CITY UNIVERSITY
LONDON

Centre for
Comparative
Social Surveys

Centre for Comparative Social Surveys
Working Paper Series

Paper no. 02
February 2011

What makes a good mix?
Chances and challenges of mixed mode data collection in the ESS

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Abstract

Since its inception, the European Social Survey (ESS) has been administered via face-to-face interviews. Because of their propensity for yielding high-quality data and high response rates, face-to-face interviews are often considered the gold standard among data collection modes. However, the interrelated challenges of rising survey costs and dwindling response rates have led to doubts about the sustainability of the ESS's single mode approach. This working paper considers the case for and against the introduction of other modes of data collection, including telephone interviews and web questionnaires, into the ESS.

Based on evidence from the scientific literature and from studies conducted under the ESS's own Mixed Mode Methodology Programme, I argue that (1) there is currently no single-mode alternative for the ESS in any participating country, because incomplete coverage and low response rates rule out administering the survey entirely by telephone or by web questionnaires; but that (2) within-country mixed mode designs, whereby a given country administers the ESS as a mixed-mode survey, may be feasible in some countries. Although they are unlikely to yield higher response rates than single-mode face-to-face designs, within-country mixed mode designs may be able to preserve current response rates while reducing fieldwork costs.

For a cross-national time series such as the ESS, a switch from single-mode face-to-face to mixed mode data collection presents a number of specific problems. Variation in surveys modes between countries and over time may lead to mode effects, which would compromise measurement equivalence and diminish the internal validity of cross-national and longitudinal comparisons. A switch to mixed mode data collection should therefore not be undertaken without empirical evidence showing that measurement equivalence can be preserved within a mixed-mode design. I lay out the challenges associated with mixed-mode survey measurement, and argue for a "parallel design" experiment in order to test mixed mode designs in several candidate countries. I also specify methodological conditions that mixed mode designs would have to satisfy in order to have a chance of preserving the high quality of cross-national measurement that the ESS is famous for.

Introduction

The European Social Survey (ESS) is an international time series whose main purpose is the comparative measurement of social attitudes in Europe. It collects data that allow both international and longitudinal comparisons. But these comparisons will be valid only if measurement of relevant variables is equivalent between countries, and between time points. This is why the initiators of the ESS have put in place a number of strict rules to encourage the strongest possible measurement rigour (Jowell et al. 2007): probability sampling, close attention to questionnaire design and translation into different languages, and attempts to achieve high response rates. One rule, however, has been particularly contentious from the beginning: the insistence on face-to-face interviews as the sole method of data collection in all participating countries. There were a number of good reasons in favour of face-to-face interviews: There is ample evidence that they provide the highest response rates and, in many respects, the highest data quality of all modes of data collection; in addition, interviewers can collect valuable paradata about non-contacts and refusals. It was also deemed important that all participating countries use the same mode of data collection, because the mode of data collection can influence measurement, and using different modes in different countries could therefore bias international comparisons. The effect would be that real differences between countries would be confounded with measurement errors.

Nonetheless, alternatives to single mode face-to-face data collection deserve consideration, and have been receiving it since the start of the ESS in 2002. In recent years, mixed mode data collection, in particular, has become popular in practice, and has been the subject of intense methodological research (de Leeuw 2005; de Leeuw, Dillman and Hox 2008; Dillman, Smyth and Christian 2009; Groves et al. 2004; Roberts 2007). Two considerations could speak in favour of the introduction, at least in some ESS countries, of other modes of data collection, such as telephone interviews or web questionnaires, either alongside face-to-face interviews, or as a single mode alternative: first, face-to-face interviews are the most expensive mode of data collection, so the introduction of other modes would save costs; second, rapid change in communication technologies and their availability and distribution in ESS countries mean that survey data collection, too, might change radically in the near future, and the ESS could miss an opportunity if it rules out making use of these technologies.

This report will consider the case for and against the introduction of more than one mode of data collection in the European Social Survey. It will be informed by evidence both from the scientific literature and from the results of the studies conducted under the ESS's own Mixed Mode Methodology Programme. The evidence produced here is not always entirely conclusive. While we know some things about the measurement effects associated with different modes of data collection, evidence on other aspects is sometimes patchy. For example, while a mixed mode experiment conducted in the Netherlands has given us valuable insights into practical difficulties of conducting mixed

mode research, and provided evidence to evaluate the quality of the resulting data, we cannot with confidence infer from these results anything about the difficulties mixed mode data collection might encounter, and the effects it might have, in other countries.

