# Attrition Patterns in the Swiss Household Panel by Demographic Characteristics and Social Involvement

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## 1 Introduction

The aim of this study is to gain insight into attrition patterns and their potential bias in the Swiss Household Panel (SHP). The SHP is a yearly panel study whose first sample began in 1999, with a second one added in 2004. In the SHP, households are sampled and all household members of at least 14 years of age and capable of participating are asked to take part in a telephone interview. These interviews form the basis for this study. Past attrition analyses of the SHP have shown that attrition is relatively high and somewhat selective (Lipps, 2007). The current study builds on these analyses but goes beyond the investigation of selectivity of response by demographic background variables only. It also tries to explain nonresponse by the mechanism of social involvement, which states that individuals who are more involved in society in general are more likely to respond to surveys (Stoop, 2005). Finally, it assesses the success of re-approaching prior refusals and the selectivity of the respondents who re-entered the panel after previous refusals.

The study aims to answer the following questions:

1   To what extent do respondents and nonrespondents in the SHP differ on demographic characteristics and social involvement?
2   To what extent is nonresponse in the SHP explained by demographic characteristics and social involvement independently?
3   To what extent do the respondents who re-entered the panel after previous refusals resemble loyal panel members or attrited respondents?

Answers to these questions shed light on the importance of social integration on response behaviour in the case of the Swiss Household Panel. Furthermore, these analyses provide insight into the selectivity of converted nonrespondents.

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## 2 Theoretical background

### 2.1 Nonresponse bias

Surveys generally aim for high response rates because high response rates are thought to provide more accurate estimates. Although lower response rates result in less precise estimates due to a smaller sample size, whether or not the estimates are biased depends on the pattern of nonresponse (Groves, 2006). If there is a random process behind the response, the estimates obtained using the incomplete data might be less precise, but they are not biased. Often, however, nonresponse is selective. Certain groups are known to have a higher probability of cooperating with a survey request than others, leading to a sample that is no longer representative of the population. This nonresponse bias becomes especially problematic if response to the survey is correlated to the outcome variables of interest to the researcher, such as specific attitudes and behaviours (Groves, 2006).

Overall, higher response rates are thought to decrease nonresponse bias. Some studies, however, report no relationship between survey response and nonresponse bias (Merkle and Edelman, 2002) or even a negative relationship, for instance when converted nonrespondents form an atypical group (Groves, 2006). It is thus very important not only to focus on response rates but also to assess response bias.

This study focuses on nonresponse once in the panel as opposed to nonresponse in the first wave. As the nonrespondents in later waves have participated in a previous wave, a lot is known about them. Using responses nonrespondents gave in an earlier wave, more information is available on them than in cross-sectional surveys, and this information can be used to get a better understanding of nonresponse in the Swiss Household Panel.

### 2.2 Theories on response

Survey nonresponse can occur on different levels (Dillman, Eltinge, Groves, and Little, 2002). First of all, the social environment, such as the general survey climate or urbanization, influences response rates. Furthermore, the survey institute is of influence, as it decides upon the survey protocols (mode of data collection, use of incentives) and selects and trains the interviewers. The interviewers and the interaction between interviewers and respondents in a previous wave form a further source of nonresponse, as interviewers vary in interviewing skills and ability to convince a respondent to cooperate. Finally, nonresponse can occur as a result of the characteristics of the sample members; this type of nonresponse is the focus of this study.

Reasons for nonresponse of sample members are related to how easy or how hard it is to locate, contact, and persuade them to participate in the survey. Difficulties in locating, contacting, and convincing sample members to cooperate are governed by different processes (Lynn and Clarke, 2002). The difficulty of locating sample members increases when they move a lot. Meanwhile, the likelihood of find-

ing sample members at home and of contacting them successfully is related to their employment status, their age, and whether or not children are part of the household. Unemployed and inactive people, older people, and people with children are more likely to be found at home, and these groups tend to include more women (Stoop, 2005; Watson and Wooden, 2009).

For panel studies, it is important to note the interrelatedness between contacting a respondent and the willingness to cooperate; when it takes more effort to contact a respondent in one wave, there is a greater risk of attrition in a later wave (Watson and Wooden, 2009).

Several processes are thought to play a role in sample members' willingness to cooperate with a survey request. For instance, sample members are thought to take the costs associated with participating into account, such as the relative amount of time required, and to weigh these costs against the benefits (the opportunity costs hypothesis) (Dillman et al., 2002). Expected benefits might be lower – or the costs higher – if past experiences in a previous wave have been unpleasant, thereby decreasing the likelihood of participation (Loosveldt and Carton, 2001).

One aspect influencing sample members' assessment of participation costs is the skills they possess for successfully completing the survey and making it a pleasant experience. Loosveldt and Carton (2001) provide evidence that participation in the second wave of a panel study is related to the respondent's ability to perform the task, which is determined by the prominence of inconsistent answers, use of the "don't know" category, as well as the interviewer's assessment of the respondent's ability. Some of the background characteristics of respondents are related to their ability to participate; higher educated and younger respondents tend to have the highest cognitive and communicative skills (Loosveldt, 1997).

