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*Research Article*

### **Attrition in the Austrian Generations and Gender Survey: Is there a bias by fertility-relevant aspects?**

**Isabella Buber-Ennser**

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## **Attrition in the Austrian Generations and Gender Survey: Is there a bias by fertility-relevant aspects?**

**Isabella Buber-Enns<sup>1</sup>**

### **Abstract**

#### **BACKGROUND**

In longitudinal research the loss of sample members between waves is a possible source of bias. It is therefore crucial to analyse attrition.

#### **OBJECTIVE**

This paper analyses attrition in a longitudinal study on family and fertility, by distinguishing between attrition due to non-contact and attrition due to non-cooperation.

#### **METHODS**

Based on the first two waves of the Austrian Generations and Gender Survey, the two components of attrition are studied separately by using bivariate as well as multivariate methods. Moreover, overall dropout – the combination of both components – is analysed. Apart from various socio-economic characteristics and data collection information, the study focuses on fertility-relevant variables such as fecundity, fertility intentions, sexual orientation, and traditional attitudes.

#### **RESULTS**

Fecundity, fertility intentions, and homosexual relationships are associated with higher attrition due to non-cooperation in bivariate analyses, but have no explanatory power in the multivariate model. Pregnancy and traditional attitudes towards marriage are associated with significantly lower attrition due to non-cooperation in the multivariate context. Overall dropout is significantly lower only among persons with traditional attitudes towards marriage, although small in size and statistical significance. Moreover, various individual and regional characteristics are significantly associated with dropout, with differences between attrition due to non-contact and attrition due to non-cooperation.

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## **CONCLUSIONS**

Detailed insights into attrition are not only important when using longitudinal data and interpreting results, but also for the design of future data collections. The Austrian GGS panel has a relatively low dropout (22%) and is affected by a small bias towards family-oriented persons as well as less-educated respondents and persons with migration backgrounds, but the data can be used without concern about selectivity.

## **1. Introduction**

In longitudinal research the loss of sample members between waves – known as attrition – is a common problem and a substantial factor in most panel studies. Attrition may not only decrease the sample size but also may lead to biased estimates if cases are not dropping out randomly from the original sample (Miller and Wright 1995). Non-response is a source of bias in survey estimates if those who respond are different from those who do not with respect to characteristics of interest (Groves 2006). It is therefore crucial to analyse attrition and to find out who left a panel study. As detailed information is available from the first wave – and information increases with each wave – research on the response rate in the second and subsequent waves of a panel can take into account a variety of possible determinants and is therefore going to differ from studying response rates in the initial wave (Lepkowski and Couper 2002).

Non-response may be the consequence of failure to locate a previously interviewed person, failure to contact a person once located, or refusal by a respondent that has been contacted (Lepkowski and Couper 2002). These different types of non-response have different causes (Watson and Wooden 2009). As the distinction between location and contact is often empirically difficult, the response process is usually modelled as the outcome of two sequential events, namely contact and cooperation (e.g., Abraham, Maitland, and Bianchi 2006; Nicoletti and Peracchi 2005; Watson and Wooden 2009). Others study attrition in general, without this differentiation (e.g., Abraham et al. 2006; Behr et al. 2005).

The current paper analyses attrition between wave 1 and wave 2 of the Austrian Generations and Gender Survey (GGS). We distinguish between attrition due to unsuccessful contact and due to non-cooperation. The two components of attrition are studied separately by using bivariate as well as multivariate methods. Moreover, overall dropout – the combination of both components – is analysed.

Apart from socio-economic characteristics and data collection information, the study focuses on fertility-relevant variables. Therefore, fecundity, fertility intentions, sexual orientation, and traditional attitudes are related to attrition. As the GGS focuses

on family formation and fertility it is crucial to find out if data are possibly biased in this respect, which would have an impact for analyses related to the core questions of the GGS. In addition, insights on attrition are valuable for the design of future panel surveys.

## **2. Determinants of attrition**

Possible candidates for predicting contact and cooperation in longitudinal surveys are characteristics of individuals and households as well as field phase-related characteristics (Fitzgerald, Gottschalk, and Moffitt 1998; Lepkowski and Couper 2002). Numerous studies have analysed the associations between respondents' characteristics and sample attrition (Beckett et al. 1988; Behr, Bellgardt, and Rendtel 2005; Fitzgerald et al. 1998; D. Watson 2003). Others focused on the data collection process, survey design features, and the interview situation (Nicoletti and Peracchi 2005; Riandey 1988; Watson and Wooden 2009). Furthermore, the sensitivity of the subject plays a role when interviewing respondents (Razafindratsima, Kishimba, and l'équipe Cocon 2004).

Most empirical evidence is based on the Panel Study of Income Dynamics (PSID), the British Household Panel Study (BHPS), the European Community Household Panel (ECHP), the German Socio-Economic Panel (GSOEP), the Dutch Socioeconomic Panel, the National Longitudinal Study of Youth (NLSY), the US Time Use Survey (ATUS), the US Longitudinal Study on Generations, and the Australian Household, Income and Labour Dynamics Survey (HILDA). Moreover, studies based on selected GGS countries and a French longitudinal survey on contraception (CONCON) reveal valuable insights into family and fertility surveys. We summarise the predictors of non-contact, non-cooperation, and overall dropout.

Contacting sample members has been associated with residential mobility, socio-demographic characteristics assumed to be associated with the likelihood of finding someone at home (such as age, household size, and household composition), regional characteristics, and measures of community attachment. More specifically, the number of children in the household, home ownership, and length of residence at the current address have been positively related to the probability of future contact, while living in large cities and living in a single household are associated with lower rates of follow-up (Haisken-DeNew and Frick 2005; Nicoletti and Peracchi 2005). In addition, interviewer workloads, interviewer continuity, interview mode, and length of fieldwork turned out to be relevant (Nicoletti and Peracchi 2005; Watson and Wooden 2009). The length of fieldwork and the duration of the household interview are positively related, whereas item non-response on central variables is negatively related to the probability of future contact with the household (Nicoletti and Peracchi 2005).

The factors affecting non-cooperation (i.e., response once a contact has been made) include individual characteristics of respondents, their identification with the study, the survey topic, their interview experience in prior waves, and the survey design (Groves and Peytcheva 2008; Watson and Wooden 2009). “A lack of cooperation is mainly the result of a personal decision that reflects personal characteristics, related to the perceived cost of completing the interview and a person’s past experience with the survey” (Nicoletti and Peracchi 2005, p. 774).

The findings on demographic and socio-economic characteristics regarding cooperation can be summarised as the following: being female, being married, or having children is positively related to the probability of future cooperation, whereas being widowed or divorced, not living in a couple, or being a lone parent is negatively related. Response rates are low for people separated or never married, for people who are out of the labour force, for renters (as compared to home owners) and for those who live in metropolitan areas – characteristics regarded as proxies for social integration (Abraham et al. 2006). Moreover, cooperation is low among those on welfare, non-whites, the less educated, and individuals with few working hours or low income – indicators of belonging to the lower proportion of the socioeconomic distribution (Haisken-DeNew and Frick 2005; Moffitt, Fitzgerald, and Gottschalk 1999). In addition, health and religiosity are significant predictors of panel response (Miller and Wright 1995; Razafindratsima et al. 2004).

An overview of the literature suggests that the field phase situation is also an important predictor of cooperation (Vandecasteele and Debels 2007). The interviewer–respondent interaction is crucial, with persons contacted by the same interviewer as in the previous wave being more willing to cooperate again (Behr, Bellgardt, and Rendtel 2003; Groves and Couper 1998; Hox and de Leeuw 2002) and there is a correlation between educational level of interviewer and response rate (Albacete et al. 2012). Sponsorship of the survey, incentives, the mode of data collection, the topic of the survey, and questions perceived as intrusive or offensive are relevant (Groves and Peytcheva 2008; Arnaud Régnier-Loilier, Saboni, and Valdes 2011). Moreover, item non-response on crucial variables is related to dropout in subsequent waves (Loosveldt, Pickery, and Billiet 2002; D. Watson 2003). It is regarded as an indicator of low cooperation, lack of interest in the survey, and unpleasant or negative experiences (Loosveldt et al. 2002; Rendtel 2002).

