

Item Nonresponse in the European Social Survey

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Item nonresponse is widely considered an important indicator of data quality. It decreases the available sample size for analyses and bears the risk of biased results if the missingness is not at random. The present study investigates item nonresponse rates in the first three rounds of the European Social Survey (ESS). The ESS is a biennial cross-national survey of attitudes and behaviours, first fielded in 2002. Our focus is on the average level of item nonresponse across 75 questions being part of the ‘core modul’ of the ESS questionnaire (cumulative item nonresponse). We describe the average amount of item nonresponse for all countries separately for the different types of item nonresponse: ‘don’t know’, ‘refusal’, and ‘no answer’. In addition we analyse the potential reasons for differences across countries in the main type of item nonresponse, i.e. ‘don’t know’ nonresponse. This is done by multi-level modelling; the three hierarchical levels of respondents, interviewers, and countries are distinguished.

Key words: item nonresponse • don’t know • refusal • no answer • European Social Survey

INTRODUCTION

Item nonresponse is the failure to obtain substantive answers to individual survey questions or items (Dillman et al. 2002: 12ff). It can be termed a ‘second-level nonresponse’ in contrast to unit nonresponse where no data at all is obtained for a sample person (de Leeuw et al. 2003: 155). There are no universally accepted rules to establish a border between item and unit nonresponse. Theoretically, a target person that has provided an answer to at least one question of a survey could be labelled a respondent (admittedly with a rather high level of item nonresponse).

However, in practice the requirements for a unit response are usually much stronger. Survey protocols often require that certain key questions and/or a certain proportion of questions are answered in order to classify a sampling unit as a respondent (AAPOR 2008; Dillman et al. 2002: 12).

Item nonresponse can originate in different phases of the survey life cycle. Often item nonresponse results from problems in the question-answer process during data collection (de Leeuw et al. 2003: 158f). A question may be overlooked by an interviewer, a respondent does not know the answer to a particular question, or a respondent is not willing to communicate an answer. In these cases information for a certain question is not provided at all. In other cases an information is provided; however, during the data editing phase when collected data are checked for errors and inconsistencies, it turns out that the information cannot be used. For instance, these checks may show that values are out of range or logical inconsistencies do exist between answers to different survey questions. In these cases it may be decided to assign a 'missing data' code replacing a substantial answer. And, of course, sometimes it may also happen that during the data processing phase usable information is lost because of errors introduced during data editing by survey organisations, researchers, or data archives.

Usually three different types of item nonresponse are distinguished, depending on the reasons for the lack of information: 'don't know', 'refusal', and 'no answer'. In the case of a 'don't know' a respondent is willing but unable to respond to an individual survey question. Memory problems when asked about past behaviour or the lack of an opinion on a particular issue addressed in an attitude question are examples of this type of nonresponse. In the case of a 'refusal', the respondent has the relevant information but is not willing to communicate an answer to a question, e.g. because of the sensitive nature of the information (e.g. information on income or voting intentions).¹ The third type of item nonresponse – 'no answer' – can be considered a rest category. It contains, e.g., missing values due to the fact that the interviewer / respondent did not correctly follow the skip patterns of a questionnaire and thereby missed one or several questions. It may also be assigned during data editing if substantial answers turn out to be implausible, as described above.

Sometimes the definition of item nonresponse is tricky, especially as regards 'don't know' responses. Choosing a 'don't know' option may not always be interpreted as item nonresponse since there may be questions in a survey where 'don't know' can be taken as a meaningful response. This can be the case, e.g., with questions about voting intentions where the percentage of respondents not favouring a certain candidate or party has informational value on its own. Or there may be attitude questions where not every respondent can be expected to have an opinion on the issue dealt with. 'Don't know' may be a valid and accurate response when respondents genuinely have no opinion on the issue at hand. However, there

is a controversy over whether ‘don’t know’ mainly reflects the absence of a real opinion (Converse 1964, 1970) or whether the use of ‘don’t know’ primarily is a form of a ‘satisficing’ behaviour (Krosnick 1991; Krosnick et al. 2002). The latter will occur mainly when respondents have a low ability or low motivation to exert the cognitive efforts necessary to answer a question or when questions are particularly difficult.

Regardless of which perspective is true, item nonresponse is a concern for survey research since it decreases the available sample size for analyses. In multivariate analyses even low rates of missings at individual survey questions can result in a substantial decrease of the available sample size if ‘listwise deletion’ of cases is used (Borgers and Hox 2001). In addition, item nonresponse bears the risk of biased results if the missingness does not occur at random (de Leeuw et al. 2003; Stocké and Stark 2005). Therefore, high and/or selective item nonresponse should be avoided.

In cross-national research the situation is more complex than in single nation studies. Differential item nonresponse rates may reduce the available sample sizes differently across countries. Comparisons between countries can be endangered when the bias due to item nonresponse differs across countries (Stocké and Stark 2005). If any of the national studies are flawed, both similarities and differences between countries can be methodological artifacts. Common survey protocols across countries are needed in order to tackle the potential problem of item nonresponse in a coherent and comparable manner.

In the present paper we analyse item nonresponse in the first three rounds of the European Social Survey (ESS). We aim at answering the following questions. First: How large is the amount of item nonresponse in the ESS? Do countries vary in the level of item nonresponse? And second: What explains the differences in item nonresponse rates across countries?