The survey request has also been approached as an interaction governed by social exchange. This argumentation is based on the idea that people adhere to the norm to reciprocate received favours. The use of incentives, for example, could induce the respondent to feel the need to reciprocate by cooperating (Dillman et al., 2002). Related to this is the theory of social integration or social involvement. Studies have shown social integration and isolation to be correlated with the likelihood of responding to surveys. People who are more socially involved in society, for example, are more likely to respond in surveys (Groves and Couper, 1998 in Stoop, 2005; Watson and Wooden, 2009). For the SHP, this correlation has been established in an earlier study as well (Lipps, 2007).

People high on social integration are more likely to participate in surveys for several reasons. First, such individuals respond more in surveys, because an interview is a social event and individuals with high social integration tend to enjoy social events. Second, they tend to be guided by the norms of the dominant culture, in which participation in a survey may be seen as a "civic duty" (Dillman et al., 2002; Johnson, O'Rourke, Burris, and Owens, 2002). Furthermore, less social integra-

tion is related to more cynicism about established institutions, an attitude which is expected to influence response rates to surveys as well (Stoop, 2005).

Finally, topic saliency is thought to be relevant. People might be more willing to respond to a survey on a topic that is of interest to them. Dealing with a preferred topic can be seen as a benefit of cooperating, hence lowering the opportunity costs of participating. For the sample member to judge the survey's saliency, the interviewer must communicate the topic clearly or tailor the survey request to fit the interests of the respondent. These two aspects are combined in the leverage-salience theory, which explains participation in surveys in terms of the survey topic's importance to potential respondents as well as the topic saliency in the request for survey participation. Panel members' level of interest, however, is also judged on experiences made in previous waves. Generally speaking, more interest in the topic, given that the saliency of the topic is clear, will lead to a higher probability of responding (Groves, Presser, and Dipko, 2004; Groves, Singer, and Corning, 2000).

The focus of this study is on social integration and its association with other explanations for non-response. People who are more socially involved are also more likely to possess the skills required to participate in surveys. Furthermore, more social individuals are likely to have a greater interest in the topics that are usually covered in large surveys.

Many of the usual background characteristics in nonresponse analyses can be linked to processes behind noncontact and noncooperation. For instance, employed people and people with a higher socio-economic status are often harder to contact, as they are less often found at home, but they are more willing to cooperate than people from a lower socio-economic stratum or unemployed people, as employed people and people with a higher socio-economic status might have better skills, experience lower opportunity costs and be more interested in the survey. Also, holding a paid job can be perceived as a way of participating in society, whereas unemployed people face more social isolation (Gallie and Paugam, 2004). Older people, on the other hand, are easier to contact, because they are more likely to be at home, but they tend to be more reluctant to cooperate. Some groups are harder to contact and more reluctant to cooperate, such as men, singles, ethnic minorities, younger persons, and big city dwellers. An additional reason to include demographic characteristics is simply that they are of interest to most social scientists, and therefore, their relation to attrition is of particular interest (McCulloch and Buck, 2003).

All the above-mentioned demographic characteristics that are often found to be related to noncontact or noncooperation will be included in this study: gender, age, education, Swiss nationality, region, urbanization, civil status, children in the household, and home ownership. Related to the ability to participate in surveys is the health of the respondent, which will be part of this study as well.

This study goes beyond the relation between demographic characteristics and response; it aims to gain insight into the importance of social participation as an

explanation for responding in the Swiss Household Panel. How to establish the degree of social integration of respondents and nonrespondents in our study? Social isolation and social involvement are related to the psychological makeup of individuals. Obvious attributes of individuals that measure social involvement are political interest and political participation. In support of this, a test of the leverage-salience theory showed that politically active and interested people are more cooperative irrespective of the survey topic. Possibly a wide variety of topics covered in most surveys are of interest to them (Groves et al., 2004). In addition to political interest, membership in clubs and volunteer work are indicators of social involvement (Stoop, 2005). Also related to social involvement is a general trust in people as well as trust in and perceived influence upon the government. This study will provide insight into the extent to which respondents and nonrespondents in the SHP differ in terms of demographic characteristics and social involvement.

Because social involvement is related to demographic characteristics, it is important to establish selectivity on social involvement when controlling for these demographic characteristics. This answers the question to what extent nonresponse in the SHP is explained by demographic characteristics and social involvement independently.

## 2.3   Patterns of response

Sample members in a panel can have different patterns of nonresponse. When a respondent after a certain wave drops out and is not recontacted, this situation leads to attrition. Yet in panel surveys, it is often the case that respondents do not participate in one wave of data collection – perhaps they could not be reached that year, or they refused – but return to the panel in a later wave. This pattern is quite common in the Swiss Household Panel. Similar distinctions are made by Burkam and Lee (1998), who distinguish between monotone and nonmonotone attrition, and Hawkes and Plewis (2006), who separate attrition from wave nonresponse.