The focus of this report will be practical: I shall present the evidence for and against different modes not from the point of view of underlying scientific theories, e.g. about the causes of mode effects, but from the point of view of the survey researcher who must make a decision whether or not to allow mixed mode data collection. Moreover, the report will focus on the situation of the European Social Survey in particular, that is: on the specific situation of a cross-national time series using probability samples of national populations.

Mixing Modes in an international survey: some definitions

The term "Mixed Mode Survey" needs to be clarified, and we need to introduce a number of important distinctions. De Leeuw (2005) and Groves et al. (2004: 163-165) each have provided excellent overviews, which form the basis of the classification that follows.

One mode for recruitment, initial contacts, or follow-up contacts, another for data collection. First, it is important to realize that many surveys are in fact what de Leeuw (2005: 237) has called "mixed-mode survey systems" without necessarily mixing modes of data *collection*. Thus, respondents may be first contacted and possibly even selected in one mode, but have their answers collected in another. This is already practised in some ESS countries (where advance letters or advance telephone calls are used to alert the sample member of the impending visit of an interviewer to their house, or to arrange such a visit), and these practices may contribute to the enhancement of response rates and to saving costs. Even though countries differ in the way they use such practices, this has no known impact on measurement error, as all the data are collected in the same mode (de Leeuw 2005: 239).

One mode for the main part of the interview, another for a subset of items. Another mixed-mode element is already practised in the ESS: namely the use of different modes for different parts of the questionnaire. While the ESS main questionnaire is invariably administered by personal interview (CAPI: computer-assisted personal interview; or paper-administered interview), the supplementary questionnaire is filled in by the respondents as a self-administered questionnaire (SAQ) in some countries. This design would pose no known problems for international and longitudinal comparisons if it was implemented in the same way in all countries and remained invariant over time.

Different modes for different respondents. However, countries differ in the mode of administration of the supplementary questionnaire, and some countries have also changed the supplementary mode from round to round – that is, different respondents

receive the same questions by different modes. With such a design, the influence of mode of data collection on measurement risks introducing a bias into cross-national and longitudinal comparisons. This, then, is the problem this report focuses on.

In the following, I will use the term "mixed mode data collection" exclusively for the case where different respondents receive the same questions by different modes. When discussing practical implications and the decision whether to switch from single-mode to mixed mode data collection in the ESS, I shall consider the ESS main questionnaire only, and not the supplementary questionnaire.

Yet another distinction needs to be introduced. For in a multi-country survey such as the ESS, mixed mode data collection could take three different (albeit not mutually exclusive) forms, which I would like to call, respectively, Across-country mixed mode (ACMM), Within-country mixed mode (WCMM), and Across-time mixed mode (ATMM).

1. Across-country mixed mode data collection (ACMM). In a cross-national survey, different countries may use different modes of data collection. This approach is taken in a number of international surveys, such as the Pew Global Attitudes Project (2009, 86ff), where data are collected by face-to-face interview in some countries, and by telephone in others; and the World Values Survey, where most countries collect data by face-to-face interview, but some (for example, the USA and Japan) use self-completion questionnaires (World Values Survey 2009). ACMM, in this sense, can occur even if each country conducts single mode data collection in any single round. Yet the ESS as a whole would become a mixed mode survey as soon as one country departed from the current face-to-face mode in at least one round. This would mean that comparisons between countries using different modes of data collection may be affected by mode effects.

2. Within-country mixed mode data collection (WCMM). A special case of ACMM occurs if one or several countries collect data with more than one mode in the same round, using different modes to survey different respondents. This is what I would like to call Within-Country Mixed Mode (WCMM). An example of a single-country mixed mode survey is the American Community survey, which uses postal questionnaires, telephone interviews, and face-to-face interviews (US Census Bureau 2009). Methodologically, WCMM brings in additional complexity: the fieldwork agency in a WCMM country has to administer different modes of data collection, and to oversee a more complex survey system, because questionnaires have to be produced in two or more formats, different respondents might be contacted, followed-up, and surveyed in different ways, and data from different input templates would have to be combined. When analysing data collected by WCMM, mode effects may affect comparisons between countries that use different designs (either single-mode versus mixed-mode, or different mixed-mode designs). In addition, analyses involving subgroups from a mixed-mode

country may be affected by mode effects, if the process of selection into different modes is non-random (as it is likely to be).