In order to answer these questions we will not analyse individual survey items. Instead, our focus is on the *average* level of item nonresponse across 75 questions being part of the ‘core modul’ of the ESS questionnaire (a ‘cumulative count approach’, Wood (2005)). We first describe the average amount of item nonresponse for all countries; here we report both the total item nonresponse rates and the rates for the different types of item nonresponse: ‘don’t know’, ‘refusal’, and ‘no answer’. Subsequently, when analysing possible reasons for the differences in item nonresponse rates between countries, we concentrate on the main type of item nonresponse, which is ‘don’t know’ nonresponse.²

The paper is organised as follows. Section 2 summarises what is known about the causes and correlates of item nonresponse and derives some hypotheses for the empirical analyses. Section 3 introduces the database and describes the methodology for the analyses. The results are presented in section 4, and a summary and discussion are provided in section 5.

PREVIOUS RESEARCH

De Leeuw (2001), de Leeuw et al. (2003: 160ff) and Dillman et al. (2002: 13f) summarise the potential causes and correlates of item nonresponse. They distinguish four basic factors which determine the level of item nonresponse: the respondent, the interviewer, features of the questions and the questionnaire, and the mode of data collection. In the following we provide a brief overview of the previous research along these four factors and discuss which implications the existing findings might have for differences in item nonresponse rates between countries in a cross-national survey like the ESS.³

Providing a substantive answer to a survey question requires the respondent to go through several steps of cognitive processing and decision making (see Beatty and Herrmann 2002). The question has to be interpreted, relevant information has to be retrieved and edited, and finally the response has to be communicated. Respondents may differ in their ability and motivation to go through this process and provide a substantive answer. Past research has repeatedly shown that elderly respondents and less educated respondents tend to have higher item nonresponse rates. In addition, it has been demonstrated that reluctant respondents or converted refusers tend to have higher item nonresponse rates compared to more cooperative respondents (Mason et al. 2002; Keeter et al. 2006). Sometimes women exhibit higher nonresponse rates than men (Francis and Busch 1975: 211; Pickery and Loosveldt 1998, 2001, 2004; Stocké and Stark 2005: 16). In several studies dealing with political topics also the political interest of respondents proved to be relevant for the level of item nonresponse: respondents with high interest in politics have lower item nonresponse rates than respondents with low interest (Francis and Busch 1975; Pickery and Loosveldt 2001; Stocké and Stark 2005).

If the countries participating in the ESS differ in the composition of their samples in terms of sex, age, education, and political interest, or in the extent in which they made an effort to convert initially reluctant sample persons into respondents, this can lead to differences in item nonresponse rates across countries.

In interviewer-mediated surveys like the ESS, the interviewer is another source of item nonresponse. Survey organisations differ in the prescribed protocols to handle unanswered questions. Some survey organisations may encourage their interviewers to use (multiple) probes if the respondent does not provide a substantial answer to a question. Other organisations may instruct their interviewers to accept every (missing) answer they receive. In comparing the results of different US survey organisations asking the same questions Smith (1982), for instance, found one large and systematic ‘house effect’: the number of ‘don’t know’ answers. Apart from such differences regarding the general policy of a survey agency, there will also be differences between individual interviewers (Pickery and Loosveldt 1998, 2001,

2004). Interviewers differ in their ability to develop a high level of rapport with respondents. Also, interviewers differ with regard to the carefulness in fulfilling their job and their willingness to obey the survey protocol. An interviewer may cause missing data if he/she fails to ask a question, fails to probe (Sanchez and Morchio 1992), or fails to record an answer. All this can happen incidentally or deliberately.

When the behaviour of interviewers differs across countries, e.g. because of differences in the survey protocol (e.g. the recommendation on when to probe), differences in interviewer experience or differences in interviewer training, payment and supervision, differences in item nonresponse rates between countries may result.

It is self-evident that also the questionnaire and the individual questions determine the level of item nonresponse. Item nonresponse rates vary between questions which deal with different topics, use different formats, or require more or less effort to be answered ('question difficulty'). Questions involving psychological threat (e.g. questions on income or questions on law violations) or dealing with low-saliency issues, open questions, or questions requiring intensive efforts to retrieve information ('how many times have you visited a doctor in the last three years?') will result in above-average nonresponse rates. Generally, it is safe to conclude that a well-designed questionnaire will help to reduce respondent and interviewer errors. An important aspect for the level of item nonresponse is whether or not a 'don't know' and/or a 'refusal' option is routinely offered to the respondents.⁴ Some researchers like Krosnick (2002) have emphasised that offering such a category can provide an easy way out so that respondents do not exert the effort required to produce a substantive answer and prefer to come up with a 'don't know' ('satisficing').⁵

In the ESS the formulation and format of the questions is standardised across countries. However, this does not preclude that the topic threat and/or the saliency of questions may vary across countries, and/or that the provision of item missing data options is handled differently between countries. If this is the case, differential item nonresponse rates across countries can result.

Finally, the mode of data collection makes a difference. Interviewer-administered surveys (both face-to-face and telephone) tend to have less item nonresponse than self-administered surveys. In self-administered surveys the respondent has to decide on its own whether to read all questions and to record an answer. In contrast, interviewers usually are instructed to read out all the questions, and normally they are required to probe if a respondent does not provide an adequate answer. Furthermore, computer-assisted interviewing generally results in less item nonresponse than paper-and-pencil interviewing (Brener et al. 2006; Lynn 1998; Smith and Kim 2003). The computer programme usually prevents the occurrence

of routing errors, and the implementation of range and consistency checks replaces much of the post-editing which is otherwise necessary.

In the ESS the prescribed mode of interviewing is face-to-face interviewing for all countries. However, countries are free to choose using PAPI or CAPI. We expect countries using CAPI to have lower item nonresponse rates than countries using PAPI.