Creating groups of sample members with different response patterns will demonstrate whether not only response or nonresponse but also the response pattern is related to demographic characteristics and attitudinal and behavioural measures of social involvement. Three response patterns are distinguished: continuous response in all waves, irregular response patterns, and drop out.

## 2.4   Refusal conversion and survey bias

Refusal conversion is one method to keep response rates up. Respondents who refused in previous waves can be re-approached and converted back into the panel. Although conversion increases response rates, it does not automatically decrease response bias; as response bias depends on the association of response propensity with the outcome variables of interest (Groves 2006). For example, a study of refusal conversion in the British Household Panel Survey showed that the lower

likelihood of nonresponse together with the higher likelihood of conversion after nonresponse among women compared to men increased the bias regarding gender distribution (Burton, Laurie, and Lynn, 2006). For this reason, it is important to focus on this group separately.

The SHP decided to re-approach previously abandoned respondents, using a selection of nonrespondents in 2006 (wave 8) and all addresses from wave 2 in 2007 (wave 9), except those respondents who sent a written refusal and those who left the country, were institutionalized, and refused in both wave 7 and wave 8. When respondents moved, the field agency tried to get information from household members or contacted municipalities for details. This procedure helped to get 850 respondents back into the panel. Because it is harder to trace respondents who moved in the interim than those who have not changed address or phone number, this converted group is probably more stable than the respondents who could not be traced.

To evaluate the impact of the successfully converted respondents on the composition of the sample, this study will compare the characteristics regarding demographics and social involvement between the successfully converted respondents, those respondents who did not come back in the sample, and those who were interviewed in all waves for which they were eligible.

## 3     Method

### 3.1    Data

The Swiss Household Panel is an ongoing yearly nationwide CATI panel survey among a representative sample of households in Switzerland. The questionnaire covers a wide variety of topics, including household composition, socio-demographics, health and well-being, finances, attitudes, and behavioural measures. The first sample started in 1999 and interviewed 5 074 households and 7 799 members of households; the most recent wave of data available stems from 2008, with 2,718 households and 4,494 household members left from the original 1999 sample. When new members arrive in original households they are added to the sample. When a respondent from an existing household moves out of the original household, this new household is added to the sample as well. Within each household, one household member is assigned to be the reference person, functioning as a source of information on the household composition and situation and thus also acting as a gatekeeper for the other household members.

### 3.2    Selection of cases and creation of groups

Because households, rather than individuals, were sampled, the selection of cases for the current analysis was not completely straightforward. First of all, by sampling

households, many individuals in the sample were not interviewed in any of the waves. They could not be contacted or were unable or unwilling to participate, but they remained in the sample as long as they remained in the household. We excluded these respondents, who were not in any of the waves of the SHP.

Secondly, unlike many panel attrition studies, the first wave was not taken as a starting point for the analysis. The composition of a household is dynamic, as new members arrive, old members leave, and people age. The choice was made to include all respondents who responded in at least one of the waves; they could have arrived in the household later, or they could have reached the age of 14 (the required minimum age for the individual interviews) at a later wave and hence could have come into the analytical sample at a later point in time.

Participation of respondents was only counted starting with the first wave in which they were eligible. Also, people entering the household at a later stage became eligible the first time they were present. Household members who lived in the selected household in 1999 and who left the household were monitored. Hence, they remained part of the sample. Respondents were no longer included in the sample if they left the country, were institutionalized, or were deceased. Only a small number of cases in this category could be determined because this information could only be provided when there was contact with another household member (and the grid questionnaire was completed). Hence, it is very likely, for example, that many cases of single person households leaving the sample (leaving the country, moving to an institution, or death) or complete households leaving the country were missed and wrongfully coded as nonresponse. As a result, in all probability, the actual number of cases in which individuals left the sample was higher.

A final relevant point about the selection of cases is that no distinction was made in the analysis between people who had been part of past waves and who were no longer contacted because they refused to participate in future waves, those who were contacted but who could not be reached or were not able or willing to participate, and those who could no longer be located. All were coded to nonresponse for the specific waves in question.

In sum, the total sample on which this attrition analysis was based consisted of all individuals who responded to the individual questionnaire in at least one of the waves between 1999 and 2008. This yielded a total of 10,331 respondents for the first sample of the SHP.

Groups of respondents were created based on their response patterns. No distinction for reason of nonresponse was included because this varied within respondents over waves. It was only established whether individuals were interviewed or not, or if they had left the sample. The following groups were created:

*"Always in"*. Respondents who completed an individual interview in every wave were coded "always in". Respondents who entered the household later or reached

the age of 14 later than wave 1 and who responded at all waves after entrance were coded "always in" as well. This group contained 25.5% of the respondents.