Attrition – the combination of loss of contact and/or refusal to answer – is inhomogeneous across countries. The extent and the determinants of panel attrition vary substantially across countries and waves (Behr et al. 2003, 2005). For example, findings on age diverge: Whereas some studies report lower response rates among younger persons in a multivariate framework (Behr et al. 2005), others find no explanatory power of age after controlling for other variables (Nicoletti and Peracchi 2005). Results

on employment status diverge as well: on the one hand, being out of the labour force is associated with low response rates (Abraham et al. 2006). On the other hand, in some European countries unemployed persons show an increased response probability in multivariate models (Behr et al. 2005). Diverging results across Europe are also evident for level of education (Behr et al. 2005; Watson 2003). For example, in northern European countries more highly educated people are less likely to drop out, but this effect is reversed in southern European countries where those with higher education are more likely to be lost (Watson 2003). Regarding respondents' gender, studies on survey response mostly find higher response rates among women than among men. The main reason usually cited for this observation is the fact that women are more often at home (Watson and Wooden 2009). Nevertheless, there is limited evidence that – even conditional on contact – men may be more likely to discontinue survey participation (Nicoletti and Buck 2004; Watson and Wooden 2009). Income distribution also turned out to be relevant to attrition, again with opposite trends in southern and northern European countries (Watson 2003).

Bartus and Spéder (2013) studied the relationship between respondent characteristics and panel continuation in five GGS countries (Bulgaria, France, Georgia, Germany, and Hungary). Whereas dropout is high among men and low among home owners across all countries, the findings for family characteristics and income diverge: in bivariate analyses the authors find that childless persons are underrepresented, while the married, the educated, and persons with relatively higher income are overrepresented in the second wave sample. Bulgaria and Georgia constitute notable exceptions: in Bulgaria, parents of young children and highly educated persons are less likely to continue. In addition, the relationship between dropout and perceived income becomes reversed in Bulgaria and Georgia, where those reporting economic constraints participated more often in the second wave. Evidence from multivariate regression analyses is more mixed. Moreover, detailed studies on attrition in the French GGS (between both waves 1 and 2 and waves 1 and 3), including longitudinal weights based on these analyses, constitute valuable contributions to the literature (Régnier-Loilier and Lincot 2010; Régnier-Loilier 2012; Régnier-Loilier and Guisse 2012).

Behr and colleagues (2005) suggested including three groups of variables in attrition analyses: (1) variables related to field work, (2) variables related to respondents' attitude towards the survey, and (3) important analysis variables. They argued that social stratification variables like age, sex, marital status, and level of education are used to measure the attitude towards surveys. As a third group, they explicitly mentioned variables that are important in the specific context. In line with this, the French survey on fertility intentions included method of contraception, unplanned pregnancy, abortion, and desire for a child as variables of interest for the

specific survey, and it turned out that method of contraception does have an effect on attrition (Razafindratsima et al. 2004).

Following the proposed distinction, it is crucial to study attrition in the GGS by family- and fertility-related variables, such as fertility intentions, pregnancy, perceived problems in conceiving a child, and homosexual partnership. We want to find out if item non-response on crucial variables in the GGS is related to attrition. The particular contribution to the literature is twofold: first, to our knowledge, fertility-related aspects have not been studied in detail in panel studies focusing on family formation and fertility. Second, the systematic inclusion of individual and field-phase characteristics and the distinction between contact and cooperation contributes to the literature in disentangling the dropout process. Available data for Austria allowed this approach. The current paper complements recent studies on attrition in the GGS and might stimulate research on further GGS countries or other family surveys.

### **3. Data and method**

The current study is based on the Austrian GGS. The first wave was carried out in 2008/9 and includes 5,000 respondents aged 18 to 45 years. The sample was drawn from the Austrian central register. The response rate in wave 1 was 60.7% (Statistik Austria 2009). The second wave was carried out four years later,<sup>2</sup> between September 2012 and May 2013. For further information on data validation we refer to Buber (2013). At the end of the interview in wave 1, respondents were asked whether they agreed to be contacted for another interview three years later. 96% agreed to be contacted again, indicating a high willingness to continue. Regardless of the given answer a letter was sent out to all respondents in spring 2012 asking if they agreed to be contacted and interviewed for a second wave. This letter was also important for further updating the address list of interviewees. It turned out that geographical mobility was substantial, as 800 out of the 5,000 respondents of wave 1 had changed address between wave 1 and wave 2 (information provided by Statistics Austria). If respondents had moved between wave 1 and wave 2 and if they had – according to Austrian law – registered their residential move in the central register, the contact address was updated by Statistics Austria. Due to the access to the central register, the loss of respondents due to unknown address was expected to be comparatively low.

For panel maintenance, Christmas cards were sent out to the respondents. Respondents were informed about the survey they had participated in and findings arising from it. Thereafter, the letter inviting them to take part in the second wave

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<sup>2</sup> According to international guidelines, the interval between waves is three years (UN 2005). Due to financial constraints the interval between wave 1 and wave 2 in Austria was four years.

referred to the homepage of the Austrian GGS, with general information on the survey and a downloadable brochure presenting first results for Austria. The interviewers offered a printed version of this brochure to the respondents. To prepare, motivate, and support interviewers, training for the first and the second waves included not only general information on the survey tool (CAPI – computer-assisted personal interview) and recent trends in fertility in Austria<sup>3</sup> but also offered professional soft-skills trainings. The aim was to prepare interviewers intensively for unusual interview situations, such as the loss of a family member, separation, or an unfulfilled wish to have children. A further approach to gaining high survey participation was the concept of respondents being interviewed by persons of the same gender. The GGS survey included questions on very personal topics, such as fecundity and conception. Matching respondents and interviewers by gender is regarded as a way to facilitate communication (Hyman 1954) and to increase data quality regarding sensitive topics (Catania et al. 1996).

We first provide a description of the small subgroups of respondents no longer in the central register, not living at the given address, unable to be reached, and unable to be interviewed. In a second step we focus on attrition due to non-contact and in a third step on attrition due to non-cooperation.<sup>4</sup> Finally, overall attrition is presented. Descriptive as well as multivariate methods are used to characterise the two broad groups of dropouts as well as overall dropout.

According to Behr et al. (2005) it is important to analyse attrition with respect to survey-relevant characteristics. In the GGS these are – besides e.g., marital status and parity – fertility-related variables like fecundity, fertility intentions, or traditional attitudes. The GGS includes questions on fecundity. Both the respondent's problems and, if cohabiting with a partner or living in a living-apart-together relationship, the partner's problems conceiving a child were captured.<sup>5</sup> The GGS includes different dimensions of fertility intentions, namely the intention to have a child (1) now, (2)

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<sup>3</sup> The Austrian Institute for Family Research at the University of Vienna and the Vienna Institute of Demography (VID) of the Austrian Academy of Science constitute the Austrian country team. They were involved in the preparation of the first and the second waves of the GGS and, among others, supported the survey agency in the interviewer training.

<sup>4</sup> For a study on locating, contact, and successful interview we refer to Abraham, Maitland, and Bianchi, (2006) who distinguish different types of noncontact and model them separately. This paper focuses on unsuccessful contact and refusal and does not further elaborate on unsuccessful locating of sample members, which is associated with mobility and tracking procedures (Watson and Wooden 2009) and mainly addressed by research on survey methodology.

<sup>5</sup> The exact wording of the question for own fecundity was: "Some people are not physically able to have children. As far as you know, is it possible for you, yourself, to have a/another baby?" Possible answers were: (1) definitely not, (2), probably not, (3) probably yes, (4) definitely yes, (5) don't know. The question on the partner's fecundity was: "Do you think it would be physically possible for your current partner/spouse to have a child of his/her own if he/she wanted to?" Possible answers were: (1) definitely not, (2), probably not, (3) probably yes, (4) definitely yes, (5) don't know.

within three years, and (3) ever. Due to the filter structure of the survey, not all respondents were asked these questions. According to international guidelines, women aged 50 years or more, male respondents with a female partner aged 50 years or more, and respondents with same-sex partners were not asked all the questions on pregnancy, fecundity, and fertility intentions. Moreover, fertility intentions within the next three years were skipped in the case of pregnancy. Respondents intending to have a child within the next three years were not asked about any further childbearing plans. Therefore we combined the information on pregnancy, age of female partner, and type of sexual relationship on the one hand, and fecundity and fertility intentions on the other hand. Moreover, traditional attitudes might be relevant to family and fertility behaviour. The GGS includes the attitude towards marriage, captured by the statement “Marriage is an outdated institution”. This item was incorporated in the current study on attrition.

As the Austrian GGS is restricted to the age range 18 to 45 years we are unable to take into account further survey-relevant characteristics included in the GGS that become relevant for individuals at more advanced ages, such as intergenerational exchange and dependencies.