DATA AND METHODS

We use data from the first three rounds of the European Social Survey (ESS).⁶ The ESS is a biennial multi-country survey covering over 30 nations. The survey is designed to chart and explain the interaction between Europe's changing institutions and the attitudes, beliefs and behaviour patterns of its diverse populations (Jowell et al. 2007).⁷ The target population in each country consists of all persons aged 15 and over resident within private households. The first three rounds of data collection were implemented in 2002/2003, 2004/2005 and 2006/2007. More than 20 European countries participated in each round. The national sample sizes varied between a low of around 600 interviews to a high of around 3,000 interviews, with most countries having completed about 1,500 to 2,000 interviews. The average interview length was around 70 minutes.

The ESS questionnaire of each round includes two main sections, each consisting of approximately 120 items; a 'core' module which remains relatively constant from round to round, plus two or more 'rotating' modules, repeated at intervals. The core module aims to monitor change and continuity in a wide range of social variables. Apart from demographic and socio-economic variables, the core module comprises 75 variables fielded in each of the first three rounds of ESS, which form the basis for our analyses. These variables include a broad range of attitudes, values, behaviour patterns, and factual issues, with a specific emphasis on political aspects.⁸ They cover information on media use; social and public trust; political interest and participation; socio-political orientations, governance and efficacy; moral, political and social values; social exclusion, national, ethnic and religious allegiances; well-being, health and security.

Regarding the item nonresponse definitions, the ESS follows the usual differentiation in three types of item nonresponse: 'don't know', 'refusal', and 'no answer' (see 'ESS data protocol' at <http://ess.nsd.uib.no>). A 'don't know' is to be assigned to a question when a respondent is willing but unable to respond. This code is explicitly provided for 73 of the 75 questions. However, it is important to note that the code is only included in the ESS questionnaire and not on the showcards for the respondents. This means that normally only the interviewer can see this code but not the respondent. The interviewer is instructed not to read it out.

The ‘refusal’ code is to be used when an answer is available but not communicated by a respondent. This code is explicitly provided only for three of the 75 questions, namely questions judged to be of a sensitive nature.⁹ These were the question on the party voted for in the last national election, the question on party affiliation and the question on party membership. Also the ‘refusal’ code is a pre-coded but unread response category. Finally, the ‘no answer’ code is available for all other forms of missing data, like interviewer errors or production/system errors.

In the following we investigate the incidence of these three different types of item nonresponse. We include in our analyses the data from 17 countries, which participated in each of the first three rounds of the ESS. These were Austria, Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom. All our results are based on data weighted with the ESS design weight, which corrects for different probabilities of selection within a country.

In our analyses we do not examine nonresponse to individual survey items. Instead, we investigate nonresponse over multiple items, i.e. we look at the average level of nonresponse across all 75 items.¹⁰ In doing this, general patterns of nonresponse can be identified irrespective of individual questions and their specific ‘sensitivity’ for nonresponse. This approach recognises that different factors may determine the general level of item nonresponse vs. the level of nonresponse for a specific question (Wood 2005). It might well be that, e.g., respondents from a higher socio-economic status are more reluctant to provide specific information about their income whereas at the same time they are more capable and willing to answer a wide range of other questions.

RESULTS

Descriptive overview

How large is the amount of item nonresponse in the European Social Survey? To get a first insight we counted the number of missing answers (don’t know, refusal, no answer) across the 75 items of the core. Table 1 shows the resulting distribution of overall item nonresponse for the first three rounds of the ESS. The table is based on all respondents from the 17 countries which fielded the ESS in each round (1-3).

In each round slightly more than half of the respondents (54 percent in ESS 1, 56 percent in ESS 2, and 58 percent in ESS 3) are not affected by a missing value at any of the 75 items. Approximately 18 percent of the respondents have a non-substantive answer at one item, another 9 to 10 percent at two items. At the other side of the continuum, only 3 to 4 percent of the respondents exhibit a missing value at eight items or more (that is at ten or more percent of all items). Thus, the

Table 1 Overall item nonresponse in core module of ESS 1-3 (percentage of respondents with 0, 1, 2, ... items with missing answers)

	ESS 1 (%)	ESS 2 (%)	ESS 3 (%)
No missing value at any item	54.3	56.1	58.2
Missing value at 1 item	17.8	18.3	17.5
Missing value at 2 items	9.6	9.4	8.7
Missing value at 3 items	5.8	5.3	5.0
Missing value at 4 items	3.4	3.3	2.9
Missing value at 5 items	2.3	2.1	2.1
Missing value at 6 items	1.6	1.4	1.4
Missing value at 7 items	1.2	1.1	1.0
Missing value at 8 or more items	4.0	3.0	3.2
Total (N)	33,174	32,503	32,882

distribution of overall item nonresponse is rather right-skewed. Countries differ in the distribution of item nonresponse. In ESS 3, e.g., Norway is the country with the lowest overall item nonresponse. In Norway as many as 76 percent of all respondents have no missing data at all. In contrast, in Portugal, the country with the highest prevalence of item nonresponse in ESS 3, only one third of all respondents do not exhibit any item nonresponse.

In order to facilitate the provision of country-specific results, we calculated *average* nonresponse rates.¹¹ In addition to the total item nonresponse rate, results for the three different types of item nonresponse (don't know, refusal, no answer) were computed. Table A1 in the appendix provides the results in detail, and table 2 gives a condensed overview. Table 2 shows the average rates across all countries in each round, plus the results for the countries with the lowest and highest item nonresponse rate in each round. In all three rounds of the ESS, the level of item nonresponse is rather similar. The mean item nonresponse rate across all countries is 2.2 percent in ESS 1, and 1.8 percent both in ESS 2 and 3.¹² 'Don't know' nonresponse constitutes the largest part of item nonresponse. The average rate is 1.8 percent in ESS 1, 1.4 percent in ESS 2, and 1.5 percent in ESS 3. Item nonresponse due to 'refusals' and 'no answer' only plays a minor role (0.2 percent or less in each round).