*"Ever out".* Respondents who did not complete all waves, but who were present at least once, and this was in either 2006, 2007, or 2008 were coded "ever out" (27.6%). This category was created to approximate a distinction between respondents who were actually dropping out (see "lost") and respondents with an irregular response pattern, or who were convinced to respond again after having refused in an earlier wave.

*"Lost".* Respondents who did not respond in the last three waves (2006, 2007, and 2008) were coded "lost". The majority of this group did not respond in more than these three waves. In the sample, 45.3% of the respondents belonged to this group.

*"Converted".* The group of converted respondents was used for research question 3. This group was a subsample of the "ever out" group: respondents who were interviewed at least once in the first four waves, who were absent in 2004 and 2005, and who returned in 2006, 2007, or 2008. This group contained 850 respondents (8,2%).

Respondents who were either known to be deceased, institutionalized, or had left the country were disregarded in the analysis. This group contained 170 respondents (1.6%) (102 deceased and 68 institutionalized respondents or respondents who left the country).

## 3.3   Measures

To gain insight into nonresponse and attrition, the response groups were compared on two main groups of variables. The first group contained demographic variables, and the second group consisted of attitudes and behaviour regarding social involvement.

The demographic variables were as follows: gender, age, education (0 = incomplete compulsory, 10 = university), Swiss nationality, region, urbanization (in 5 categories), civil status (married, never married, divorced, separated, widow/widower), children present in household, homeowner versus tenant. Satisfaction with health (0 = not at all satisfied, 10 = completely satisfied) was also included.

Regarding social integration, the following variables were used: participation in clubs ("Do you take part in club or other groups' activities (religious groups included)?" (yes/no)); voting frequency ("Supposing there are 10 federal polls a year, in how many do you usually take part?" (0–10)); trust in people ("Would you say that most people can be trusted, or that you cannot be too careful in dealing with people?" (0 = can't be too careful – 10 = most people can be trusted)); interest in politics ("Generally, how interested are you in politics?" (0–10)); feelings of political influence ("How much influence do you think somebody like you can have

on government policy?"(0–10)); and confidence in the federal government ("How much confidence do you have in the federal government?" (0–10)).

All questions were asked in all waves, except the question on general trust in people, which was asked for the first time 2002. The question regarding voting frequency was only asked to people eligible to vote. Answers were taken from the first wave in which the respondent participated, or when missing, in the next available wave. Changes in these variables after this year were not taken into account. Respondents with any missing values for the variables included in the study were excluded for the analyses. This yielded an analytical sample of $N = 9{,}652$.

## 3.4   Analysis

Comparing the response groups on demographic variables and social integration assessed the nonresponse bias in the SHP. It consisted of bivariate and multivariate analyses.

First, to answer research question 1, namely to what extent respondents and nonrespondents in the SHP differed in terms of demographic characteristics and social involvement, cross-tabulations are presented showing the distribution on the demographic variables and on social integration for the different response groups. Using Cramer's V and T-tests, it is tested whether the "ever out" and the "lost" group were significantly different from the "always in" group on these variables.

Second, to examine to what extent demographic characteristics and levels of social integration had an independent effect on response, I estimated multinomial regression models including stepwise demographic characteristics and variables measuring social integration. The dependent variable was the response group, distinguishing between "always in", "ever out" and "lost" respondents. This approach follows other research on attrition and nonresponse analysis (see for comparable approaches Behr, Bellgardt, and Rendtel, 2005; Burkam and Lee, 1998; Fitzgerald, Gottschalk, and Moffitt, 1998).

A final multinomial analysis examined the extent to which the respondents who re-entered the panel after previous refusals resembled loyal panel members or attrited respondents, in order to assess whether the converted respondents formed an atypical group.

## 4   Results

### 4.1   Demographic characteristics and social integration by response groups

Table 1 shows how response groups differed on demographic characteristics and social integration. The "always in" group had, compared to the other groups, significantly more women. This group was also older than the "ever out" and the "lost" group. They were higher educated and more likely to be of Swiss nationality.

Table 1:        Response groups by demographic characteristics and social
               involvement attitudes and behaviour (SHP I, 1999–2008)