3. Across-time mixed mode data collection (ATMM). Since the ESS started as a single-mode survey and has, at the time of writing, completed four waves of data collection, any departure from the current practice of using solely face-to-face interviews would turn the ESS into an across-time mixed mode survey (ATMM). An example of a single-country ATMM design are the British cohort studies, two longitudinal surveys following birth cohorts of British residents from birth throughout the life course[1]. They started out as face-to-face only surveys, but have since adopted an ATMM design, alternating face-to-face and telephone interviews in consecutive waves. In the ESS, any ATMM design is likely to be more complicated than that, because a wholesale switch, across all countries, from one design to another is rather unlikely. In any case, for the researcher interested in longitudinal analysis, an ATMM design means that real change over time in variables of interest may potentially be confounded with measurement effects due to different modes of data collection.

The three mixed mode designs – ACMM, WCMM, and ATMM – are not mutually exclusive. On the contrary, the introduction of WCMM even in a single country would automatically make the ESS both an ACMM and an ATMM survey. Yet it is possible, in theory, to realize an ACMM/ATMM design without WCMM: namely, if every country uses only one mode of data collection, but some use different modes from others.

Why Mixed Modes?

Why should we consider mixing modes of data collection in the ESS, thereby endangering the realization of the "principle of equivalence" (Jowell 1998)? I shall discuss three potential benefits of mixed mode data collection for the ESS:

(1) The hope that a mixed mode design might help raise response rates.
(2) The hope that a mixed mode design might help reduce survey costs.
(3) The likelihood that communication technology is going to radically transform survey fieldwork in the near future.

Only two of these three benefits are likely to apply, for although mixed mode data collection would probably reduce survey costs and have the propensity to provide a vehicle for methodological innovation, there is no evidence to support the expectation that it would raise current ESS response rates.

[1] The National Child Development study (NCDS) follows all people born in a certain week in March 1958; the British Cohort Study (BCS70) follows all people born in a certain week in April 1970.

Response rates

At its inception, the ESS specified a target response rate of at least 70 % for each country, in order to ensure that country comparisons wouldn't be biased too starkly by differential non-response error (Jowell et al. 2007: 22). In practice, only around 20-25 % of countries achieved this target in the four rounds to date.[2] Although the ESS fares better than many other cross-national surveys in this respect, concern about non-response error is intensified by evidence that response rates to surveys are falling internationally in the developed world (de Leeuw and de Heer 2002; Tourangeau 2004) .

In general, survey non-response may be attributable to three types of causes: non-contact; refusal to respond; and inability to respond. Evidence from the USA suggests that all three causes have a part to play in the explanation of falling response rates (Tourangeau 2004: 782).[3] When methodologists write about mixed mode data collection, they often express the hope that a multi-mode approach will help to mitigate falling response rates. In particular, following up non-contacts in a different mode is sometimes thought to decrease the non-contact rate, and offering sample members a choice of mode carries the hope of reducing refusal rates, by giving sample members the chance to answer in a mode they personally prefer.

In the case of the European Social Survey, however, it is doubtful whether mixed mode data collection by itself would contribute to enhancing response rates (or at least to halting the declining trend). Evidence suggest that face-to-face data collection, as currently practised in the ESS, is the single mode likely to achieve the highest response rates. Mixed modes *can* enhance response rates relative to modes *other* than face-to-face interviews; for example, when non-respondents to an initial mail are followed up in an interviewer-administered mode.[4] There is, however, no evidence that mixed mode data collection will enhance response rates relative to single mode *face-to-face* surveys. In particular, giving respondents a choice of mode does not appear to raise response rates,

[2] A response rate of 70 % of higher was achieved by 5 out of 22 countries in Round 1 (23 %); 6 out of 26 countries in Round 2 (23 %), 5 out of 25 countries in Round 3 (20 %), and 7 out of 28 countries in Round 4 (25 %).

[3] De Leeuw and de Heer (2002) provide evidence that both non-contact and refusal increased between the 1970s and the 1990s across different types of surveys in sixteen developed countries, including the USA, Canada, Australia, and thirteen European countries. The authors do not provide evidence on the rates of inability to participate.