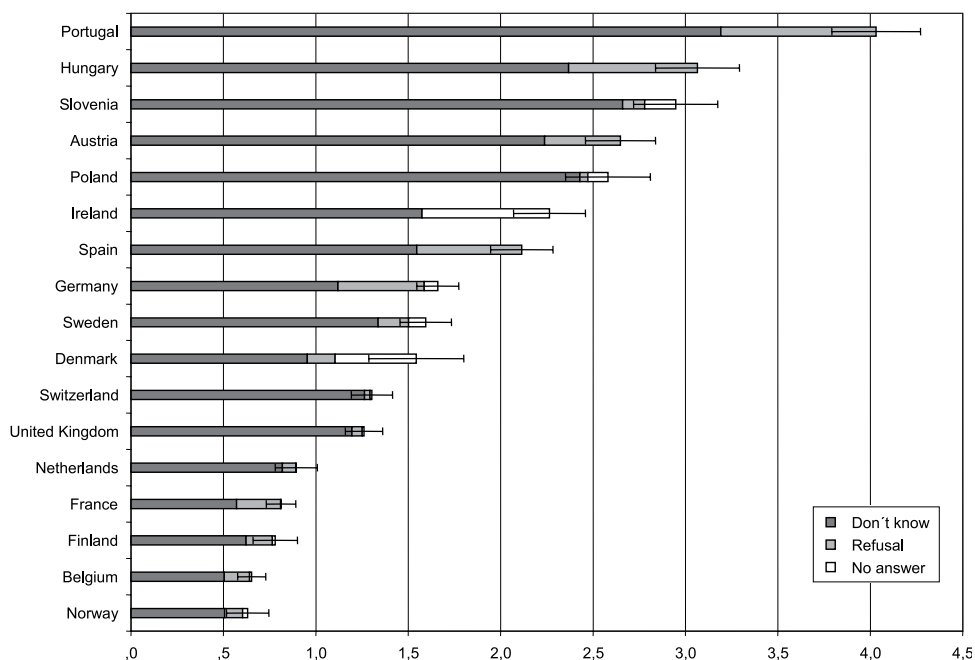
Figure 1 displays the country-level results for ESS 3. The figure shows the three types of item nonresponse as a stacked bar graph plus the confidence intervals for the total item nonresponse rate.¹³ The percentage of total item nonresponse varies across countries (see the confidence intervals, which do not overlap for quite a number of countries). The range is from a low of 0.6 percent to a high of 4.0 percent.

Table 2 Item nonresponse rates in ESS core modul, ESS 1-3*

		ESS 1 (%)	ESS 2 (%)	ESS 3 (%)
Don't know	Lowest value in a country	0.5	0.4	0.5
	Highest value in a country	3.3	2.7	3.2
	Mean value across all countries	1.8	1.4	1.5
Refusal	Lowest value in a country	0.0	0.0	0.0
	Highest value in a country	0.9	0.5	0.8
	Mean value across all countries	0.2	0.2	0.2
No answer	Lowest value in a country	0.0	0.0	0.0
	Highest value in a country	0.8	1.0	0.7
	Mean value across all countries	0.2	0.2	0.1
Total item nonresponse	Lowest value in a country	0.6	0.6	0.6
	Highest value in a country	4.0	3.1	4.0
	Mean value across all countries	2.2	1.8	1.8

* The mean value is the arithmetic average across all countries, i.e. each country was given the same weight in the calculation.

Figure 1 Item nonresponse rates in core modul of ESS 3 per country ('don't know', 'refusal', 'no answer'; in percent)



The lowest rate is observed in Norway, followed by Belgium, Finland, France, and the Netherlands, which also exhibit a rate of less than 1.0 percent. The highest item nonresponse rate pertains to Portugal. Also Hungary and Slovenia (both around 3 percent), and Austria and Poland (around 2.5 percent) show a rate well above the average. In each country ‘don’t know’ forms the major part of item nonresponse, varying from 0.5 to 3.2 percent. In most countries ‘refusal’ and ‘no answer’ nonresponse only plays a minor role (0.2 percent or less). Noticeable exceptions in this respect are Austria, Germany, Hungary, Portugal, and Spain, which exhibit an average ‘refusal’ rate between 0.4 and 0.8 percent. A comparatively high level of ‘no answer’ nonresponse is observed in Denmark (0.4 percent) and Ireland (0.7 percent).

Multivariate analyses

In the present situation, with nested data from a cross-national survey, multi-level modelling is appropriate to examine the potential reasons for the country differences in item nonresponse. The three hierarchical levels which we distinguish are respondents (nested within interviewers), interviewers (nested within countries), and countries. We analyse the data from each round of the ESS separately, and check how stable the results are across rounds.

Since it seems plausible that the different types of item nonresponse have different determinants, it is advisable to analyse them separately (Shoemaker et al. 2002; Stocké and Stark 2005, and Stocké 2006). We confine our analyses to ‘don’t know’ nonresponse, which is the largest part of item nonresponse in each country in each round of ESS.¹⁴ Our dependent variable is the cumulated number of ‘don’t know’ nonresponse for the 75 questions from the ESS core module. Since this variable consists of non-negative integers with a rather skewed distribution, Hierarchical Nonlinear Modelling techniques with Poisson distributions are appropriate (Pickery and Loosveldt 1998). In our analyses we use Poisson models with variable exposure to take the different number of applicable items per respondent into account. We also control for overdispersion, which means that the variance component at the respondent level is not restricted.