| | Always in<br>n = 2,630 | Ever out<br>n = 2,856 | Lost<br>n = 4,675 |
|---|---|---|---|
| **Sex (%)** | | | |
| men | 41.10 | 47.69 | 47.02 |
| women | 58.90 | 52.31 | 52.98 |
| *Cramer's V* | | .07*** | .06*** |
| **Age (%)** | | | |
| 14 to 19 | 17.38 | 24.86 | 16.30 |
| 20 to 29 | 10.15 | 13.06 | 19.42 |
| 30 to 39 | 23.38 | 19.61 | 19.40 |
| 40 to 49 | 18.82 | 17.75 | 17.18 |
| 50 to 59 | 15.74 | 12.96 | 12.11 |
| 60 + | 14.52 | 11.76 | 15.59 |
| *Cramer's V* | | .11*** | .13*** |
| **Education (%)** | | | |
| compulsory school | 27.72 | 36.52 | 31.15 |
| upper secondary level (vocational) | 37.19 | 35.15 | 40.35 |
| upper secondary level (matura) | 10.57 | 9.78 | 10.27 |
| tertiary level (vocational) | 12.85 | 10.10 | 9.58 |
| tertiary level (university) | 11.67 | 8.44 | 8.64 |
| *Cramer's V* | | .10*** | .08*** |
| **Swiss nationality (%)** | 94.45 | 91.49 | 87.10 |
| *Cramer's V* | | .06*** | .12*** |
| **Region[a] (%)** | | | |
| Lake Geneva | 16.46 | 17.82 | 18.01 |
| Middleland | 26.08 | 23.70 | 25.30 |
| North-west Switzerland | 15.67 | 13.76 | 14.18 |
| Zurich | 18.21 | 16.18 | 15.61 |
| East Switzerland | 10.46 | 14.92 | 13.95 |
| Central Switzerland | 9.54 | 9.35 | 8.56 |
| Ticino | 3.57 | 4.27 | 4.39 |
| *Cramer's V* | | .08*** | .07*** |
| **Urbanization** | | | |
| highly and moderately urbanized centres | 58.75 | 57.21 | 59.68 |
| small urban centres | 9.24 | 10.82 | 10.95 |
| communes of urbanized centres | 12.89 | 10.64 | 11.17 |
| communes of small urban centres | 8.63 | 8.82 | 6.78 |
| communes remote from urbanized centres | 10.49 | 12.50 | 11.42 |

| | Always in n = 2,630 | Ever out n = 2,856 | Lost n = 4,675 |
|---|---|---|---|
| *Cramer's V* | | .05* | .05** |
| **Civil status (%)** | | | |
| single, never married | 34.60 | 42.79 | 39.82 |
| married | 54.26 | 47.37 | 47.99 |
| separated | 1.37 | 1.33 | 1.07 |
| divorced | 6.46 | 5.88 | 6.25 |
| widower/widow | 3.31 | 2.63 | 4.88 |
| *Cramer's V* | | .09*** | .07*** |
| **Children in household %** | 57.19 | 64.80 | 56.40 |
| *Cramer's V* | | .09*** | .01ns |
| **Employment (%)** | | | |
| employed | 61.37 | 62.85 | 64.71 |
| unemployed | 1.14 | 1.68 | 2.10 |
| not in labour force | 37.49 | 35.47 | 33.20 |
| *Cramer's V* | | .03ns | .05*** |
| **Owner residence (%)** | 51.98 | 50.14 | 44.30 |
| *Cramer's V* | | .02ns | .07*** |
| **Mean satisfaction with health (0–10) (sd)** | 8.32 (1.70) | 8.25 (1.83) | 8.16 (1.90) |
| t-value | | 1.53ns | 3.87*** |
| **Participate in clubs (%)** | 59.77 | 52.80 | 47.18 |
| *Cramer's V* | | .07*** | .12*** |
| **Mean participated in polls (0–10) (sd)** | 7.77 (2.95) | 7.14 (3.17) | 6.66 (3.46) |
| t-value | | 7.01*** | 13.07*** |
| **Mean general trust in people (0–10)[b](sd)** | 5.91 (2.35) | 5.62 (2.37) | 5.39 (2.52) |
| t-value | | 4.52** | 7.31*** |
| **Mean interest in politics (0–10) (sd)** | 5.43 (2.79) | 5.07 (2.81) | 4.71 (2.94) |
| t-value | | 4.71*** | 10.44*** |
| **Mean political influence (0–10) (sd)** | 3.48 (2.60) | 3.43 (2.61) | 3.16 (2.71) |
| t-value | | 0.74ns | 4.92*** |
| **Mean trust in government (0–10) (sd)** | 6.00 (2.03) | 5.83 (2.16) | 5.65 (2.34) |
| t-value | | 2.98** | 6.66*** |

\*      $p < .05$
\*\*     $p < .01$
\*\*\*    $p < .001$
a)      Region: Lake Geneva: VD, VS, GE; Middleland: BE, FR, SO, NE, JU; North-west Switzerland: BS, BL, AG Zürich; East Switzerland: GL, SH, AR, AI, SG, GR, TG; Central Switzerland: LU, UR, SZ, OW, NW, ZG; Ticino.
b)      Asked from 2002 onwards.

With regard to region and urbanization, the distributions were significantly different, but the pattern is unclear. It appears, however, that "always in" respondents were more likely to be from middle- sized towns and less likely to be from remote communities. The "always in" respondents were further more likely to be married and less likely to be single. They were less likely than the "ever out" group to reside in a household containing children, but in this respect they did not differ from the "lost" group. The "always in" respondents were less likely to be in the labour force or to be unemployed compared to the "lost" group but not to the "ever out" group. They were more likely to be home owners than the "lost" group. The "always in" respondents reported more satisfaction with their health than "lost" respondents.