Various socio-demographic, economic, and data collection characteristics were taken into consideration. Apart from the standard variables on marital status, partner status, parity, and household, a combination of these variables was generated to characterise the living arrangements of respondents, distinguishing between (1) being a child in one’s birth family, (2) married couple without children, (3) non-married couple without children, (4) married couple with children, (5) non-married couple with children, (6) single mother, (7) single father, (8) living alone and (9) other living arrangements. Information on the relation to the household members revealed that the latter group comprised shared accommodations, either with relatives (siblings, grandparents) or with non-relatives, typically shared student flats.<sup>6</sup>

To capture information on migration background, not only nationality at birth and current nationality but also mother tongue and first language usually spoken at home were taken into consideration. For residential mobility the data included information on intended residential move in wave 1 and degree of certainty (definitely no, probably no, yes), as well as the planned destination for those intending to move (e.g., abroad, within province). The combination of both turned out to be a valuable source of information on dropout.

Different indicators are included in the data to capture regional characteristics and housing. According to the OECD regional typology, we distinguished between predominantly urban (share of population living in rural local units below 15%),

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<sup>6</sup> Shared living arrangements with relatives were more common (57%) than flatsharing with nonrelatives (43%).

intermediate (share of the population living in rural units between 15% and 50%) and predominantly rural areas (OECD 2010). In addition, the nine Austrian provinces and housing conditions (home-ownership, tenant, rent-free accommodation, and other type of housing) were taken into account.

To capture health and wellbeing, self-perceived health and limitations in daily activities because of physical or mental health problems or disability were taken into consideration. Moreover, providing regular personal care to others (not including small children) on the one hand and being able to rely on emotional support on the other were included as a further aspects of health and wellbeing. Emotional support, captured by the question “Over the last 12 months, have you talked to anyone about your personal experiences and feelings?”, was associated with higher attrition in the French GGS (Régnier-Loilier 2012; Régnier-Loilier and Guisse 2012), and might be considered as a proxy for social integration.

Two fieldwork variables are included in the model, namely length of the interview in wave 1 and interviewer ID in wave 2. Interview duration was categorised in (1) less than 45 minutes, (2) 45 minutes up to less than 2 hours, (3) 2 hours and more, (4) no duration given (most probably due to interruptions during the interview). Interviewer characteristics like gender, age, and level of education are not included in the analysis, as the current paper focuses on respondents’ demographic behaviour and attitudes.<sup>7</sup> However, given the possibility of identifying interviewers, an analysis using robust standard errors, which cluster by interviewer, was conducted. Finally, willingness expressed at the end of the wave 1 interview to participate in wave 2 is crucial for panel dropout and was taken into account. The GGS envisages as possible answers (1) yes, (2) no, and (3) don’t know.

#### **4. Attrition in the Austrian Generations and Gender Survey**

In total, 116 wave 1 respondents could not be found in the central register (Table 1). By Austrian law, first establishment of accommodation in Austria, moving house within Austria, and establishment of a further residence require registration in the central register.<sup>8</sup> Reasons for being no longer in the central register in wave 2 are thus either an unregistered move abroad or an unregistered death while temporarily abroad. In total, 3,907 interviews with wave 1 respondents could be realised in wave 2, which corresponds to a panel stability of 78%. Refusing to participate and not living at the

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<sup>7</sup> With the exception of one single respondent, respondents were questioned by interviewers of the same gender. Further information, such as interviewer continuity, is not available.

<sup>8</sup> See <https://www.help.gv.at/Portal.Node/hlpd/public/content/118/Seite.11802001.html>.

given address were the main reasons for dropout. Death,<sup>9</sup> institutionalisation, inability to be contacted, inability to be interviewed<sup>10</sup>, and interview with a different person in the household were further reasons for dropout, although small in size (Table 1). Panel stability was 65% in the French GGS (Régnier-Loilier and Lincot 2010), 73% in the Bulgarian, 79% in the Hungarian, and 83% in the Georgian GGS, whereas Germany constituted an exceptional situation with panel continuation of only 32% (Bartus and Spéder 2014). Therefore, by international comparison, panel stability in Austria is comparatively high.

**Table 1: Panel stability and response rate for the Austrian GGS**

	<b>N</b>	<b>Panel stability</b>
RESPONDENTS in wave 1 (2008/9)	5,000	100%
Respondent deceased	1	0%
Respondent institutionalised	3	0%
No longer in central register	116	2%
Respondent not living at given address	179	4%
Unable to reach respondent	57	1%
Different person was interviewed	5	0%
Respondent refused to answer	707	14%
Respondent unable to be interviewed	25	1%
Completed interviews in wave 2	3,907	78%

Comparing the distribution of numerous socio-economic characteristics of respondents participating in wave 1 and the total of respondents interviewed in wave 2 reveals that, for all included variables, the differences are 2 percentage points or less (see detailed tables in Buber-Ennsner 2013), indicating at first glance that panel respondents do not substantially differ from wave 1 respondents and that bias due to attrition in the Austrian GGS is not very big.

<sup>9</sup> A death is coded for only one out of 5,000 respondents. One might speculate that some of the 116 respondents who were no longer in the central register at wave 2 had died in the meantime. According to Statistics Austria, which runs the Austrian central register and the survey agency, this can only be the case if a person had died while temporarily abroad. Otherwise, deregistration in the Austrian central register requires a reason, e.g., moving abroad or death. The fact that half of those no longer in the central register had planned a move at wave 1 and that two-thirds had other than Austrian nationality at birth – compared to 17% in the overall wave 1 sample — supports the assumption that the majority of those no longer in the central register at wave 2 had meanwhile moved abroad.

<sup>10</sup> According to the survey agency, reasons for being unable to be interviewed are physical, cognitive and/or mental impairment, or insufficient knowledge of German.

We briefly describe the small subgroups of respondents no longer in the central register, not living at the given address, unable to be reached, and unable to be interviewed: respondents who were no longer in the central register and who were not living at the given address can be characterised as young, intending movers, highly educated individuals, to a large extent with migration background. Persons unable to be reached were most often Austrian nationals and almost half of them were residents of Tyrol, a province in the west of Austria. The specific situation when conducting the second wave of the survey in Tyrol is the main reason for the relatively high proportion of women who could not be reached.<sup>11</sup> The small proportion of respondents unable to be interviewed were most often female, non-Austrian nationals at birth, had rather low education, had a language other than German as their mother tongue or as the first language spoken at home, and their interviews at wave 1 were longer on average (possibly indicating language problems).<sup>12</sup> Moreover, health problems were more often reported in this group, either via limitations in daily activities or via bad self-perceived health. For further characterisation of these small dropout groups we refer to Buber-Ennser (2013).

#### **4.1 Attrition due to non-contact**

Individuals known to be outside of the scope of a survey (those who died, moved to an institution, or moved outside the country) are excluded in the analyses of panel attrition (Behr et al. 2005; Nicoletti and Peracchi 2005; Watson 2003). As we cannot identify individuals who moved abroad, we exclude for the analysis of attrition only persons deceased or institutionalised, reducing the sample to 4,996 wave 1 respondents. Attrition due to non-contact, which was either because the respondent was no longer in the central register, not living at the given address, unable to be reached, or because a different person was interviewed in the household, added up to 357 persons, which corresponds to a proportion of 7%.

Descriptive results reveal minor variations in the attrition due to non-contact for fecundity (Table 2, column 2). The small group (nine persons) answering the question on their own fecundity problems with “don’t know” had higher dropout (11%). The same holds for those answering in wave 1 the question on partner’s fecundity problems

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<sup>11</sup> During fieldwork no female interviewer trained by Statistics Austria was available in this province. Female respondents were assigned either to male interviewers in Tyrol or to female interviewers from other Austrian provinces. In Tyrol the high proportion of (female) respondents who were unable to be reached resulted in high attrition due to noncontact.

<sup>12</sup> According to oral information given by the survey agency, some respondents with a mother tongue other than German were assisted by a family member during the wave 1 interview. A number of them did not have assistance available for the wave 2 interview and were therefore coded as “unable to be interviewed”.

with “don’t know” (7 persons, attrition 29%, results available on request). Given the small numbers in these groups, the relatively high attrition has to be interpreted with caution. Type of sexual relationship was related to attrition: respondents living in a homosexual relationship had higher attrition (23%) due to unsuccessful follow-up. Again, this group was quite small in wave 1 (13 respondents), indicating that neither wave 1 nor wave 2 data allow specific analyses of men and women living in a homosexual relationship. Fertility intentions, a central variable in the GGS, were not associated with attrition due to unsuccessful follow-up in bivariate analyses. However, attitudes towards marriage were associated with dropout, in the sense that those strongly agreeing that marriage is an outdated institution had higher attrition due to unsuccessful follow-up (12%), those agreeing also had comparably high attrition (9%), whereas those strongly disagreeing with this statement had lower attrition (5%).