The selection of our independent variables is guided by the results of previous research as described in section 2 above. According to this, the respondent, the interviewer, the questions and the questionnaire, and the mode of data collection are critical for the level of item nonresponse. In the following we include information on the respondent, the interviewer and the mode of data collection as determinants for item nonresponse. We are not able, however, to consider aspects of the questions and the questionnaire, like differential topic threat or differential saliency of questions across countries, since we do not have information on these issues.

On the respondent level, we include the variables gender, age, and educational level.¹⁵ Since a great deal of the analysed variables refer to political issues, we also consider the political interest of the respondents.¹⁶ Information on the reluctance of respondents (in particular whether a respondent is a converted refuser or not) is only available in a minority of countries so that we cannot follow up this aspect.

On the level of interviewers, only an interviewer identification number is available in the ESS data. Hence, in our analyses we can only check whether or not variation in item nonresponse rates on the interviewer level can be observed. However, we are not able to analyse further which features of interviewers (like their personal characteristics, attitudes and behaviour) might be responsible for the variation.

Finally, on the country level we distinguish whether the data were collected by using a laptop or not, i.e. CAPI vs. PAPI. In each of the first three rounds of the ESS, the majority of the 17 countries (nine countries in ESS 1 and eleven countries each in ESS 2 and 3) used CAPI and the other countries used PAPI.

Table 3 provides the results of our analyses for ESS 3. The results for ESS 1 and ESS 2 are pretty similar, therefore, we do not discuss them here in detail (see table A2 and A3 in the appendix).¹⁷ The coefficients of the fixed part of the models correspond to the mean number of item nonresponse. They are in log linear

Table 3 Three-level poisson regression on number of item nonresponse (ESS 3): Coefficients plus standard errors (in parentheses) and event rate ratios (in italics)

	Model 1	Model 2	Model 3
Fixed part			
Intercept	-4.61 (0.13) <i>0.01</i>	-4.81 (0.12) <i>0.01</i>	-4.81 (0.09) <i>0.01</i>
Gender (male*)		0.35 (0.02) <i>1.42</i>	0.35 (0.02) <i>1.42</i>
Age (in years)		0.01 (0.00) <i>1.01</i>	0.01 (0.00) <i>1.01</i>
Education		-0.22 (0.02) <i>0.80</i>	-0.22 (0.02) <i>0.80</i>
Political interest		-0.48 (0.02) <i>0.62</i>	-0.48 (0.02) <i>0.62</i>
Mode (CAPI*)			0.67 (0.15) <i>1.96</i>
Random part			
Country σ_{v0}^2	0.30	0.22	0.12
Interviewer σ_{u0}^2	0.54	0.53	0.53
Respondent σ_e^2	2.61	2.13	2.13

* reference group

$N_{\text{Respondent}} = 32,473$; $N_{\text{Interviewer}} = 2,480$; $N_{\text{Country}} = 17$

For all fixed effects and variance components at the interviewer and country level: $p < .01$

(Please note that no p-value for the variance component at the respondent level can be computed).

metric and should be exponentiated for easy interpretation (yielding the so called event rate ratios). The event rate ratios can be interpreted in such a way that a one unit increase in the independent variable multiplies the expected number of item missings by the event rate ratio ($= \exp(\beta_j)$). A positive coefficient increases the expected number of item nonresponse, a negative coefficient decreases the expected number of item nonresponse.

Our first model in table 3 is a ‘random intercept only’ model which serves as a benchmark for the intraclass correlation and the decomposition of the variances at the three different levels. In a second model we include the socio-demographic variables gender, age, and education as well as the political interest of the respondent, which allows us to control for sample composition effects. In our third and final model we additionally include the mode of data collection (CAPI vs. PAPI) as an independent variable on the country level.¹⁸ The upper part of table 3 includes the fixed part of the models and the lower part contains information on the random part of the models. In the three-level models the proportion of variance (the intraclass correlation) for level 2 and level 3 are calculated as:

$$\rho_{\text{interviewer}} = \frac{\sigma_{u0}^2}{\sigma_{v0}^2 + \sigma_{u0}^2 + \sigma_e^2} \quad \rho_{\text{country}} = \frac{\sigma_{v0}^2}{\sigma_{v0}^2 + \sigma_{u0}^2 + \sigma_e^2}$$

(Algina 2000, cited in Hox 2002: 32)

Thus, in model 1 about 8.7 percent of the variance in our dependent variable (number of items with missing information) is at the country level and about 15.7 percent is at the interviewer level. Most of the variance, about 75.6 percent, is located at the respondent level.

Once the socio-demographic variables and the political interest of respondents are included (model 2), the variance at the country level is reduced to 7.6 percent (compared to 8.7 percent in model 1). This means that to some extent the variance in the number of item nonresponse can be attributed to differences between countries in the sample composition according to these four variables. All effects we observe in model 2 are in the expected direction. For example, the probability for item nonresponse for females is about 1.4 times higher than for males. The age of the respondent has a positive effect on the probability to deliver missing information. The education of the respondent has a negative effect. With each increase in the level of education, the probability for item missing information reduces by 0.8. Also the political interest of a respondent is negatively related to item nonresponse: the higher the level of political interest, the lower the level of item nonresponse.

Model 3 shows that there is also a remarkable reduction in the country level variance after including the mode variable (CAPI vs. PAPI). Only 4.3 percent of the

variance in the number of item nonresponse remain at the country level. There is no change in the variance component at the respondent and at the interviewer level because country level variables cannot predict lower level variation. In countries where data were collected with paper-and-pencil questionnaires the probability for item nonresponse is about twice as high than in countries using computer-assisted interviewing.

