.138***	1.424***
Survey mode * estimated living arrangement					
Self-admin. * without partner				-0.286***	-0.671***
Self-admin. * in same-sex p.				-1.294***	-1.219***
Year group * estimated living arrangement					
2002-2004 * without partner					-0.168
2002-2004 * in same-sex p.					-1.571***
2006-2010 * without partner					-0.642***
2006-2010 * in same-sex p.					-0.149
2011-2016 * without partner					-0.685***
2011-2016 * in same-sex p.					-0.610***
Survey mode * year group					
Self-admin. * 2002-2004					-0.055
Self-admin. * 2006-2010					1.468***
Self-admin. * 2011					1.035***
Survey mode * year group * estimated living arr.					
Self-admin. * 2002-2004 * without partner					0.116
Self-admin. * 2002-2004 * in same-sex p.					0.022
Self-admin. * 2006-2010 * without partner					0.119
Self-admin. * 2006-2010 * in same-sex p.					0.350**
Self-admin. * 2011-2016 * without partner					0.050
Self-admin. * 2011-2016 * in same-sex p.					0.147
Constant	-3.171***	-3.910***	-3.728***	-3.868***	-3.522***
Pseudo R ² (McFadden)	0.059	0.208	0.215	0.217	0.226
AIC	516,614	435,195	431,048	429,929	424,884
Number of cases	1,396,86	1,396,86	1,396,86	1,396,86	1,396,86

^a No school leaving certificate and Hauptschule leaving certificate (after 9 years) are classified as lower secondary. Realschule leaving certificate (after 10 years) is classified as intermediate secondary. If still attending school, the targeted school leaving certificate is used.

Data source: Microcensus Scientific Use Files 1996 to 2016 (except 2005), population in private households aged 16 years and over who were asked the question about a partner in the household

*p<0.05, **p<0.01, ***p<0.001

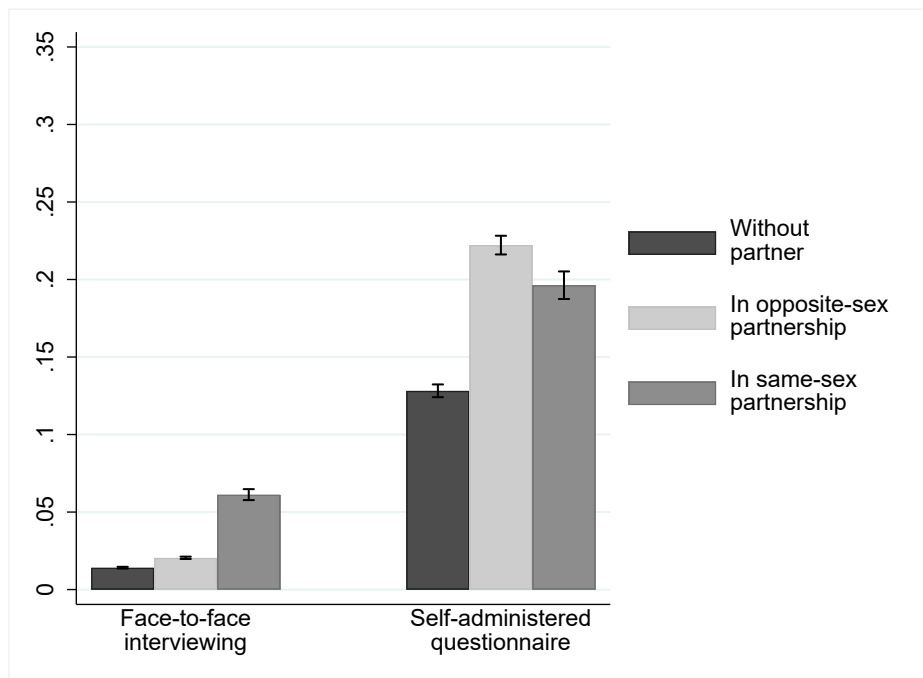
Model 1 contains only the year of the Microcensus (grouped) and the socio-demographic characteristics of the respondents. The effects of these variables are, in themselves, not relevant here. It suffices to note that all effects are significant and that there are temporal, regional, and social differences in the willingness to respond.

Model 2 also includes the survey mode. This has a marked effect, and – measured in terms of the increase in McFadden's R^2 – it contributes substantially to the explanatory power of the model. Respondents who filled in the questionnaire themselves had a much greater tendency not to answer the question about a partner in the household than those who were interviewed face-to-face. Although this appears to contradict the theoretical considerations and previous findings regarding response behaviour, it is easily explained by the fact that the survey mode is not randomly assigned in the Microcensus. As expected, respondents who complete a self-administered questionnaire are a selective group with a rather low willingness to respond.