[4] For example, the American Community Survey initially invites participation by sending a postal questionnaire to sample members' homes. Non-respondents are then followed up by telephone calls, where telephone numbers are available. Finally, all remaining non-respondents are visited by interviewers at their homes. This procedure increases response rates relative to a single-mode postal survey. See: US Census Bureau. 2009. "Design and methodology: American Community Survey." Washington DC: US Census Bureau.

and if anything, sometimes even decreases it (Dillman, Smyth and Christian 2009: 304 ff).[5]

Neither does evidence from the experiments carried out under the ESS's own Mixed Mode Methodology Programme support the hope that mixed mode designs can raise response rates. In a mixed mode experiment carried out in the Netherlands parallel to Round 4 of the ESS, response rates in two experimental groups implementing different mixed mode designs were around 8 percentage points *lower* than the response rate in the regular Round 4 face-to-face survey (Eva et al. 2010).[6] It is possible that the implementation of the WCMM design in this experiment may be improved upon to raise response rates[7]. Yet it seems that relative to a single mode face-to-face survey, a country that chose a WCMM design could at best hope to match its previous response rate.

Even if a WCMM design does not itself raise response rates, it might be possible that countries differ in how successful different modes are in achieving high response rates. For instance, inhabitants of different countries may differ in their preferences for certain modes. Survey researchers acknowledge that different countries have different "survey climates" (Jowell et al. 2007): countries have their own survey traditions, which have generated infrastructures, country-specific experiences, and even respondent expectations that may give certain survey modes advantages over others (Roberts, Eva and Widdop 2008: 5).

So there might well be reasons supporting an ACMM design (without WCMM), whereby each country would choose the single mode of data collection that best fits the country's survey climate and has the best chance of achieving a high response rate.

At the current point in time, this question mainly concerns the comparison between face-to-face and telephone data collection. Yet we found no evidence that response rates of a single mode face-to-face survey could be matched by data collection in another mode. In particular, a telephone survey experiment conducted under the Mixed Mode Methodology Programme in five countries found that a variety of telephone data collection designs all achieved notably lower response rates than the face-to-face ESS mainstage survey conducted at around the same time (Roberts et al. 2009).

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[5] The evidence Dillman et al. cite largely stems from comparisons of single mode postal surveys with mixed postal and web surveys.

[6] Response Rates: ESS Round 4 Netherlands (face-to-face): 52.0 %; concurrent mixed mode design (offering respondents a choice of three modes: face-to-face, telephone, and web): 44.0 %; sequential mixed mode design (offering respondents web first, and offer those who refuse telephone and face-to-face, in that order): 43.4 %.

[7] A potential improvement might be achieved through better follow-up of respondents who agreed to fill in an online questionnaire, but do not do so even after several reminders. This issue will be discussed further below.

The telephone survey experiment involved three treatment groups, each of whom were contacted and interviewed by telephone, but received different versions of the ESS questionnaire: Group A responded to the full ESS questionnaire adapted for telephone interview (estimated to take around 60 minutes to complete); Group B received a shortened 45-minute version of the questionnaire; and Group C was initially invited to take part in a 30-minute interview (which consisted of the first half of the full questionnaire), and on completion was asked whether they would be willing to conduct a second 30-minute interview (the second half of the full questionnaire). Respondents were told the expected length of the interview in advance. The purpose of this design was to test the effect of expected interview length on response rates.

In all five countries the response rates in all experimental groups were significantly lower than in the ESS 3rd Round face-to-face survey. Although response rates varied between countries, the 45-minute questionnaire generally achieved slightly higher response rates than the 60-minute version. The 30-minute (first half) version elicited the highest response rates; however, overall response rates for Group C were lowest, as significant proportions of respondents dropped out after the first half, and did not agree to respond to the second. Overall, there was no indication that telephone surveys would achieve higher response rates than face-to-face surveys in any of the countries involved. Instead, the evidence points to the opposite conclusion: the introduction of single mode telephone data collection in some countries would probably mean a falling response rate in these countries relative to face-to-face data collection (Roberts et al. 2009).