"Always in" respondents scored higher on participation in clubs, participation in polls, general trust in people, political interest, and trust in the federal government compared to the two other groups. The "lost" group scored lower on feelings of political influence, compared to the "always in" respondents. Those with an irregular response pattern did not differ from them significantly in this respect.

The general picture that emerges from the bivariate analysis is that respondents who were interviewed every year differed from the rest demographically and demonstrated a higher level of social involvement. Regarding all variables related to social integration, the group of respondents who were interviewed irregularly was positioned in between the loyal respondents and the ones who attrited from the panel. This group, however, was slightly different with regard to the demographic characteristics, such as age, education, civil status, and on having children in the household.

## 4.2   Regression of response on demographic and social integration variables

Given that response was selective by demographic characteristics and by attitudes and behaviour related to integration, the question arose whether response was selective on these attitudes and behaviour *within* the demographic groups. Did certain demographic groups drop out more, because they were less socially integrated, or was dropout within demographic groups related to social integration? And how much of the variance in response patterns could be explained by demographic characteristics and social integration?

To determine to what extent nonresponse was explained by demographic characteristics and by attitudes and behaviour regarding social involvement, multinomial regressions were estimated. Table 2 presents the results. Model 1 includes only the demographic characteristics, and in Model 2 the social integration variables were added. To avoid excluding the non-Swiss respondents, who generally had no right to vote and did not answer the question on voting frequency, the variable voting frequency was categorized (no voting right, 0–3, 4–7 and 8–8 times out of 10). General trust in people was disregarded, as the corresponding question was only asked from 2002 onwards. Model 1 showed that "ever out" and "lost" respondents

Table 2:    Multinomial regression of "always in" respondents versus "ever out" and "lost" respondents on demographic characteristics and social involvement (N=9,652)

| | Model 1 "Ever out" | | | Model 2 "Ever out" | | | Model 1 "Lost" | | | Model 2 "Lost" | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | Exp(B) | Wald | B | Exp(B) | Wald | B | Exp(B) | Wald | B | Exp(B) | Wald |
| Intercept | .699** | | 14.174 | 2.021*** | | 66.589 | 1.830*** | | 121.475 | 2.891*** | | 166.490 |
| Age (centered) | -.003 | .997 | 1.694 | -.005* | .995 | 5.425 | .003 | 1.003 | 3.111 | .004 | 1.004 | 3.743 |
| Female | -.317*** | .729 | 30.296 | -.042*** | .669 | 46.085 | -.305*** | .737 | 34.117 | -.439*** | .644 | 65.858 |
| Obligatory education[a] | .252** | 1.286 | 12.086 | .376*** | 1.456 | 24.645 | .037 | 1.038 | .313 | .075 | 1.078 | 1.132 |
| Tertiary education[a] | -.300*** | .741 | 16.679 | -.245** | .782 | 10.894 | -.478*** | .620 | 52.887 | -.369*** | .692 | 30.255 |
| Married[b] | -.140* | .869 | 4.099 | -.156* | .855 | 4.940 | -.299*** | .742 | 23.785 | -.291*** | .747 | 21.554 |
| Children in hld | .203** | 1.225 | 8.694 | .260*** | 1.297 | 13.910 | .005 | 1.005 | .006 | .071 | 1.074 | 1.283 |
| Employed[c] | .195** | 1.216 | 9.380 | .069 | 1.071 | 1.090 | .276*** | 1.318 | 22.588 | .186** | 1.204 | 9.427 |
| Unemployed[c] | .492* | 1.636 | 4.032 | .371 | 1.450 | 2.254 | .712** | 2.037 | 10.268 | .583* | 1.791 | 6.707 |
| Swiss nationality | -.358** | .699 | 9.796 | -1.206*** | .299 | 55.191 | -.791*** | .453 | 61.581 | -1.093*** | .335 | 56.892 |
| Satisfaction health | -.041* | .960 | 6.597 | -.029 | .971 | 3.256 | -.044** | .957 | 9.520 | -.027 | .973 | 3.467 |
| No voting right[d] | | | | -1.130*** | .323 | 71.047 | | | | -.606*** | .546 | 24.780 |
| Voting frequency 0–3[d] | | | | .083 | 1.086 | .626 | | | | .245* | 1.277 | 6.667 |
| Voting frequency 8–10[d] | | | | -.246** | .782 | 10.239 | | | | -.322*** | .725 | 20.590 |
| Interest in politics | | | | -.013 | .987 | 1.144 | | | | -.043*** | .958 | 16.432 |
| Political influence | | | | .008 | 1.008 | .455 | | | | .000 | 1.000 | .001 |
| Trust in government | | | | -.018 | .982 | 1.768 | | | | -.039** | .962 | 9.772 |
| Participation in clubs/groups | | | | -.244*** | .784 | 17.674 | | | | -.342*** | .710 | 42.095 |
| Nagelkerke r² | .036 | | | .067 | | | | | | | | |

*p<.05; **p<.01; ***p<.001
a)    Reference group is secondary education.
b)    Reference group is never married, divorced or separated, widowed.
c)    Reference group is not in labour force.
d)    Reference group is voting frequency of 4–7.

were less likely to be female, higher educated, and married. They were more likely to be either employed or unemployed rather than to be inactive. They were less likely to be of Swiss nationality and less satisfied with their health. Additionally, the "ever out" group was more likely to have children in the household and to have a lower education compared to the "always in" group, whereas the "lost" group did not differ in this respect.