Model 3 incorporates the estimated living arrangement of the respondents. The reference category chosen is people estimated to be living in an opposite-sex partnership, because the size and composition of this group hardly changes over time (whereas the group who were estimated to be living without a partner and who were asked the question about a partner changed considerably as of 2005). The results show that respondents who were estimated to be living without a partner were significantly less inclined towards non-response, and those estimated to be living in a same-sex partnership were significantly more inclined towards non-response than those in the reference group. Thus, not only the presence of a possible partner in the household but also, as expected, the sex of that partner was relevant to the willingness to respond. The cohabiting couples that were not reported were primarily (but not exclusively) same-sex couples.

The influence of the estimated living arrangement on the willingness to respond depended on the survey mode. A corresponding interaction effect was therefore added in Model 4 and illustrated graphically based on the predicted probabilities in Figure 3. In the case of face-to-face interviewing, the sex of the possible partner proved decisive: only when the possible cohabiting partner was of the same sex was the probability of non-response clearly and significantly increased. The probability of non-response was also greater when the possible cohabiting partner was of the opposite sex. However, the difference between respondents with a possible cohabiting opposite-sex partner and those without a possible cohabiting partner was relatively small. In the case of self-administered questionnaires, on the other hand, the presence of a possible partner was the relevant factor: if there was a possible partner in the household, the probability of non-response was greater, relatively independent of whether that partner was of the same or the opposite sex. This confirms that socially desirable response behaviour occurred mainly in face-to-face interviewing. In the presence of an interviewer, the respondents least likely to answer the question about a partner in the household were those who were potentially cohabiting with a same-sex partner. Among those who completed a self-administered questionnaire, on the other hand, the tendency towards non-response was generally high and related not only to norm-deviant behaviour but to all behaviour that was deemed to be private.

Figure 3: Probability of item non-response, by survey mode and estimated living arrangement (predicted on the basis of Model 4)^a

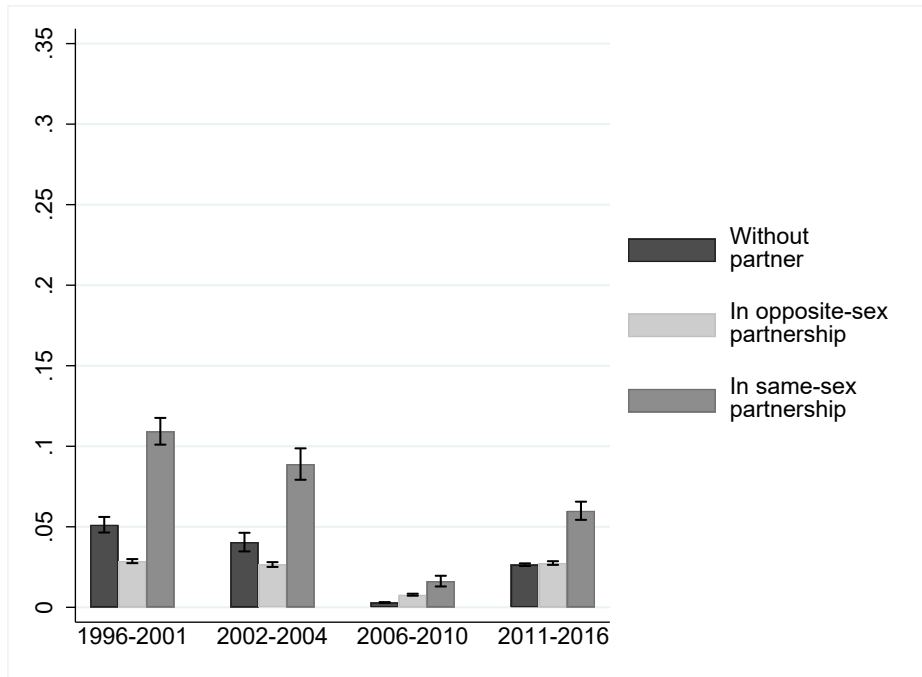


^a in relation to the respective reference category of all other independent variables contained in the model, with 95% confidence intervals