Overall, then, we find no evidence so far that the introduction of either a WCMM or an ACMM design would help alleviate the problem of low response rates. Yet it is important to note that a high response rate is not an end in itself. Rather, it is desired for two ends: to keep costs as low as possible (a high response rate means that a given sample size can be achieved with fewer resources, everything else being equal), and to keep non-response bias at a minimum (i.e., to achieve a sample that is as representative as possible). If representativeness could be achieved with lower response rate, and if a sample of a given size could be achieved at lower cost with a design that achieves a lower response rate (i.e. by increasing the selected sample size), then there would be no reason to insist on maximizing response rates for their own sake. This consideration leads us to another reason sometimes cited in favour of mixed mode research: cost effectiveness.

Cost effectiveness

Face-to-face data collection tends to deliver the highest response rates of all modes, but is also the most costly mode to conduct. An important motivation for mixed mode data collection, therefore, is to try and reduce the cost of data collection per respondent, and ultimately to reduce overall survey costs.

There is good evidence that mixed mode surveys could be conducted more cheaply than single mode face-to-face, although the ratios of cost savings would differ by country, as they are dependent, among other factors, on the relative costs of interviewer time, which make up the bulk of face-to-face survey costs (Roberts, Eva and Widdop 2008).

It is extremely unlikely that the ESS will ever abandon its stringent rules of sample design, which demand that every member of a country's resident population (aged 15 and older) should have a known and non-zero chance of being included in the sample. The feasibility of mixed mode research thus depends on the availability of sampling frames which will allow respondents to be contacted in cheaper modes than interviewer visits to their homes. A mixed mode design whereby interviewers visit sample members' homes only to offer a response mode other than face-to-face is unlikely to save much in terms of costs relative to a face-to-face survey, as travel time, failed contact attempts, etc., would bear on the total interviewer time that would need to be factored in.

Communication technology and methodological innovation

One of the most conspicuous social changes in the last two decades has been the rapid development and distribution of new technologies for human communication. Mobile phones, the internet, and devices that combine the two, have given rise to new forms and patterns of human interaction. Surveys play a role in monitoring such changes, but new communication technologies also bring opportunities and challenges for survey data collection itself.

As will be laid out below, mobile phones are gradually replacing fixed-line telephones in some European countries, thus making telephone surveys of national populations increasingly difficult to conduct. On the other hand, the increasing prevalence of the internet has given rise to new methods of survey data collection, including online questionnaires, voice-over-internet protocol (VOIP), and e-mail, as forms of respondent contact. There is not yet any country in the world with internet coverage quite high enough to conduct representative internet-based surveys of national populations.[8] But the trend in most, if not all, countries is firmly in the direction of increasing coverage and increasing familiarity with the internet.

Surveys, then, need to react to technological change, and must themselves change with the times. The challenge is how to conduct change in a methodologically sound way – that is, in a way that maintains the standards of scientific rigour that distinguish the best surveys.

[8] It is, of course, possible to supply respondents without computers or internet connections with the necessary hardware and software – and indeed this has been done, for example in the LISS panel survey in the Netherlands. This method is, however, very expensive and not feasible for most surveys, including the ESS.

At the moment, face-to-face interviews achieve best results overall. Yet as surveys compete for funding with one another, and with other scientific projects, it is prudent even for the most rigorously conducted surveys to continue to explore the viability of other modes of data collection. Currently, the ESS enjoys a high reputation for scientific rigour and international scientific collaboration. So the ESS is in a good position to build on its standing by insisting on careful methodological experimentation to precede and accompany the introduction of new modes of data collection into its time series. From this perspective, a continued insistence on single-mode face-to-face data collection could turn out to be a missed opportunity.

As new technologies replace traditional survey data collection methods, capacity and resources for these traditional methods may decline, at least in some countries. There is therefore a real sense of momentum building in an important minority of ESS countries for mixed mode data collection to be permitted. At the same time, at least currently, in a majority of ESS countries there is either little interest for, or a very low feasibility of, mixed mode data collection.

Problems with mixed mode surveys

Any reduction of data collection costs that may be achieved through a switch from single mode face-to-face to mixed mode data collection would come at a price. Four types of problems of mixed mode designs have been identified in the scientific literature: mode effects on item measurement; coverage; response propensity; and practical challenges of running a multi-mode survey. Although these issues already complicate mixed mode data collection in a single nation survey, they are in many ways intensified in the situation of a multi-nation survey such as the ESS. I shall discuss these issues here insofar as they bear on the specific situation of the ESS. It will be important to keep in mind the distinction between ACMM and WCMM, as some of the problems take rather different forms depending on the precise mixed mode design.