We found significant random coefficients or variance components for the respondent characteristics at the interviewer and at the country level (results not shown). This means that, e.g., the effect of education varies between interviewers and between countries. Therefore, we also tried to calculate random coefficient models. Regrettably, as we do not possess any further data on interviewer characteristics, we could not analyse cross-level interactions between interviewers and respondents. And all the cross-level interactions which we could check between PAPI/CAPI on the one hand and the respondent variables on the other hand proved to be non-significant (results not shown). Therefore, with the present data we are not able to clarify the random parts of our models any further.

SUMMARY AND DISCUSSION

This article analysed item nonresponse in the first three rounds of the ESS. We examined the cumulated nonresponse over 75 items of the core module of the ESS which are fielded in every round of the survey. The major findings are:

(1) Item nonresponse rates in the ESS are rather low. The average item nonresponse rate (including ‘don’t know’, ‘refusal’, and ‘no answer’ nonresponse) across all 17 countries is around two percent in ESS 1 to 3. ‘Don’t know’ forms the major part of nonresponse in all countries in all three rounds of the ESS. The average ‘don’t know’ rate across all countries varies between 1.4 and 1.8 percent in ESS 1 to 3. The highest rate observed in a country is 3.3 percent. This rate does not exceed the ‘don’t know’ rates reported for high quality national surveys like the British Social Attitudes Survey (BSA) or the American General Social Survey (GSS).¹⁹ The ESS countries with low levels of ‘don’t know’ (around 0.5 percent) even show rates considerably lower than the figures reported for the BSA Survey and the GSS.

(2) Multilevel modelling reveals that the differences in ‘don’t know’ responses between the ESS countries are related both to sample composition effects and the use of different survey modes, i.e. CAPI vs. PAPI. In accordance with previous research (see section 2), we found a positive effect on the number of ‘don’t know’ of being female, being older, having a lower level of education and being less interested in politics.²⁰ Differences in the composition of the samples with regard to these characteristics are one reason for the differences in ‘don’t know’ rates

across countries. Another reason is the use of computer-assisted vs. paper-and-pencil interviewing. In countries using PAPI, the ‘don’t know’ rate is on average nearly twice as high as in countries using CAPI. This result (as well as all the other relationships we found) is not an idiosyncrasy of a particular round of the ESS – the effect can be observed in all three rounds of the ESS. Thus, the relationship deserves some discussion, as follows.

(3) It seems self-evident that CAPI leads to lower item nonresponse by eliminating routing errors of interviewers (given a properly programmed CAPI software). As items cannot be skipped or left blank, CAPI reduces the level of ‘no answer’ item nonresponse (Nicholls II et al. 1997). Less clear is why and how CAPI should also lead to lower levels of ‘don’t know’ nonresponse, as we found in the present analyses. In the past two decades several large survey programmes made a transition from PAPI to CAPI, often accompanied by methodological research on the potential effects of this change on data quality. As far as item nonresponse and more specifically the level of ‘don’t know’ responses are concerned, either no differences between PAPI and CAPI were found (Baker et al. 1995; Martin et al. 1993) or fewer ‘don’t know’ responses were observed in CAPI than in PAPI (Lynn 1998; Smith and Kim 2003). The researchers reporting lower ‘don’t know’ rates speculate whether a special feature of CAPI implementation plays a role for this result. In CAPI applications often a specific function key is reserved for ‘don’t know’ answers so that ‘don’t know’ does not appear as a response option on the main screen. In contrast, in PAPI ‘don’t know’ usually is a precoded but unread response category in the questionnaire. Smith and Kim (2003: 2) argue that “... it is likely that interviewers find the integrated DK responses on PAPI more cognitively accessible because it is explicitly offered and perhaps more acceptable as a legitimate response since it is physically located along with the other response options.” Unfortunately, we cannot check for the ESS whether such implementation features play a role since screen shots of the CAPI programs used in the countries are not made accessible. Apart from such technical differences, it is sometimes also discussed whether a survey administered with a laptop is perceived differently by respondents than a paper-and-pencil survey. Lower ‘don’t know’ rates in CAPI might be a consequence of respondents perceiving that the computer requires one to answer (Lynn 1998), of respondents perceiving CAPI interviews as more confidential (Baker et al. 1995), or of the use of laptop computers making the survey seem more important, more objective, or more scientific (Tourangeau and Smith 1998).

Finally, we should note in this context that we cannot definitely rule out that the differences in the level of ‘don’t know’ between CAPI and PAPI countries which we observe may also be the consequence of other, non-observed factors. The use of PAPI vs. CAPI is not randomly assigned to countries in the ESS. PAPI

is mainly used in the Central European countries, whereas CAPI is mainly used in the Western and Northern European countries. This implies that also other factors, like cultural differences between countries or ‘house effects’ of the different survey organisations fielding the ESS, can play a role. Further evidence, however, that PAPI/CAPI differences are actually relevant when explaining the country differences in the ESS is found when we look at the two countries which changed the survey mode in the first three rounds of the ESS. Both Belgium and Spain switched from PAPI to CAPI between round 1 and round 2. In both countries this switch was accompanied by halving the number of ‘don’t know’ responses. In Belgium the rate dropped from 1.7 percent to 0.8 percent, and in Spain it decreased from 3.3 percent to 1.7 percent. These two shifts pertain to the most pronounced changes in the level of ‘don’t know’ in the first three rounds of the ESS (see table A1 in the appendix).

(4) We could only rudimentary analyse the role of the interviewer for item nonresponse. Although we found a noticeable variance component for the number of ‘don’t know’ responses on the level of interviewers, we were not able to examine in detail the reasons for this result. Future research could profit if at least some information on characteristics of interviewers and preferably also on their behaviours and attitudes (in particular towards their role as an interviewer) could be made available. Such an approach could be linked to a similar enterprise dealing with the influence of interviewers’ attitudes and behaviours on unit nonresponse (see Hox and de Leeuw 2002).