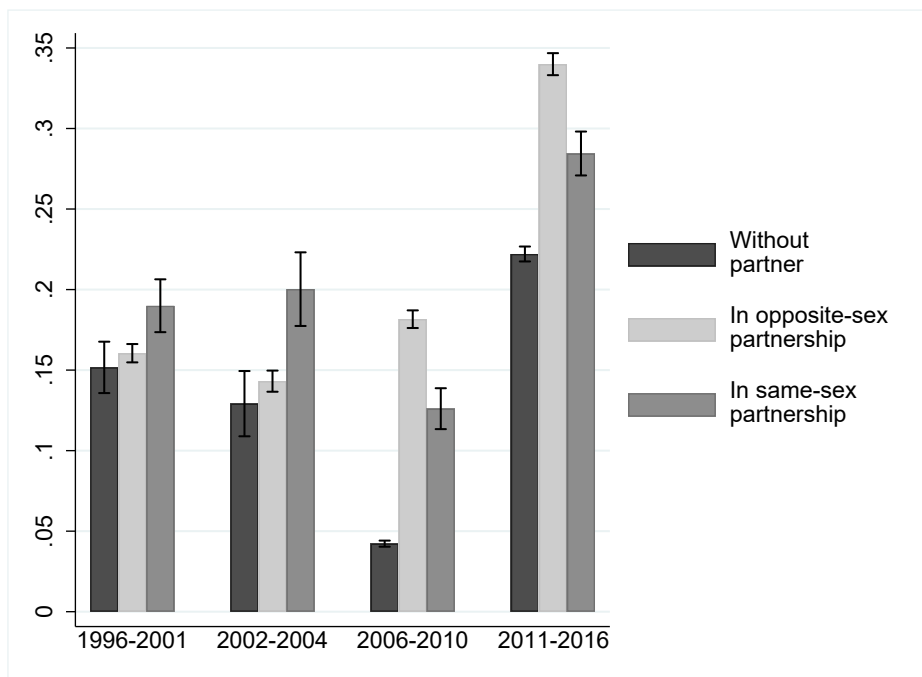
In summary, there is a relationship between the estimated living arrangement and non-response, and non-response was highest among people who were presumed to be cohabiting with a same-sex partner. This was especially the case with face-to-face interviewing, which is the predominant survey mode in the Microcensus, and it confirms the hypothesis that cohabiting same-sex couples are underreported. The next question to be examined is whether under-reporting decreased over time – in other words, whether people estimated to be cohabiting with a same-sex partner became more willing to respond over time (relative to all other respondents). To investigate this, Model 5 was extended to include a three-way interaction effect between survey mode, estimated living arrangement, and year range. The predicted probabilities for non-response derived from this are shown in Figures 4a and 4b.

Figure 4: Probability of item non-response, by survey mode, estimated living arrangement, and year range (predicted on the basis of Model 5)^a

a) Persons who were interviewed face-to-face



b) Persons who completed a self-administered questionnaire



^a in relation to the respective reference category of all other independent variables contained in the model, with 95% confidence intervals

In the case of the respondents interviewed face-to-face (Figure 4a), while the level of the effect of the estimated living arrangement varies, it is similar in all year ranges. People who were presumed to be cohabiting with a same-sex partner had a consistently clearer and significantly higher tendency towards non-response than others. On closer inspection, however, it is noticeable that the differences decreased somewhat over time. In the years 1996 to 2001, the probability of non-response among those estimated to be cohabiting with a same-sex partner was almost four times higher than among those estimated to be cohabiting with an opposite-sex partner. By contrast, it was approximately three times higher in the years 2002 to 2004, and about twice as high in the years 2006 to 2010 and 2011 to 2016. The fact that the situation is somewhat different compared to respondents estimated to be living without a partner is method-related: due to the change in the routing, the non-response of this group decreased at an above-average rate after the change in 2006 (but increased rapidly again later).

In the case of those respondents who completed a self-administered questionnaire, the development was less consistent (Figure 4b). Here the probability of non-response was generally high at first, and only slightly higher among those presumed to be cohabiting with a same-sex partner than among others. In the years from 2006 onwards, the pattern changed. From this point, respondents presumed to be cohabiting with a same-sex partner had only a medium probability of non-response, which was clearly (and significantly) below that of those presumed to be cohabiting with an opposite-sex partner. Generally speaking, then, the effect of the presence of a possible same-sex partner on the risk of non-response tended to decrease over time in both survey modes.