Measurement effects and data quality

Telephone interviews

Telephone interviews have been shown to be subject to measurement effects relative to face-to-face interviews in two respects: satisficing and social desirability.

There is consistent evidence that telephone interviews tend to elicit more socially desirable responses than face-to-face interviews. This has been established in the USA, where Holbrook et al. (2003) found evidence that telephone respondents give more

socially desirable responses than face-to-face respondents across three national studies on a variety of attitudinal and behavioural variables with empirically established social desirability connotations, including political interest, attitudes to government aid for African Americans, voting participation, and attendance at religious services.

The ESS's own research (Jäckle, Roberts and Lynn 2006; Jäckle, Roberts and Lynn 2010) confirmed the greater propensity of telephone interviews to elicit socially desirable responses in an experiment conducted in Hungary. The results of the latter experiment also suggested that it was the location of the interviewer (i.e., on the phone and not in the respondent's home) rather than the absence of showcards (which are ordinarily used in many ESS questions) that caused the social desirability bias in the telephone interviews. Social desirability effects were found with respect to questions concerning political interest, political efficacy, attitudes to immigration, attitudes to household division of labour, religiosity, attendance of religious services, time spent watching television, and household income.

Telephone interviews have also been suspected of yielding lower quality data than face-to-face interviews (Roberts 2007). In many studies, however, the evidence is mixed: some indicators of satisficing suggest that respondents satisfice more in telephone surveys, while others suggest the opposite, or no difference. For example, in the ESS CATI experiment already described above, telephone respondents were more likely than face-to-face respondents to use extreme points on response scales, while face-to-face respondents were more likely to agree with the premise of questions (acquiescence effects) and to use scale mid-points. Importantly, the results were not uniform in all participating countries. The strongest mode effects were found in Switzerland, while hardly any were found in Hungary (Roberts et al. 2009). Overall, it is not clear whether telephone interviews necessarily lead to lower quality data than face-to-face interviews.

An MTMM experiment conducted within the ESS WCMM Dutch mixed mode experiment found that telephone interviews yielded the lowest data quality relative both to face-to-face interviews and to web questionnaires using four composite scores (Revilla and Saris 2010). However, since allocation to modes was not random within this design, it is not certain that the mode of administration was indeed responsible for these differences, rather than unmeasured characteristics of the respondents, which may be related both to their propensity to give less reliable and valid answers and to their likelihood to choose a given mode of data collection.

Web questionnaires

Like other self-completion questionnaires, computer assisted self-completion questionnaires (CSAQ) have been demonstrated to differ from face-to-face interviews in the degree to which they elicit socially undesirable responses. Respondents are more

likely to report socially undesirable opinions and behaviours when filling in a self-completion questionnaire than when responding to a face-to-face interview. In several cases, where researchers have compared estimates derived from surveys to estimates derived from official statistics or objective tests, it could be shown that self-completion questionnaires in general lead to more accurate estimates than face-to-face interviews (Tourangeau and Smith 1996).

Although the smaller social desirability bias of SAQs is well established, the sizes of measurement effects between CSAQs and face-to-face interviews vary. Moreover, while the two methods lead to different results on *some* attitude items with empirically established social desirability connotations, there appears to be no differential measurement effect on others (Heerwegh and Abts 2010). For a survey such as the ESS, with its particular focus on attitudes, it thus becomes difficult to predict which questions would be affected by mode effects.

Although it is difficult to establish the accuracy of an estimate derived from an attitude question (for unlike with some behavioural items, it is difficult to prove that a given response to an attitude question is "wrong" or "right"), it is reasonable to assume that the greater privacy that SAQs afford the respondent relative to face-to-face interviews leads to more accurate reports of unpopular attitudes as well as of sensitive behaviour. Yet in the context of the ESS, improved accuracy is not always an advantage, because it would introduce a measurement bias into comparisons with earlier waves of data collection, and into comparisons across countries insofar as some countries would use SAQs, while others would continue to use face-to-face interviews.