NOTES

- 1 In a paper using questions as units of analyses Shoemaker et al. (2002) could show that the proportion of ‘don’t know’ responses was positively correlated with the independently judged question difficulty, and the proportion of ‘refusals’ was positively correlated with question sensitivity (but also with question difficulty, what was not expected by the authors).
- 2 Shoemaker et al. (2002), Stocké and Stark (2005) and Stocké (2006) have argued that question ‘refusal’ and ‘don’t know’ have different determinants and should, therefore, be analysed separately.
- 3 We do not repeat in detail the research literature described in the overviews mentioned above. For the individual references see these overviews. We only add some references pertaining to new publications and/or references pertaining to aspects not dealt with in the overviews.
- 4 This may sometimes be required by institutional review boards for the protection of human subjects.
- 5 These answers could be called ‘false negatives’, i.e. people with an attitude who decline to express an opinion (Gilljam and Granberg 1993). They would be the counterpart to ‘false positives’, i.e. people expressing opinions while lacking an underlying attitude (see the concept of ‘nonattitudes’ introduced by Converse 1964). Beatty and Herrmann (2002) refer to these two types of errors as ‘errors of omission’ and ‘errors of commission’.

- 6 European Social Survey Round 1 Data (2002). Data file edition 6.1; European Social Survey Round 2 Data (2004). Data file edition 3.1; European Social Survey Round 3 Data (2006). Data file edition 3.2. Norwegian Social Science Data Services, Norway – Data Archive and distributor of ESS data.
- 7 The project is directed by a Central Coordinating Team, led by the Centre for Comparative Social Surveys at City University, London. In each participating country, a National Coordinator is responsible for the conduct of the national survey to a common standard.
- 8 The 75 variables comprise the majority of questions from section A, B, and C of the ESS 1, 2, and 3 questionnaires (see the questionnaires at <http://ess.nsd.uib.no>).
- 9 The ESS ‘project instructions’ require that interviewers had to be instructed that even at questions where a ‘refusal’ code was not provided explicitly in the questionnaire (and similarly, in the rare event when a ‘don’t know’ category was not explicitly provided) they had to note a respective nonsubstantive answer if it did occur, either on the questionnaire (PAPI) or using e.g. the notepad facility in CAPI (see ESS ‘project instructions’ at <http://www.europeansocialsurvey.org>).
- 10 Such an approach was also used, e.g., by Francis and Busch 1975; Jäckle and Lynn 2008; Stocké and Stark 2005, and Wood 2005.
- 11 When calculating these rates, we took the number of applicable items into account. A few questions of the core were relevant only for a subgroup of respondents. For instance, only persons who declared that they were a member of a political party were asked which one this was. The number of applicable items per respondent ranges from 65 to 75 items. For the great majority of respondents (85.9 percent in ESS 1, 83.7 percent in ESS 2, and 88.2 percent in ESS 3) the number of applicable items varies between 69 and 71 items. We determined the item nonresponse rate of each respondent by dividing the number of items with missing answers by the number of applicable items.
- 12 Also at the level of individual countries usually only modest changes in the average item nonresponse rate can be observed (see table A1 in the appendix). Between ESS round 1 and 2, 13 of the 17 countries exhibit a change of 0.5 percentage points or less. Only three countries show a change of 1.0 percentage points or more. Between ESS 2 and 3, 15 countries change by no more than 0.5 percentage points, no country changes by more than 1.0 percentage points.
- 13 The confidence intervals should only be treated as a rough approximation since they were calculated assuming simple random sampling in all countries. The majority of countries in the ESS, however, use complex sample designs, and in these countries the actual confidence intervals will probably be larger. We were not able to adjust for these complex sample designs since the ESS data set does not include the required information.
- 14 One should also take note that ‘don’t know’ nonresponse is a type of nonresponse relevant for nearly all our questions. In contrast, ‘refusal’ and ‘no answer’ are more question-specific types of item nonresponse. This makes them less well suited for the kind of analyses performed here, that is to say, analysing cumulative nonresponse over a large number of items.
- 15 Education is measured according to the (slightly modified) ISCED-97 standard. Seven levels are distinguished: 0 Not completed primary education; 1 Primary or first stage of basic; 2 Lower secondary or second stage of basic; 3 Upper secondary; 4 Post secondary, non-tertiary; 5 First stage of tertiary; 6 Second stage of tertiary.
- 16 Political interest is an ordinal variable with four categories: 1 not at all interested; 2 hardly interested; 3 quite interested; 4 very interested.

- 17 A combined analysis of data from all three rounds of the ESS showed no significant interaction between the independent variables and a variable which indicated the round of the ESS.
- 18 For models like the present one no information for model fit in terms of deviance is available (for HLM 6.06 which is used here see Raudenbush et al. 2004: 112).
- 19 Lynn (1998) reports an average of 3.2 (CAPI) vs. 4.8 (PAPI) percent of ‘don’t know’ answers for 90 attitude items in the British Social Attitudes Survey. Smith / Kim (2003) refer to a mean of 2.6 (CAPI) vs. 4.4 (PAPI) percent of ‘don’t know’ answers to 49 items from the General Social Survey in the US.
- 20 It should be mentioned that the effects of respondent characteristics on the number of ‘don’t know’ which we found also mean that item nonresponse in the ESS does not occur totally at random. However, in the present paper we do not follow up the issue of potential bias introduced by differential item nonresponse (for a relevant example relating to a cross-national survey see Stocké and Stark 2005).