We ran logit regressions to estimate the probability of non-contact (Table 3, column 2). In the multivariate framework, attitudes towards marriage were significantly associated with attrition: persons strongly agreeing that marriage is an outdated institution had significantly higher attrition due to non-contact. Additional groups with significantly higher attrition due to non-contact were: cohorts born 1985–1989 (thus aged 19–23 at wave 1 and 22–27 at wave 2), respondents with other than Austrian nationality<sup>13</sup> (particularly German nationals<sup>14</sup>), self-employed persons, married couples without children, persons sharing accommodation with others (relatives or non-relatives), members of the urban population, citizens of certain Austrian provinces (Burgenland, Carinthia, and Tyrol<sup>15</sup>), individuals who planned to move in wave 1 (particularly if planning to move abroad) and even those merely considering a move, those not willing to be contacted again, persons with other than Roman Catholic or Protestant religion or without any religious affiliation, recipients of social welfare payments at wave 1, and those with rather short interviews in wave 1 (less than 45 minutes) or without coded interview duration in wave 1. Respondents who were on parental leave in wave 1 had significantly lower attrition (as compared to employed individuals). The remaining individual- and fieldwork-related indicators had no

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<sup>13</sup> To take into consideration the migration background we ran different models including indicators for nationality, mother tongue, and first language spoken within the family. A detailed differentiation for nationality since birth had the best model fit.

<sup>14</sup> Germans constitute the largest migrant group and the share of German students at Austrian universities is high. These circumstances partly explain the characteristics of respondents who are no longer in the Austrian central register: we assume that some of the respondents with German nationality left Austria between waves 1 and 2 and are therefore no longer in the central register.

<sup>15</sup> Attrition by province and gender clearly revealed female respondents in Tyrol as the group with highest attrition due to non-contact (15%). The fieldwork conditions described above are the main reason for this. When excluding Tyrol, attrition due to non-contact was slightly lower among women than among men (6% and 7%, respectively).

explanatory power in the multivariate logit model; some indicators were dropped due to collinearity.

**Table 2: Attrition due to fertility-relevant aspects, descriptive results**

	Non-contact		Non-cooperation		Overall dropout	
		N		N		N
Total	7%	4,996	16%	4,644	22%	4,996
Indicator for fecundity						
No problems reported	7%	4,313	16%	4,003	22%	4,313
Respondent or partner has problems conceiving a child	6%	503	17%	474	21%	503
Pregnant	7%	149	10%	139	16%	149
Female partner 50+	0%	18	11%	18	11%	18
Homosexual relationship	23%	13	20%	10	38%	13
Fertility intentions						
Wants a child now	6%	549	14%	518	18%	549
Wants a child within 3 years	10%	757	18%	685	26%	757
Wants a child later	9%	1,134	15%	1,029	23%	1,134
Wants no further child(ren)	6%	2,362	16%	2,232	21%	2,362
Don't know	10%	10	11%	9	20%	10
Refusal	0%	4	0%	4	0%	4
Marriage is an outdated institution						
Strongly agree	12%	185	19%	162	29%	185
Agree	9%	667	18%	607	26%	667
Neither agree nor disagree	7%	1,091	18%	1,018	23%	1,091
Disagree	7%	1,990	15%	1,846	22%	1,990
Strongly disagree	5%	855	12%	809	17%	855
Does not apply	3%	204	13%	198	16%	204
Don't know or refusal	0%	4	25%	4	25%	4

**Table 3: Estimated coefficients of logit regressions for attrition**

	Non-contact	Non-cooperation	Overall dropout
Indicator for fecundity			
No problems reported	0	0	0
Respondent or partner has problems conceiving a child	0.06	0.12	0.13
Pregnant	0.01	-0.53*	-0.39
Female partner 50+	.	-0.90	-1.11
Homosexual relationship	0.00	0.34	0.52
Fertility intentions			
Wants a child now	-0.28	-0.21	-0.21
Wants a child within 3 years	0.24	0.15	0.17
Wants a child later	0.01	-0.11	-0.09
Wants no further child(ren)	0	0	0
Don't know	0.82	-0.22	0.02
Marriage is an outdated institution			
Strongly agree	0.54+	0.13	0.12
Agree	0.12	0.01	0.02
Neither agree nor disagree	0	0	0
Disagree	0.28+	-0.03	0.00
Strongly disagree	-0.03	-0.31*	-0.25*
Does not apply	-0.73	-0.23	-0.33
Don't know or refusal	.	-0.26	-0.53
Sex			
Male	0	0	0
Female	0.04	0.28*	0.23**
Cohorts			
1960–1964	0	0	0
1965–1969	-0.18	0.01	0.03
1970–1974	-0.09	-0.05	0.01
1975–1979	-0.15	-0.27	-0.74
1980–1984	0.16	-0.13	-0.05
1985–1989	0.67+	0.16	0.25
1990–1992	0.60	-0.05	0.06
Nationality			
Austrian nationality since birth	0	0	0
Austrian nationality, granted later	0.40	0.40*	0.47**
German nationality	2.26***	0.47	1.31***
Other nationality	0.88***	0.23	0.49**
Highest educational level			
ISCED 1+2	0	0	0
ISCED 3	-0.16	-0.24*	-0.26*
ISCED 4	-0.04	-0.30+	-0.33*
ISCED 5+6	0.29	-0.27+	-0.24+

**Table 3: (Continued)**

	Non-contact	Non-cooperation	Overall dropout
Employment status at wave 1			
Employed	0	0	0
Self-employed	0.53*	0.01	0.07
Unemployed	0.18	0.21	0.22
Student	-0.09	-0.16	-0.16
Retired	0.60	-0.61	-0.24
Parental leave	-0.85*	-0.13	-0.17
Permanently ill	0.14	-0.02	0.24
Housekeeping	-0.11	-0.17	-0.11
Civil service	-0.69	-0.09	-0.12
Other	0.39	0.29	0.41
Living arrangement			
Child in one's birth family	0.26	-0.31	-0.05
Married couple without children	0.71+	-0.05	0.18
Non-married couple without children	0.69	-0.14	0.26
Married couple with children	0	0	0
Non-married couple with children	0.35	-0.13	0.10
Single mother	0.13	-0.33	-0.03
Single father	1.69	0.54	0.98
Living alone	0.61	-0.12	0.22
Other (shared accommodation)	1.46*	-0.52	0.17
Household size			
1 person	0	0	0
2 persons	-0.34	0.06	0.01
3 persons	0.24	0.30*	0.31**
4+ persons	.	.	.
Regional type			
Predominantly urban	0.64**	0.13	0.15
Intermediate	0.16	0.02	0.00
Predominantly rural	0	0	0
Provinces			
Burgenland	0.75+	0.22	0.31
Lower Austria	0	0	0
Vienna	-0.06	0.03	0.02
Carinthia	0.67*	0.30	0.27+
Styria	0.27	-0.29+	-0.31*
Upper Austria	-0.06	-0.03	-0.05
Salzburg	0.14	-0.19	-0.23
Tyrol	1.10***	0.29	0.27+
Vorarlberg	0.36	0.01	0.11
Planned residential move in wave 1			
Definitely no	0	0	0
Probably no	0.51**	0.12	0.14
Abroad	1.42***	0.54	0.88**
Within Austria	0.37*	0.22*	0.22*
Unsure about moving or don't know where to move	0.73	0.61	0.64
Willingness to participate in wave 2			
Yes	0	0	0
No	0.84***	0.86***	0.88***
Don't know	.	1.74*	1.81+

**Table 3: (Continued)**

	Non-contact	Non-cooperation	Overall dropout
Religious affiliation			
Roman Catholic	0	0	0
Protestant	0.23	-0.11	-0.09
Other religious affiliation	0.42+	0.05	0.10
No religious affiliation	0.42*	0.18	0.21+
Refusal	.	-0.60	-0.56
Receiving social welfare payment			
Yes	0.69*	-0.06	0.08
No	0	0	0
Length of interview in wave 1			
Less than 45min	0.50**	0.29*	0.29**
45min to 1h59min	0	0	0
2h and longer	0.27	0.27	0.29
No duration given	1.34**	0.14	0.01
Constant	-4.97***	-1.76***	-1.99***
R <sup>2</sup>	0.1590	0.0478	0.0615
N	4,947	4,870	4,986

Significance levels: + p<0.10; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001.

Remark: The model for attrition due to non-cooperation used robust standard errors which cluster by interviewer.

Further individual characteristics had no explanatory power. For the entire model we refer to Table A3 in the Appendix.