The absence of an interviewer in web data collection has also raised concerns about the quality of the data collected. Skilled interviewers can help respondents understand questions they find difficult – thereby reducing task difficulty – and can raise respondent motivation through interaction and encouraging feedback. Moreover, respondents who answer questionnaires via the web may engage in a variety of other activities simultaneously (such as visiting other websites, answering e-mails, ...), and may therefore be less attentive to the task. It is thus likely that web questionnaires may be more prone than face-to-face interviews to encourage respondents to satisfice, and to leave items unanswered.[9]

With the exception of research into primacy and recency effects, there are few studies that have compared self-completion and face-to-face modes in terms of data quality

[9] Roberts (2007, p. 14) argues that self-completion respondents may feel less time pressure than interview respondents, and that they might therefore be encouraged to answer questions more carefully, leading to less satisficing (or possibly offsetting some of the other characteristics of web surveys). Yet in a survey experiment by Heerwegh and Loosveldt, web respondents actually completed a survey much faster than respondents to a face-to-face interview (Heerwegh & Loosveldt 2008: 841; in their study, web-respondents took an average of 32 minutes to answer between 180 to 235 questions, while face-to-face interviews took an average of 48 minutes).

(Roberts 2007: 14). Moreover, the effect of mode on satisficing and item non-response is likely to vary by length of questionnaire (Roberts 2007). One study carried out under the Mixed Mode Methodology Programme compared data from face-to-face interviews and web questionnaires in a relatively long questionnaire (180 to 235 survey questions) in two random samples of university students (Heerwegh and Loosveldt 2008; Heerwegh and Abts 2010). The analysis showed that web respondents were significantly more likely than face-to-face interviewees to answer "don't know", to fail to respond to individual items, and to use the middle category of response scales (an indicator of non-differentiation). While these results constitute evidence for the hypothesis that SAQ's might be more likely to induce satisficing than face-to-face interviews, the differences between the modes had only small effects on the substantive distributions of answers.

WCMM designs

The measurement effects described above have the potential to create particular problems when more than one mode is used within a single country. This is because in any practicable WCMM design, it is very unlikely that the allocation of respondents to different modes will be governed by a random process. Rather, we expect that the selected mode of data collection will be related to respondent characteristics. This would mean that comparisons of subgroups of a national population may potentially be subject to measurement bias, if different subgroups have different probabilities to select into the available modes, and if the dependent variable is subject to measurement effects due to mode. Such within-country effects would, of course, also have implications for cross-country comparisons involving population subgroups.

The implications of WCMM designs for cross-country comparisons are also potentially severe. Even where two countries combine the same modes (say, face-to-face and web), the designs would likely be of uncertain equivalence, because a number of conditions are likely to vary by country: sampling frames used for different modes might be different, and so might mode penetration (e.g. internet access) and sampling practicalities. This means that *the processes of selection by which respondents end up responding in one mode or another* are likely to differ by from country to country. Quite simply, countries will inevitably differ in the proportions of sample members who take up one mode or another. As we know that responses to certain types of questions are prone to mode effects, we would face the possibility of biased comparisons between countries.

Another consideration concerns the impact of WCMM designs on longitudinal comparisons. The introduction of WCMM in a country would not only have implications for comparisons of WCMM waves of data collection with previous waves conducted as single-mode face-to-face surveys. It would also endanger the equivalence of all subsequent WCMM-waves with one another. This is because it is unlikely that two subsequent waves of WCMM data collection would be identical in terms of the process of

selection into different modes, and the proportion of respondents taking up the various modes.[10] A country introducing WCMM, then, would in fact become an ATMM country with a (potentially) *different* design in each wave subsequent to the abandonment of single-mode data collection.

Unknown implications of mixed mode designs

Despite the considerable body of evidence about measurement effects that I have reviewed so far, our ignorance concerning the effects of mixing modes of data collection on measurement precision still far outweighs our knowledge. Although some measurement effects have been shown to have affected data in some countries, with some variables, and at certain points in time, there is no guarantee that these effects will be the same or similar in other countries, or stable over time, or that we can extrapolate from the evidence concerning given variables to the likely effects on other variables. Therefore, the introduction, without further testing, of mixed mode designs (whether ACMM only, or WCMM) to the ESS would most likely mean that data analysts who wanted to take into account mode effects would, to a certain extent, have to rely on untested assumptions about the existence, size and (geographical and temporal) invariance of mode effects.