It is difficult to say whether these developments were mainly due to the increasing acceptance of same-sex partnerships, to their legal recognition, and/or to methodological improvements. All in all, an interplay of these factors must be assumed. Among those who were interviewed face-to-face, the trend progressed relatively steadily and thus in parallel with the steadily increasing acceptance and legal recognition of same-sex partnerships. Because it has become easier in recent years to report a cohabiting same-sex partnership to an interviewer, the willingness to respond has increased among those in such partnerships. Among those who completed a self-administered questionnaire, on the other hand, the decisive factor was the exact way in which the question about a partner in the household was asked. If the question was clear and transparent, and if it could be deduced at least indirectly from the question text that same-sex partners were also supposed to be reported (as was the case from 2006 onwards), people cohabiting with a same-sex partner were more willing to respond.¹²

5.3 Prevalence of Cohabiting Same-Sex Couples: Valid Reports and Imputation

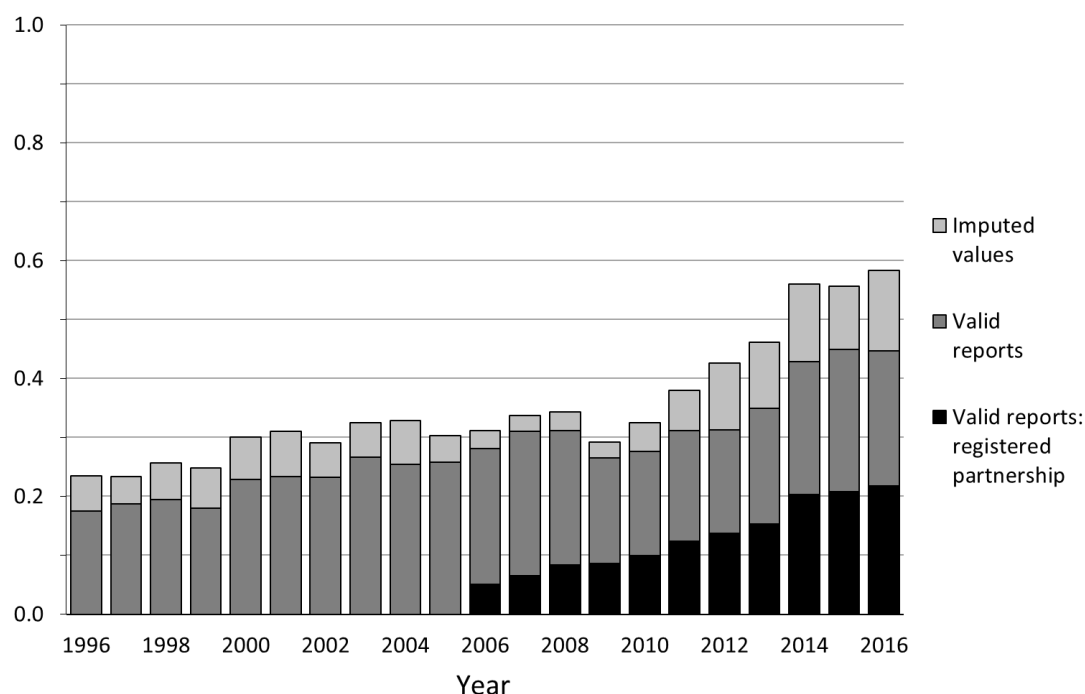
So far this study has shown that the non-response rate to the question about a partner in the household was low but tended to increase over the years under consideration – even among respondents in whose household there was a possible same-sex partner. In absolute terms, the under-reporting of same-sex couples did not decrease over time. In relative terms, however, the differences in response behaviour between people with a possible same-sex partner and a possible different-sex partner became smaller.

¹² Because the year 2005 had to be excluded from the analyses (see Section 4.2), it is not possible to determine whether the greater willingness to respond was due primarily to the change in the construction and design of the question in 2005, or to the insertion of the words “including registered partner” after “partner” in 2006.

The final graph illustrates how this affects the measurement of the prevalence of cohabiting same-sex couples over time. Figure 5 shows the proportion of respondents with a same-sex partner among all those with a partner in the household. For the period up to 2006, only the valid responses to the question about a partner in the household were analysed; from 2006 on the responses on marital status were also considered in order to differentiate between registered and unregistered partnerships. This results in a low estimate of the prevalence of cohabiting same-sex couples in Germany. According to this, in 1996 only 0.2% of all persons living with a partner had a partner of the same sex, i.e. only two out of 1,000 couples were same-sex. This proportion rose more or less steadily to 0.45% in 2016. About half of these were registered partnerships, which have also been steadily increasing since 2006 and account for an increasing share of all same-sex partnerships.