First descriptive results and chi-squared tests had revealed significant differences by level of education and living arrangement: attrition due to unsuccessful follow-up was higher in the lowest (ISCED 1+2) and highest (ISCED 5+6) educational groups, among students, retired, childless, single, divorced and widowed persons, non-married couples without children, and single parents (Table A1). In addition, economic constraints indicated by unemployment, difficulties in making ends meet, and receiving social welfare payments were significantly associated with higher attrition due to non-contact in bivariate statistics. However, these differences failed to show statistical significance in the multivariate framework.

## 4.2 Attrition due to non-cooperation

In this chapter we focus on 4,644 successfully contacted respondents and evaluate whether or not they participated in the wave 2 survey. As mentioned above, a total of 3,907 were interviewed, which corresponds to a proportion of 84%. When analysing the determinants of attrition due to non-cooperation at this stage we did not distinguish between the different reasons for dropping out (i.e., refusal or unable to be interviewed).

As mentioned earlier, at the end of the wave 1 interview respondents were asked if they agreed to be contacted again.<sup>16</sup> All those interviewed in wave 1 – regardless of their answer on wanting to be interviewed in a second wave – were politely invited to consider participating in wave 2. This was successful as 61% of those not willing to continue the panel survey were in fact interviewed in wave 2 (Table 4). Our findings indicate that – at least in Austria – it is worthwhile contacting respondents again and asking them to consider participating in the panel, even if in the initial interview they signalled unwillingness to do so.

**Table 4: Willingness in wave 1 to participate in wave 2 and completed interviews in wave 2**

	Proportion of completed interviews	N
Yes	79%	4,799
No	61%	197
Don't know	50%	4
Total	78%	5,000

Again, we started by analysing fertility-related aspects. Compared to the mean (16%), attrition due to non-cooperation was substantially lower in the case of pregnancy at wave 1 (10%; Table 2, column 4). The small group of persons living in a homosexual relationship more often refused to participate in wave 2 (20%). Several specifications for problems conceiving a child were considered (Table A2). Both the respondent's and the partner's problems with conceiving a child were associated with slightly higher attrition due to non-cooperation in bivariate analyses.<sup>17</sup> Moreover, refusing to answer questions on fecundity problems in wave 1 was related to high attrition in wave 2, but due to the small size of this group<sup>18</sup> this result has to be regarded with caution, although there is some indication of a link between the refusal to answer this rather sensitive question and the refusal to participate in wave 2.

<sup>16</sup> The exact wording of the question was: "Vieles in einem Menschenleben ist heute so und morgen anders. Das Generations and Gender Programm erarbeitet derartige Veränderungen. Dürfen wir Sie in drei Jahren wieder kontaktieren?"

<sup>17</sup> Attrition due to non-cooperation was 15% among respondents stating that they could certainly conceive a child, 17% among respondents answering that they could probably conceive a child, 18% among respondents who stated that they probably could not conceive a child, and 17% among those stating that they certainly could not conceive a child. The partner's problems conceiving a child were associated with slightly higher attrition (17% versus 15%, Table A2)

<sup>18</sup> Three respondents refused to answer the question regarding own fecundity; one respondent did not disclose information on his partner's fecundity.

Regarding fertility intentions, descriptive analyses showed somewhat lower attrition among those wanting a child at the time of the wave 1 interview (14%) and higher attrition if they intended to have a child within the next three years (18%) but no further differences in the other categories (Table 2, column 4). Attrition due to non-cooperation varied substantially by attitude towards marriage, captured via “Marriage is an outdated institution”: (strong) agreement with this statement was associated with higher dropout (18% to 19%), strong disapproval with lower dropout (12%). Dropout among those who refused to answer this question was high (25%), but this group was very small (only four persons).

Although bivariate analyses indicated minor differences in attrition by fecundity, multivariate analyses revealed no significantly higher attrition in the case of problems conceiving a child.<sup>19</sup> On the contrary, pregnancy and very traditional attitudes<sup>20</sup> were associated with significantly lower attrition due to non-cooperation (Table 3, column 3).

In the multivariate model, non-response rates were significantly higher among women, Austrian nationals who received Austrian nationality not at birth but later in life, less educated persons, those who planned a residential move, and those who did not want to be contacted again. Moreover, respondents with short interview length in wave 1 and residents of a specific Austrian province (Styria) showed significantly higher response rates. Regression analysis for attrition due to non-cooperation used robust standard errors which cluster by interviewer, thus treating only records with different interviewers as truly independent.

### **4.3 Overall dropout**

Finally, we focus on 4,996 respondents and distinguish between dropout and successful interview only. With this distinction, the overall dropout rate is 22%. Whereas separate analyses on attrition due to unsuccessful contact or refusal allows us to clearly see at which point of the panel study respondents were lost, analyses of general dropout reveals valuable information for data users regarding possible bias in the data. Also, both types of attrition are often combined for generating longitudinal weights. This was, for example, the strategy in the German DemoDiff study (Brüderl et al. 2011).

Overall dropout – the combination of dropout due to non-contact and dropout due to non-cooperation – was relatively high among those intending to have a child within

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<sup>19</sup> Different specifications and combinations of the two questions on conception were incorporated in multivariate models to discover the best model fit. Finally, fecundity was captured via an indicator for either own or partner’s problems conceiving a child. The same applies for different specifications of fertility intentions (see Buber-Ennsner 2013 for more details).

<sup>20</sup> i.e., strong disagreement with the statement about marriage being an outdated institution.

the next three years (26%), among persons with liberal attitudes towards marriage (29%), and among respondents living in a homosexual relationship at wave 1 (38%) (Table 2, column 6). Overall dropout was relatively low in the case of pregnancy at wave 1 (16%) and among respondents with traditional attitudes towards marriage (17%). Dropout was of the same size among respondents with and without fecundity problems (21% and 22%, respectively).

Multivariate logit regressions revealed that fecundity and fertility intentions were not significantly associated with dropout, whereas respondents with traditional attitudes towards marriage and those expecting a child at wave 1 had significantly lower dropout rates (Table 3, column 4). In addition, women, persons with migration backgrounds, less educated persons (ISCED 1 and 2), residents of specific Austrian provinces (Carinthia and Tyrol), persons with no religious affiliation, persons planning a move, and those not willing to be contacted for another interview had significantly higher attrition. Moreover, a comparatively short interview duration at wave 1 was also associated with higher attrition.

Gender-specific analyses revealed that pregnant women had significantly lower dropout rates, whereas men whose partner was expecting a child did not show significantly lower attrition (results available on request). Traditional attitudes towards marriage were associated with higher dropout among women, not among men. Educational differences were stronger among women than men (the estimated coefficients were statistically significant among women only). Regional variations also differed between women and men: dropout was highest among women living in Carinthia and in Tyrol. Whereas dropout was high in Tyrol due to the special field-phase situation (see above), the high dropout in Carinthia might reflect a politically difficult situation in this part of Austria around the time of wave 2 of the survey (personal communication by Statistics Austria): several cases of mismanagement in the federal government of Carinthia had become public at that time and led to a general disappointment with and distrust of political institutions. As the GGS was financed by the ministry, a political institution, the high dropout might be interpreted as a reaction to the political situation in this part of Austria at the time around GGS wave 2.

In our analyses, MacFadden's pseudo  $R^2$  – a measure for model fit – increased with the stepwise inclusion of survey-related, individual, regional, and field-phase characteristics. In the regression model on attrition due to non-contact,  $R^2$  is 0.1590; in the model on attrition due to non-cooperation it is substantially lower at 0.0478. For overall dropout,  $R^2$  amounts to 0.0615 (Table 3). The fact that model fit for non-cooperation is substantially lower than for non-contact reveals that attrition associated with demographic behaviour and attitudes is primarily associated with non-contact rather than refusal. It also implies that refusal is much more 'random' than non-contact in the case of the Austrian GGS. Available data allowed the distinction between the two

components of attrition, and our findings not only underline that different types of non-response have different causes but also that these two components are valuable for future data collection.

In general, model fit remained rather modest. Regarding the low explanatory power of models, Watson and colleagues (2009, p. 179) conclude: “While there is undoubtedly (and thankfully) a large random component to survey nonresponse, it is nevertheless clear that there are strong associations between many observable characteristics of both respondents and interview process and experience that are predictive of nonresponse [.]. Such information [...] can provide variables for inclusion in attrition models used in the construction of population weights or as instruments at the analysis stage”. They conclude that poor explanatory power is a desired outcome, in the sense that it reflects the large random component in survey non-response (Watson and Wooden 2009, p. 171). Following their argument, the comparatively low model fit in the current study indicates a large random component in survey non-response in the current data. The remaining unexplained variance could also be attributable to variables or factors that were not included within the analysis but are still associated with demographic behaviour or attitudes.