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APPENDIX

Table A1 Item nonresponse rates in ESS core modul, ESS 1-3 (in percent)*

Country	ESS 1				ESS 2				ESS 3			
	Don't know	Refusal	No answer	Total item nonresponse	Don't know	Refusal	No answer	Total item nonresponse	Don't know	Refusal	No answer	Total item nonresponse
Austria	2.1	0.9	0.0	3.0	2.4	0.5	0.0	2.9	2.2	0.4	0.0	2.6
Belgium	1.7	0.2	0.4	2.2	0.8	0.2	0.0	1.1	0.5	0.1	0.0	0.7
Denmark	1.5	0.1	0.5	2.1	1.3	0.1	0.2	1.6	1.0	0.2	0.4	1.5
Finland	0.9	0.1	0.0	1.0	0.7	0.1	0.0	0.9	0.6	0.1	0.0	0.8
France	1.0	0.2	0.2	1.3	0.8	0.1	0.0	0.9	0.6	0.2	0.0	0.8
Germany	0.9	0.3	0.0	1.2	1.2	0.3	0.0	1.6	1.1	0.5	0.1	1.7
Hungary	3.3	0.3	0.2	3.8	1.7	0.5	0.2	2.5	2.4	0.7	0.0	3.1
Ireland	1.8	0.1	0.8	2.7	1.6	0.1	1.0	2.6	1.6	0.0	0.7	2.3
Netherlands	1.0	0.0	0.0	1.0	0.8	0.1	0.0	1.0	0.8	0.1	0.0	0.9
Norway	0.5	0.1	0.0	0.6	0.4	0.1	0.0	0.6	0.5	0.1	0.0	0.6
Poland	3.2	0.0	0.1	3.4	2.7	0.0	0.1	2.9	2.4	0.0	0.1	2.6
Portugal	2.6	0.4	0.7	3.7	2.1	0.3	0.7	3.1	3.2	0.8	0.0	4.0
Slovenia	2.2	0.1	0.6	2.9	2.2	0.2	0.4	2.9	2.7	0.1	0.2	2.9
Spain	3.3	0.7	0.0	4.0	1.7	0.5	0.3	2.6	1.5	0.6	0.0	2.1
Sweden	1.3	0.3	0.0	1.6	1.1	0.1	0.1	1.3	1.3	0.2	0.1	1.6
Switzerland	1.6	0.0	0.0	1.6	1.5	0.0	0.0	1.5	1.3	0.0	0.0	1.3
United Kingdom	0.9	0.1	0.0	1.0	1.3	0.1	0.0	1.4	1.2	0.1	0.0	1.3
Total 1	1.8	0.2	0.2	2.2	1.4	0.2	0.2	1.8	1.5	0.2	0.1	1.8
Total 2	1.7	0.2	0.2	2.1	1.4	0.2	0.2	1.8	1.5	0.3	0.1	1.8
N (respondents)	33,174	33,174	33,174	33,174	32,503	32,503	32,503	32,503	32,882	32,882	32,882	32,882

* Total 1: Arithmetic mean across all country means; total 2: arithmetic mean across all respondents

Table A2 Three-level poisson regression on number of item nonresponse (ESS 1): Coefficients plus standard errors (in parentheses) and event rate ratios (in italics)

	Model 1	Model 2	Model 3
Fixed part			
Intercept	-4.41 (0.14) <i>0.01</i>	-4.64 (0.11) <i>0.01</i>	-4.64 (0.09) <i>0.01</i>
Gender (male*)		0.28 (0.03) <i>1.32</i>	0.28 (0.03) <i>1.32</i>
Age (in years)		0.01 (0.00) <i>1.01</i>	0.01 (0.00) <i>1.01</i>
Education		-0.23 (0.01) <i>0.80</i>	-0.22 (0.01) <i>0.80</i>
Political interest		-0.48 (0.02) <i>0.62</i>	-0.48 (0.02) <i>0.62</i>
Mode (CAPI*)			0.54 (0.17) <i>1.72</i>
Random part			
Country $\sigma_{v_0}^2$	0.28	0.18	0.10
Interviewer $\sigma_{u_0}^2$	0.53	0.49	0.49
Respondent σ_e^2	2.83	2.19	2.19

* reference group

N_{Respondent} = 27,233; N_{Interviewer} = 2,070; N_{Country} = 15

Austria and Sweden not included: no interviewer identification number available

For all fixed effects and variance components at the interviewer and country level: p < .01

(Please note that no p-value for the variance component at the respondent level can be computed)

Table A3 Three-level poisson regression on number of item nonresponse (ESS 2): Coefficients plus standard errors (in parentheses) and event rate ratios (in italics)

	Model 1	Model 2	Model 3
Fixed part			
Intercept	-4.51 (0.12) <i>0.01</i>	-4.73 (0.11) <i>0.01</i>	-4.74 (0.08) <i>0.01</i>
Gender (male*)		0.32 (0.03) <i>1.38</i>	0.32 (0.03) <i>1.38</i>
Age (in years)		0.01 (0.00) <i>1.01</i>	0.01 (0.00) <i>1.01</i>
Education		-0.23 (0.02) <i>0.80</i>	-0.23 (0.02) <i>0.80</i>
Political interest		-0.48 (0.03) <i>0.62</i>	-0.48 (0.03) <i>0.62</i>
Mode (CAPI*)			0.51 (0.16) <i>1.67</i>
Random part			
Country $\sigma_{v_0}^2$	0.21	0.16	0.10
Interviewer $\sigma_{u_0}^2$	0.46	0.44	0.44
Respondent σ_e^2	2.75	2.25	2.25

* reference group

N_{Respondent} = 29,354; N_{Interviewer} = 2,056; N_{Country} = 16

United Kingdom not included: no information on ISCED classification available

For all fixed effects and variance components at the interviewer and country level: p < .01

(Please note that no p-value for the variance component at the respondent level can be computed)