The next step was to undertake an imputation of missing values to reduce under-reporting of same-sex partnerships. Missing values were replaced by the estimated living arrangement. Thus, if there was a possible partner in the household but the question was not answered, the corresponding person was classified as living in a partnership. As a result, the proportion of people living with a same-sex partner increased only slightly in absolute terms, for example from 0.23% to 0.3% in 2000. In relative terms, however, the increase was considerable: the proportion of people with a same-sex partner increased by almost 25% on average. The impact of the imputation of missing values varied over time, but it was not weaker towards the end of the observed period than at the beginning. There continued to be a steady increase in the prevalence of same-sex cohabitation. So the increase was substantial, and was not due to an increase in willingness to respond.

Figure 5: Persons in cohabiting same-sex partnerships among all persons in cohabiting partnerships, by year and mode of identification (in %)



Data source: Microcensus Scientific Use Files 1996 to 2016, population in private households at principal place of residence aged 16 years and over

6 Summary and Discussion

This paper addresses the question of how reliably same-sex partnerships are recorded in the German Microcensus. With its large sample size, the Microcensus is an important source of data for studying same-sex partnerships. However, in comparison with survey data and official data from other countries, it contains only a small number of same-sex partnerships. Therefore, the literature often assumes that same-sex partnerships are underreported in the German Microcensus, and the Federal Statistical Office itself shares this assumption (e.g. Heidenreich & Nöthen 2002).

Direct empirical evidence of under-reporting of same-sex couples in the German Microcensus has not yet been provided. Because reliable reference data are lacking, this is also not possible here. However, the analyses presented provide the first indirect empirical indications that the prevalence of same-sex couples measured in the Microcensus is too low.

Registered same-sex partnerships are the exception here. These are validly measured in the Microcensus via the question about legal marital status. Only slight under-reporting compared to the Census was found, and this was not limited to specific social groups. In this respect, the Microcensus appears to be well suited for research on registered partnerships. However, the Microcensus has only contained a separate question about registered partnerships since 2006 (although they have existed since 2001), and they represent only a proportion of all same-sex partnerships.

Under-reporting of other (i.e. unregistered) same-sex partnerships is due to non-response to the question about a partner in the household. The resulting missing values are not missing at random (NMAR), but occur particularly frequently among respondents in whose household there is a possible same-sex partner. Among all other respondents, the tendency to non-response is significantly lower. This is especially the case in face-to-face mode, suggesting that socially desirable response behaviour is a major cause of under-reporting.

Over time, the under-reporting of same-sex partnerships has not decreased as clearly as expected. Among respondents with a possible same-sex partner, the tendency to non-response when asked about a partner in the household initially declined (especially in face-to-face mode), but rose again in the 2010s. This is in line with the general trend, which is similarly observed among other respondents. Among respondents with a possible same-sex partner, however, the decline was somewhat more pronounced and the renewed increase somewhat weaker, so the differences in response behaviour tended to become smaller. In relative terms, then, the under-reporting of same-sex couples has decreased slightly over time.

The persistent under-reporting suggests that there are other influencing factors, besides socially desirable response behaviour, which have changed less or not changed at all over time. For example, respondents with a same-sex partner are still not sure whether they should name their partner because they are not asked about it specifically, and in a heterosexual culture it is not self-evident that they are included. A more clearly worded question about a partner in the household could therefore lead to more reliable reporting of same-sex couples in the Microcensus. Response categories that differentiate between opposite-sex and same-sex partners, which are already used in some countries' censuses (e.g. in the Canadian and New Zealand Census; see Cortina & Festy 2014), would also provide more clarity. And they would have the additional advantage that the identification of same-sex couples would no longer have to be done *ex post*, and misclassifications due to incorrect gender information could be avoided (see Section 2).

For future analyses of same-sex couples based on Microcensus data, missing information in the question about a partner in the household should no longer be excluded, but imputed. The imputation proposed here, using the estimated living arrangement, only slightly increases the absolute

number of same-sex couples. However, it raises their share of all cohabiting partnerships by around 25%. Additionally, the potential for selective under-reporting of same-sex couples decreases when more cases remain in the analysis.

The present study was not able to consider the role of false data (as opposed to missing data) in the under-reporting of same-sex couples. As false data is less “suspicious”, it may even contribute more to the under-reporting of same-sex couples than missing data. Further analyses on the quality of same-sex partnership reports in the German Microcensus are therefore much needed. Reliable data on same-sex couples is vital not only for scientific research, but also for politics, public administration and civil society.

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