Summarising, this detailed study of attrition reveals a bias towards family-oriented persons as well as less-educated respondents and persons with migration backgrounds. Nevertheless, the estimated coefficients are small in size and often of low statistical significance. Despite this small bias the study highlights the fact that the Austrian GGS panel data can be used without (much) concern regarding selectivity. These data are a valuable basis for understanding demographic behaviour and the underlying causal mechanisms.

## **5. Discussion**

Behr and colleagues (2005) suggested including in analyses on attrition not only individual characteristics and variables related to field work, but also important analysis variables. It is therefore crucial to study in the GGS attrition by family- and fertility-related variables, such as fertility intentions, pregnancy, perceived problems in conceiving a child, or a homosexual partnership. In line with this, a French survey on fertility intentions revealed that the preferred method of contraception had an effect on attrition (Razafindratsima et al. 2004). To our knowledge, the GGS – a main source for fertility and family formation processes – has not been analysed with regard to survey-related characteristics yet, and papers that comprehensively examine attrition in the GGS are rare (e.g., Régnier-Loilier and Lincot 2010; Régnier-Loilier 2012; Bartus and Spéder 2013). For the Austrian GGS, apart from wave 1 characteristics, detailed

information on the field phase in waves 1 and 2 were available and allowed a comprehensive investigation of causes and determinants of attrition.

This study on attrition in the Austrian GGS revealed that certain fertility-related aspects were associated with panel dropout. On the one hand, pregnant women and persons with traditional attitudes had lower dropout, indicating that the second wave of the Austrian GGS is somewhat biased towards family-oriented persons. Although the estimated coefficients in the overall model on overall dropout were significant at a 10% and at a 5% level only, these results have to be taken into consideration when analysing and interpreting results based on the longitudinal panel. Distinguishing between attrition due to non-contact and attrition due to non-cooperation revealed that women who were pregnant at wave 1, and thus mothers of toddlers at wave 2, refused to be interviewed significantly less often. We might assume that these young mothers were more interested in the topic of the survey. Fertility intentions at wave 1, on the other hand, are not associated with dropout in wave 2 after controlling for other variables, which is important for studying the realisation of fertility intentions.

Descriptive analyses showed that some groups had comparatively high dropout, namely persons in a homosexual relationship, respondents who refused to answer the question on problems conceiving a child, and persons who answered “don’t know” regarding their partner’s fecundity problems. Nevertheless, multivariate analyses revealed no statistically significant association. Due to the small size of these groups the results have to be regarded with caution, despite their possible indication of a link between the refusal to answer rather sensitive questions and the refusal to participate in wave 2. These questions might have been perceived as intrusive or offensive, thus leading to higher non-response in the second wave (Groves and Peytcheva 2008; Arnaud Régnier-Loilier et al. 2011). Item non-response on crucial variables is regarded as an indicator of low cooperation, lack of interest in the survey, and an unpleasant or negative experiences (Loosveldt et al. 2002; Rendtel 2002). In addition, the answer “don’t know” on willingness to participate in a second wave was related to higher dropout and might be an indicator of not being interested in a second interview. Overall dropout was comparatively high when wave 1 interviews were very short. On the one hand, this was the case when respondents had no children and no partner and thus did not have to answer the corresponding questions. Typically, young men and women had short interviews at wave 1. The fact that the length of interview at wave 1 remained significant when controlling for age, family status, household situation, and various other characteristics might indicate that a very short interview time is related to no interest in the topic and the tendency to answer questions quickly without further deliberation.

Various individual and regional characteristics turned out to be significantly associated with dropout, with differences between attrition due to non-contact und

attrition due to non-cooperation. On the one hand, young adults, respondents with other than Austrian nationality, self-employed persons, married couples without children, and urban dwellers had significantly higher attrition due to non-contact. These characteristics were also related to higher overall dropout in the French GGS (Régnier-Loilier 2012). In addition, individuals who planned a move in wave 1 (particularly when planning to move abroad), those not willing to be contacted again, persons with other than Catholic or Protestant religion or with no religious affiliation, recipients of social welfare payments at wave 1, and those with rather short interview durations in wave 1 had significantly higher attrition due to non-contact. Regional variation in dropout due to non-contact was due to the specific field phase situation in one province. On the other hand, attrition due to non-cooperation was significantly higher among women, Austrian nationals who received Austrian nationality not at birth but later in life, less educated people, persons who planned a residential move or were unclear about moving, and those who did not want to be contacted again. These results stress the importance of including detailed information on residential move and migration background.

Regarding the respondents' gender, studies on survey response mostly find higher response rates among women than men. The main reason usually cited for this observation is the fact that women are more often at home (Watson and Wooden 2009). Nevertheless, there is limited evidence that – even when successfully contacted – men may be slightly more likely to discontinue survey participation (Nicoletti and Buck 2004; Watson and Wooden 2009). The fact that women more often refused to participate in wave 2 was interpreted by interviewers at Statistics Austria with the following assumption or observation: if men agree to participate in a survey, they are to some extent more convinced of the survey itself and thus more likely to answer in a second wave. Women, on the other hand, reflect about panel participation later, i.e., after the first interview has taken place. They are therefore more likely to refuse participation in a second wave. This explanation is based on personal experience and ensuing reflections of interviewers of the Austrian GGS wave 1 and wave 2, not on empirical material. Nevertheless, we are convinced that interviewers acquire a lot of knowledge during their work – some of the Austrian interviewers have had over twenty years' survey experience – and it might be worth conducting qualitative interviews to gain further insight into the interview process.

Comparing our results, based on the Austrian GGS, with work by Bartus and Spéder (2013) on panel continuation in the GGS for Bulgaria, France, Georgia, Germany, and Hungary, underlines differences by country. Whereas dropout was high among men in the study by Bartus and Spéder (2013), it was comparatively high among women in Austria, as mentioned earlier (and the effect for women is robust even when leaving out the cases in Tyrol). Also, differences by educational level and economic

situation become evident once more. In this regard, Austria is in line with countries like France, Germany, and Hungary, where highly educated persons and those with relatively more income have lower dropout. The opposite is the case in Bulgaria and Georgia: in Bulgaria, highly educated persons were less likely to continue, and both in Bulgaria and Georgia those who reported economic constraints participated in the second wave more often (Bartus and Spéder 2013).

Our findings on attrition are valuable for the design of future data collections. First, panel maintenance in the Austrian GGS was high compared to other surveys (both GGS and non-GGS). What was crucial therefore was access to the central register by the survey agency Statistics Austria. By Austrian law, first establishment of accommodation in Austria, house moving within Austria, and establishment of a further residence must all be recorded in the central register.<sup>21</sup> If respondents had moved between waves (and 16% of respondents did so) they were contacted at their new address for the second wave. This turned out to be key for panel maintenance, and future data panel collections should elaborate the possibility of using central registers. Second, we discovered that those pregnant at wave 1 and those with traditional attitudes towards marriage were less likely to drop out than those with non-traditional marriage attitudes. Earlier studies on fertility data pointed out a ‘family bias’ in social-science surveys, with the fertility of younger cohorts being overstated, because respondents with young children are easier to reach by interviewers (Festy and Prioux 2002), whereas childless respondents are considered to be “reluctant to participate because they are of the opinion that the theme of the survey is not relevant to them” (Kreyenfeld et al. 2011, p. 352). Our results on pregnancy and attitudes towards marriage are in line with this research evidence, by extending on the longitudinal data perspective. Identifying strategies to circumvent this would be helpful for future family surveys.

Third, as indicators for model fit reveal that attrition associated with demographic behaviour and attitudes is primarily associated with non-contact rather than refusal, efforts to improve the tracking of respondents would be a better strategy for survey participation than, for example, incentives.

Finally, regarding the willingness of respondents to continue in a panel survey, it is worth reiterating that in Austria all persons were asked at the end of the wave 1 interview if they agreed to be contacted again and, regardless of their answer, were later politely invited once more to consider participating in wave 2. It turned out that this attempt at encouraging participation was successful, as 61% of those who had not been willing to continue the panel survey at the end of wave 1 were successfully interviewed in wave 2.

Two main conclusions are key: first, the Austrian GGS panel has a relatively low dropout rate (22%) and is affected by a small bias towards family-oriented persons as

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<sup>21</sup> See <https://www.help.gv.at/Portal.Node/hlpd/public/content/118/Seite.11802001.html>.

well as less educated respondents and persons with migration background, but the data can be used without (significant) concern about selectivity. Second, the results are relevant not only to data users but also to future data collection.