In Model 2 the social integration variables were included. Those variables related to behaviour rather than those reflecting attitudes were important for both the "ever out" and the "lost" group in comparison to the "always in" group. Compared to the middle category of voting frequency (4–7 times), respondents who voted often (8–10 times) and those without voting rights were more likely to be in the "always in" group, after controlling for nationality. Both the "ever out" and the "lost" group were characterized by a lower likelihood of participation in clubs or groups. The group of respondents that left the panel further distinguished themselves from those who were interviewed in every wave by demonstrating less interest in political matters and less trust in the federal government.

Although health was no longer significant in Model 2 after inclusion of the social integration variables, and employment status lost its significance for the "ever out" group, both groups of variables remained important in explaining response patterns. This significance implies that they had an independent relationship to the pattern of response. The Nagelkerke $R^2$ was low, .036 for Model 1 and .067 for Model 2, indicating that demographic characteristics and social integration were related to response, yet explained only a small percentage of variation in response.

### 4.3   Comparison of converted respondents to "always in" and "lost" respondents

Results so far indicated that nonresponse in the Swiss Household Panel, just like in other household panels, was not random. Nonrespondents turned out to differ from loyal respondents with respect to various characteristics. How did the group of converted respondents compare to those who were lost and those who were loyal respondents? Was reapproaching refusals a successful strategy in not only increasing the sample size, but also in diminishing the response bias? Table 3 presents the results of a multinomial regression analysis comparing the "always in" group and the "lost" group to the "converted" group. In this analysis, Swiss nationality was disregarded, as it correlated almost perfectly with voting rights for the converted group.

Results generally indicated that the "converted" group showed greater resemblance to the "lost" group than to the "always in" group, suggesting their re-entrance in the panel reduced response bias. The "converted" group was in most respects not significantly different from the "lost" group, except that they were more likely to be married, to have the right to vote (hence they were more likely to have Swiss nationality), and they generally felt they had less influence on politics. The "converted" group balanced the sample, as this group was more likely to include males,

less likely to be higher educated, and more often employed or unemployed rather than inactive. They also reported lower satisfaction with their health. Furthermore, they voted less frequently and felt they had less political influence.

At the same time, this group was particular in nature in that relatively often, they had children living in the household and were more active in clubs and groups than the "always in" respondents. In addition, they tended to be older. Finally, converted respondents usually were eligible to vote, meaning that non-Swiss citizens were harder to persuade back into the panel. In this respect, the converted group did not decrease and potentially even increased the bias.

Table 3:    Multinomial regression of "converted" respondents ($n = 850$) versus "always in" ($n = 2,600$) and "lost" respondents ($n = 4,340$) on demographic characteristics and social involvement ($N = 7,790$)

| | Model 2 "Always in" | | | Model 2 "Lost" | | |
|---|---|---|---|---|---|---|
| | B | Exp(B) | Wald | B | Exp(B) | Wald |
| Intercept | −.029 | .913 | .012 | 1.783*** | | 54.191 |
| Age (centered) | −.007* | .993 | 5.212 | −.001 | .999 | .065 |
| Female | .336*** | 1.399 | 15.585 | −.099 | .906 | 1.526 |
| Obligatory education[a] | −.131 | .877 | 1.599 | −.149 | .861 | 2.376 |
| Tertiary education[a] | .385*** | 1.469 | 12.623 | .018 | 1.019 | .031 |
| Married[b] | −.129 | .879 | 1.724 | −.379*** | .684 | 17.008 |
| Children in hld | −.234* | .791 | 5.682 | −.176 | .839 | 3.607 |
| Employed[c] | −.233* | .792 | 6.258 | .036 | 1.037 | .165 |
| Unemployed[c] | −.823** | .439 | 6.919 | −.150 | .860 | .308 |
| Satisfaction health | .054* | 1.055 | 5.911 | .021 | 1.022 | 1.102 |
| No voting right[d] | .813*** | 2.256 | 26.664 | .824*** | 2.279 | 30.890 |
| Voting frequency 0–3[d] | −.010 | .990 | .005 | .223 | 1.250 | 3.178 |
| Voting frequency 8–10[d] | .395*** | 1.484 | 13.857 | .057 | 1.059 | .329 |
| Interest in politics | .028 | 1.028 | 2.719 | −.017 | .983 | 1.238 |
| Political influence | .038* | 1.039 | 5.421 | .033* | 1.034 | 4.440 |
| Trust in government | .019 | 1.019 | .991 | −.017 | .983 | .895 |
| Participation in clubs/ groups | .284** | 1.328 | 11.756 | −.085 | .918 | 1.192 |
| Nagelkerke R² | .067 | | | | | |

*      $p < .05$
**     $p < .01$
***    $p < .001$
a)    Reference group is secondary education.
b)    Reference group is never married, divorced or separated, widowed.
c)    Reference group is not in labour force.
d)    Reference group is voting frequency of 4–7.