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## Appendix

**Table A1: Attrition due to non-contact, non-cooperation and overall dropout, descriptive results**

	Non-contact		Non-cooperation		Overall dropout	
		N		N		N
Total	7%	4,996	16%	4,644	22%	4,996
Indicator for fecundity						
No problems reported	7%	4,313	16%	4,003	22%	4,313
Respondent or partner has problems conceiving a child	6%	503	17%	474	22%	503
Pregnant	7%	149	10%	139	16%	149
Female partner 50+	0%	18	11%	18	11%	18
Homosexual relationship	23%	13	20%	10	38%	13
Fertility intentions						
Wants a child now	6%	549	14%	518	18%	549
Wants a child within 3 years	10%	757	18%	685	26%	757
Wants a child later	9%	1,134	15%	1,029	23%	1,134
Wants no further child(ren)	6%	2,362	16%	2,232	21%	2,362
Don't know	20%	10	22%	9	30%	10
Refusal	0%	4	0%	4	0%	4
Marriage is an outdated institution						
Strongly agree	12%	185	19%	162	29%	185
Agree	9%	667	19%	607	26%	667
Neither agree nor disagree	7%	1,091	18%	1,018	23%	1,091
Disagree	7%	1,990	16%	1,846	22%	1,990
Strongly disagree	5%	855	12%	809	17%	855
Does not apply	3%	204	13%	198	16%	204
Don't know or refusal	0%	4	25%	4	25%	4
Sex						
Male	7%	1,996	14%	1,852	20%	1,996
Female	7%	3,000	17%	2,792	23%	3,000
Cohorts						
1960–1964	6%	346	16%	328	20%	346
1965–1969	5%	1,173	17%	1,111	21%	1,173
1970–1974	6%	964	16%	908	21%	964
1975–1979	6%	842	14%	794	19%	842
1980–1984	9%	851	16%	773	23%	851
1985–1989	11%	745	18%	664	27%	745
1990–1992	12%	75	15%	66	25%	75
Nationality						
Austrian nationality since birth	5%	4,175	15%	3,935	20%	4,175
Austrian nationality granted later	9%	345	22%	315	29%	345
German nationality	34%	94	19%	62	47%	94
Other nationality	17%	400	17%	332	31%	400
Highest educational level						
ISCED 1+2	10%	640	21%	579	28%	640
ISCED 3	6%	2,706	16%	2,534	21%	2,706
ISCED 4	6%	771	14%	727	19%	771
ISCED 5+6	9%	879	14%	804	21%	879

**Table A1: (Continued)**

	Non-contact		Non-cooperation		Overall dropout	
		N		N		N
Total	7%	4,996	16%	4,644	22%	4,996
Employment status at wave 1						
Employed	6%	3,324	16%	3,113	21%	3,109
Self-employed	8%	341	13%	315	20%	314
Unemployed	12%	229	20%	201	30%	201
Student	11%	426	13%	378	23%	378
Retired	16%	25	10%	21	24%	21
Parental leave	4%	334	17%	322	20%	322
Permanently ill	13%	16	29%	14	38%	14
Housekeeping	6%	213	15%	200	20%	200
Civil service	3%	32	16%	31	19%	31
Other	13%	56	20%	49	30%	49
Parity						
Childless	9%	2,273	16%	2,071	24%	2,273
1 child	7%	929	18%	863	23%	929
2 children	5%	1,228	15%	1,171	19%	1,228
3+ children	5%	566	13%	539	17%	566
Marital status						
Married	5%	2,179	13%	2,082	17%	2,179
Divorced	9%	303	20%	276	27%	303
Widowed	11%	18	6%	16	17%	18
Single	9%	2,496	18%	2,270	25%	2,496
Living arrangement						
Child in one's birth family	7%	884	16%	821	22%	884
Married couple without children	6%	306	12%	288	17%	306
Non-married couple without children	9%	522	18%	477	25%	522
Married couple with children	4%	1,835	14%	1,761	17%	1,835
Non-married couple with children	8%	402	21%	371	27%	402
Single mother	7%	264	21%	246	27%	264
Single father	20%	10	25%	8	40%	10
Living alone	11%	644	18%	573	27%	644
Other (shared accommodation)	23%	129	7%	99	29%	129
Household size						
1 person	11%	644	18%	573	27%	644
2 persons	8%	1,013	16%	934	23%	1,013
3 persons	8%	1,164	18%	1,073	24%	1,164
4+ persons	5%	2,175	14%	2,064	18%	2,175
Children with previous partner living in the household						
No	7%	4,585	15%	4,261	21%	4,585
Yes	7%	411	20%	383	26%	411
Stepchildren living in the household						
No	7%	4,915	16%	4,570	22%	4,915
Yes	9%	81	18%	74	25%	81
Has stepchildren not living in the household						
No	7%	4,775	16%	4,439	22%	4,775
Yes	7%	221	17%	205	23%	221
Self-perceived health						
Very good	7%	2,826	16%	2,626	22%	2,826
Good or fair	7%	2,101	16%	1,962	22%	2,101
(Very) bad	19%	69	23%	56	38%	69
Providing care						
No	6%	4,688	16%	4,354	22%	4,688
Yes	6%	308	14%	290	19%	308

**Table A1: (Continued)**

	Non-contact		Non-cooperation		Overall dropout	
		N		N		N
Total	7%	4,996	16%	4,644	22%	4,996
Regional type						
Predominantly urban	11%	1,666	17%	1,488	26%	1,666
Intermediate	6%	1,319	15%	1,240	21%	1,319
Predominantly rural	5%	2,011	15%	1,916	19%	2,011
Provinces						
Burgenland	7%	150	17%	139	23%	150
Lower Austria	4%	935	16%	898	19%	935
Vienna	11%	951	19%	849	28%	951
Carinthia	7%	323	19%	299	25%	323
Styria	6%	699	11%	659	16%	699
Upper Austria	5%	912	16%	868	20%	912
Salzburg	7%	335	12%	313	18%	335
Tyrol	12%	454	16%	401	26%	454
Vorarlberg	8%	237	17%	219	24%	237
Tenant						
Owner	5%	2,726	15%	2,602	19%	2,726
Tenant	11%	1,933	18%	1,727	26%	1,933
Rent-free accommodation	7%	294	13%	274	19%	294
Other	5%	39	19%	37	23%	39
Don't know	0%	1	100%	1	100%	1
Refusal	0%	3	0%	3	0%	3
Planned residential move in wave 1						
Definitely no	4%	2,840	15%	2,718	19%	2,840
Probably no	10%	728	16%	654	24%	728
Abroad	32%	62	19%	42	45%	62
Within Austria	10%	1,336	17%	1,204	25%	1,336
Unsure about moving or don't know where to move	13%	30	27%	26	37%	30
Willingness to participate in wave 2						
Yes	7%	4,795	15%	4,467	21%	4,795
No	13%	197	31%	173	39%	197
Don't know	0%	4	50%	4	50%	4
Religious affiliation						
Roman Catholic	5%	3,582	15%	3,396	20%	3,582
Protestant	10%	179	13%	161	22%	179
Other religious affiliation	14%	499	18%	430	29%	499
No religious affiliation	11%	730	19%	651	28%	730
Don't know	0%	1	100%	1	100%	1
Refusal	0%	5	20%	5	20%	5
Religiosity						
Not at all religious	11%	579	18%	516	27%	579
1-2	8%	518	16%	475	23%	518
3-4	6%	648	15%	607	21%	648
5	6%	1,112	17%	1,042	22%	1,112
6-7	7%	1,061	14%	992	20%	1,061
8-9	6%	714	15%	675	20%	714
Very religious (10)	8%	357	17%	330	24%	357
Don't know	0%	3	33%	3	33%	3
Refusal	0%	4	25%	4	25%	4

**Table A1: (Continued)**

	Non-contact		Non-cooperation		Overall dropout	
		N		N		N
Total	7%	4,996	16%	4,644	22%	4,996
Making ends meet						
With great difficulty	14%	147	21%	126	32%	147
With difficulty	12%	303	17%	268	27%	303
With some difficulty	7%	864	16%	804	22%	864
Fairly easily	6%	1,640	15%	1,569	21%	1,640
Easily	7%	1,221	17%	1,138	23%	1,221
Very easily	7%	787	13%	735	19%	787
Don't know	0%	4	25%	4	25%	0
Receiving social welfare payment						
No	7%	4,895	16%	4,562	21%	4,895
Yes	19%	100	16%	81	32%	100
Don't know	0%	1	100%	1	100%	1
Talked with someone else about one's own personal experiences/feelings						
Yes	7%	4,324	16%	4,022	21%	4,324
No	8%	672	18%	622	24%	672
Talked with someone else about their personal experiences/feelings						
Yes	7%	4,248	16%	3,952	22%	4,248
No	8%	748	17%	692	23%	748
Length of interview in wave 1						
Less than 45min	9%	674	18%	614	25%	674
45min to 1h59min	7%	4,212	16%	3,933	21%	4,212
2h and longer	8%	77	20%	71	26%	77
No duration given	21%	33	4%	26	24%	33