## 5 Conclusion and discussion

This study has shed light on attrition in the first sample of the Swiss Household Panel (1999–2008). Regarding the first research question, namely to what extent respondents and nonrespondents in the SHP differ in terms of demographic characteristics and social involvement, response in the SHP can be concluded to be somewhat selective, both with respect to demographic characteristics as well as with respect to characteristics related to social involvement; respondents who are more active and involved in society are less likely to drop out of the panel. Results are comparable to those found in other panel studies, which indicate that nonrespondents are more likely to be younger, male, lower educated and unemployed, in poorer health, and less likely to be married and home owners. Furthermore, our results support the theory that individuals who can be characterized as less integrated in society or more socially isolated (Dillman et al., 2002; Johnson et al., 2002; Stoop, 2005), such as people with little interest in politics and little civic engagement, low levels of trust, are indeed less likely to cooperate in survey research or to be loyal members of a household panel.

Furthermore, the study also shows that demographic characteristics and social involvement are both independently related to nonresponse in the SHP. After taking into account differences in demographic characteristics, social integration has an independent effect on response pattern. This suggests that weighting by demographic characteristics does not completely make up for the response bias.

When explaining nonresponse in the SHP using demographic characteristics and attitudes and behaviour regarding social involvement, similar conclusions can be drawn as in the nonresponse reports of many other surveys (Groves, 2006; Hawkes and Plewis, 2006; Lillard and Panis, 1998; Neukirch, 2002; Watson and Wooden, 2009); there is a nonresponse bias in the Swiss Household Panel, but it seems mild, as seen from the small contribution demographic characteristics and social integration make to the explanation of response. For the most part, response seems random, or at least related to variables not included in this – and most other – attrition analyses.

Interesting differences emerged when comparing the different response patterns. In many ways the respondents who had an irregular response pattern positioned themselves in between the respondents who were interviewed in every wave and those who dropped out. To maintain the original composition of the panel it seems fruitful to invest in keeping this group of respondents in. Yet, it should be stressed that in some aspects they form a distinct group, including relatively many teenagers (living with their parents and with only compulsory school completed) and many married individuals.

Finally, converted refusals help to diminish the response bias. Demographic characteristics and levels of social involvement of the converted refusals are more

similar to those of respondents who dropped out of the panel permanently than to those of the loyal respondents, and hence their inclusion adjusts the sample to a certain extent. This is not true for all characteristics; for instance, converted refusals turn out to be somewhat older and are more likely to be married. This implies that they increase the overrepresentation of these already overrepresented groups. Overall, however, findings suggest that efforts made to convert refusals not only help in increasing the sample size, but also in diminishing the response bias. Some caution is warranted though. Because they are easiest to trace, there may be an overrepresentation of individuals who did not move since they were last interviewed. As moving tends to be related to several life events (birth, death, marriage, job changes) (Lepkowski and Couper, 2002), this group might be atypical in the sense that they have a lower likelihood of having experienced such events.

A noteworthy limitation of the study is that the attrition analysis was conducted as if it were an individual study. Yet the Swiss Household Panel samples households rather than individuals. The extent to which households attrite is an equally interesting question that has not received much attention so far (but see Lipps, 2009). What has not been taken into account in this study is the clustering of individuals within households and the response patterns of the households themselves. In the future, this would be a welcome extension to the current study. Another interesting direction for future research relates to changes over time. This study did not incorporate changes in circumstances, attitudes, and behaviour over the course of the panel study; these changes could very well be related to drop out of the panel.

Notwithstanding these limitations, however, this study provides insight into attrition in the Swiss Household Panel and shows that response bias in the SHP exists, and it cannot be reduced to demographic characteristics alone. As a whole, attrition patterns in the Swiss Household Panel are comparable to those in other panel studies.

The findings of this study have several implications for users of the Swiss Household Panel. The fact that there is some bias in the data does not mean that the results of analyses done using this panel cannot be trusted. The bias found in this study is small and not unlike those found in other panel studies. To minimize the bias when using the SHP, it is recommended to include respondents who did not respond in all waves as well as those who dropped out in later waves in the analyses. Although it might be convenient to limit analyses to those respondents with complete records, the inclusion of respondents with incomplete records provides more reliable results. Finally, weights should be used. They may not correct for bias in the measures of social participation, but they do correct the sample with regard to demographic characteristics.

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