**Table A2: Attrition due to non-cooperation by survey-relevant aspects**

	Attrition	N
Total	16%	4,644
Pregnancy		
Yes	10%	139
No	16%	4,459
Perhaps	17%	18
Female partner 50+	11%	18
Homosexual relationship	20%	10
Respondent able to conceive		
No for sure	18%	223
Probably no	18%	71
Probably yes	17%	812
Yes for sure	16%	3,360
Pregnant	10%	139
Don't know	25%	8
Refusal	67%	3
Partner able to conceive		
No for sure	17%	178
Probably no	17%	36
Probably yes	15%	600
Yes for sure	15%	2,664
Pregnant	10%	139
No partner	18%	993
Don't know	20%	5
Refusal	100%	1
Indicator for fecundity		
No problems reported	16%	4,003
Respondent or partner has problems conceiving a child	17%	474
Fertility intentions		
Wants a child now	14%	518
Wants a child within 3 years	18%	685
Wants a child later	15%	1,029
Wants no further child(ren)	16%	2,232
Don't know	22%	9
Refusal	0%	4
Marriage is an outdated institution		
Strongly agree	19%	162
Agree	19%	607
Neither agree nor disagree	18%	1,018
Disagree	16%	1,846
Strongly disagree	12%	809
Does not apply	13%	198
Don't know or refusal	25%	4

**Table A3: Estimated coefficients of logit regression due to non-contact, non-cooperation and overall dropout**

	Non-contact	Non-cooperation	Overall dropout
Indicator for fecundity			
No problems reported	0	0	0
Respondent or partner has problems conceiving a child	0.06	0.12	0.13
Pregnant	0.01	-0.53*	-0.39
Female partner 50+	.	-0.90	-1.11
Homosexual relationship	0.00	0.34	0.52
Fertility intentions			
Wants a child now	-0.28	-0.21	-0.21
Wants a child within 3 years	0.24	0.15	0.17
Wants a child later	0.01	-0.11	-0.09
Wants no further child(ren)	0	0	0
Don't know	0.82	-0.22	0.02
Marriage is an outdated institution			
Strongly agree	0.54*	0.13	0.12
Agree	0.12	0.01	0.02
Neither agree nor disagree	0	0	0
Disagree	0.28+	-0.03	0.00
Strongly disagree	-0.03	-0.31*	-0.25*
Does not apply	-0.73	-0.23	-0.33
Don't know or refusal	.	-0.26	-0.53
Sex			
Male	0	0	0
Female	0.04	0.28*	0.23**
Cohorts			
1960–1964	0	0	0
1965–1969	-0.18	0.01	0.03
1970–1974	-0.09	-0.05	0.01
1975–1979	-0.15	-0.27	-0.24
1980–1984	0.16	-0.13	-0.05
1985–1989	0.67+	0.16	0.25
1990–1992	0.60	-0.05	0.06
Nationality			
Austrian nationality since birth	0	0	0
Austrian nationality granted later	0.40	0.40*	0.47**
German nationality	2.26***	0.47	1.31***
Other nationality	0.88***	0.23	0.49**
Highest educational level			
ISCED 1+2	0	0	0
ISCED 3	-0.16	-0.24*	-0.26*
ISCED 4	-0.04	-0.30+	-0.33*
ISCED 5+6	0.29	-0.27+	-0.24+
Employment status at wave 1			
Employed	0	0	0
Self-employed	0.53*	0.01	0.07
Unemployed	0.18	0.21	0.22
Student	-0.09	-0.16	-0.16
Retired	0.60	-0.61	-0.24
Parental leave	-0.85*	-0.13	-0.17
Permanently ill	0.14	-0.02	0.24
Housekeeping	-0.11	-0.17	-0.11
Civil service	-0.69	-0.09	-0.12
Other	0.39	0.29	0.41

**Table A3: (Continued)**

	Non-contact	Non-cooperation	Overall dropout
Parity			
Childless	0	0	0
1 child	0.38	0.01	0.13
2 children	0.45	0.08	0.23
3+ children	0.45	-0.13	0.03
Marital status			
Married	0	0	0
Divorced	0.33	0.50	0.27
Widowed	0.80	-0.16	-0.52
Single	0.26	0.62	0.44
Living arrangement			
Child in one's birth family	0.26	-0.31	-0.05
Married couple without children	0.71+	-0.05	0.18
Non-married couple without children	0.69	-0.14	0.26
Married couple with children	0	0	0
Non-married couple with children	0.35	-0.13	0.10
Single mother	0.13	-0.33	-0.03
Single father	1.69	0.54	0.98
Living alone	0.61	-0.12	0.22
Other (shared accommodation)	1.46*	-0.52	0.17
Household size			
1 person	0	0	0
2 persons	-0.34	0.06	0.01
3 persons	0.24	0.30*	0.31**
4+ persons	.	.	.
Children with previous partner living in the household			
No	0	0	0
Yes	-0.07	0.13	0.10
Stepchildren living in the household			
No	0	0	0
Yes	0.33	0.25	0.30
Has stepchildren not living in the household			
No	0	0	0
Yes	0.15	0.01	0.01
Health			
Very good	0	0	0
Good or fair	-0.11	-0.08	-0.08
(Very) bad	0.51	0.37	0.41
Providing care			
No	0	0	0
Yes	-0.09	-0.19	-0.20
Regional type			
Predominantly urban	0.64**	0.13	0.15
Intermediate	0.16	0.02	0.00
Predominantly rural	0	0	0

**Table A3: (Continued)**

	Non-contact	Non-cooperation	Overall dropout
<b>Provinces</b>			
Burgenland	0.75+	0.22	0.31
Lower Austria	0	0	0
Vienna	-0.06	0.03	0.02
Carinthia	0.67*	0.30	0.27+
Styria	0.27	-0.29+	-0.31*
Upper Austria	-0.06	-0.03	-0.05
Salzburg	0.14	-0.19	-0.23
Tyrol	1.10***	0.29	0.27+
Vorarlberg	0.36	0.01	0.11
<b>Accommodation</b>			
Owner	0	0	0
Tenant	0.21	-0.03	-0.02
Rent-free accommodation	0.24	-0.22	-0.12
Other	0.16	0.29	0.21
<b>Planned residential move in wave 1</b>			
Definitely no	0		
Probably no	0.51**	0.12	0.14
Abroad	1.42***	0.54	0.88**
Within Austria	0.37*	0.22*	0.22*
Unsure about moving or don't know where to move	0.73	0.61	0.64
<b>Willingness to participate in wave 2</b>			
Yes	0	0	0
No	0.84***	0.86***	0.88***
Don't know	.	1.74*	1.81+
<b>Religious affiliation</b>			
Roman Catholic	0	0	0
Protestant	0.23	-0.11	-0.09
Other religious affiliation	0.42+	0.05	0.10
No religious affiliation	0.42*	0.18	0.21+
Refusal	.	-0.60	-0.56
<b>Religiosity</b>			
Not at all religious	0.16	-0.04	-0.02
1-2	-0.08	-0.10	-0.12
3-4	-0.18	-0.18	-0.18
5	0	0	0
6-7	0.12	-0.13	-0.10
8-9	-0.09	-0.12	-0.08
Very religious (10)	0.01	0.04	-0.01
Don't know	.	0.03	-0.11
Refusal	.	0.58	0.33
<b>Making ends meet</b>			
With great difficulty	0.19	0.17	0.18
With difficulty	0.26	0.08	0.07
With some difficulty	-0.04	0.04	0.04
Fairly easily	0	0	0
Easily	0.17	0.11	0.14
Very easily	0.17	-0.11	-0.09
Don't know	.	0.03	-0.02
<b>Receiving social welfare payment</b>			
Yes	0.69*	-0.06	0.08
No	0	0	0

**Table A3: (Continued)**

	Non-contact	Non-cooperation	Overall dropout
Talked with someone else about one's own personal experiences/feelings			
Yes	0	0	0
No	-0.17	0.09	0.07
Talked with someone else about their personal experiences/feelings			
Yes	0	0	0
No	-0.08	0.00	0.04
Length of interview in wave 1			
Less than 45min	0.50**	0.29*	0.29**
45min to 1h59min	0	0	0
2h and longer	0.27	0.27	0.29
No duration given	1.34**	0.14	0.01
Constant	-4.97***	-1.76***	-1.99***
R <sup>2</sup>	0.1590	0.0478	0.0615
N	4,947	4,870	4,986

Significance levels: + p<0.10; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001.

Remark: The model for attrition due to non-cooperation used robust standard errors which cluster by interviewer.