Coverage

Telephone interviews

Traditionally, telephone surveys have been carried out on fixed-line telephones. Households were sampled either by selecting telephone numbers from a list, or by one of several methods of random digit dialling (RDD) (see Tourangeau 2004: 777-781). In both cases, it is possible to achieve a probability sampling design. However, the rise of mobile phone technology has meant that an increasing number of people abandon fixed-line telephones completely, and thus are not covered by these existing sampling frames. Data from the European Social Survey (Round 3) indicate that very few participating

[10] For example, let's assume that a country adopts a two-mode design, combining face-to-face interviews (CAPI) and web questionnaires (WSAQ). Let's further assume that in the first ESS wave adopting this design, 30 % of respondents fill in a WSAQ, and 70 % do a CAPI. If these proportions change in the next wave (say, to 60 % taking the WSAQ, and 40 % doing a CAPI), then any variables affected by measurement effects due to mode would not have been measured equivalently across waves, even though both waves seem to have, on first sight, been conducted with the same data collection design. Incidentally, since cost reduction is the chief motivator for mixed mode designs, a rising proportion of WSAQ respondents and a decreasing proportion of CAPI respondents would be in both the funders' and the survey agency's interest, and would also be likely as younger, more internet-savvy generations replace older ones. Changing mode proportions are thus not just a possibility, but are to be expected.

countries have sufficient "penetration" of fixed-line telephones to carry out a single mode telephone survey relying on fixed-line telephones only.

Of the countries participating in ESS Round 3, only Switzerland had a fixed-line telephone coverage of more than 95 % of the population (Roberts, Eva and Widdop 2008: 54). Only five other countries had at least 90 % coverage. Moreover, the trend is in the direction of decreasing fixed-line telephone access. A comparison of data from ESS Rounds 3 and 4 indicates that fixed-line telephone coverage declined in most countries between 2006 and 2008. In 2008, only three countries had an estimated fixed-line coverage of more than 90 % (Sweden, Germany, and France).[11]

On balance, it is fair to say that most countries could not operate a single-mode telephone survey relying on fixed-line telephones without departing drastically from the principle of "full coverage of the population" that guides the ESS sampling strategy. However, the coverage problem on its own does not necessarily prevent telephone interviews from being part of a WCMM data collection design.

Web questionnaires

There is currently no country in the world where internet coverage is sufficiently high to conduct an internet-only survey and satisfy the requirement of full coverage of the national population (Lozar Manfreda and Vehovar 2008: 269).[12] A single-mode web-based survey is therefore not yet realistic. Again, however, this does not disqualify web questionnaires of playing a part in a WCMM design.

Non-response

Telephone interviews

As a single mode, telephone surveys of national populations are generally regarded as prone to lower response rates than face-to-face surveys (Groves and Lyberg 1988: 203). However, response rates may well vary between countries, partly due to differing "survey

[11] According to ESS Round 4, the Swiss fixed-line coverage has declined dramatically. In 2008, only 89 % of Swiss households were estimated to have a fixed-line telephone. This apparent decline may in fact be an artefact of a change in sampling frame in Switzerland between ESS rounds 3 and 4. Round 3 relied on a telephone register for its sampling, and may therefore have been biased towards households with a fixed-line telephone.

[12] However, internet coverage is increasing fast, and near-full coverage may or may not soon be realistic in some countries. The only studies that manage to rely on the internet for all data collection *and* can hope to achieve a probability sample from the population are studies that provide hardware, software and internet access for panel respondents who would not otherwise have the necessary equipment to participate (Lozar Manfreda and Vehovar 2008: 265). Due to the high cost of realizing such a design, it is extremely unlikely that it would ever be feasible within the ESS.

taking climates" (Loosveldt and Storms 2008) that make different modes of contact more or less familiar and acceptable to a country's population. Thus, in our consultation with ESS field directors, telephone was estimated to produce higher response rates than face-to-face in seven out of twenty-three countries (Roberts, Eva and Widdop 2008: 41; see Table 11).[13]

Yet the results of the CATI experiment conducted as part of the Mixed Mode Methodology Programme suggest that response rates would suffer if the ESS were conducted by telephone. In four countries (Germany, Hungary, Poland, and the two French regions of Switzerland), a telephone survey achieved significantly lower response rates than the ESS 3rd round mainstage survey conducted at the same time (Roberts et al. 2009). The differences in response rates between the full ESS survey interview conducted by telephone and the same interview conducted by face-to-face ranged from 8 percentage points in Switzerland to 48 percentage points in Hungary. It is possible that some telephone surveys can achieve relatively high response rates because they are relatively short, whereas in the case of the ESS, which takes around an hour, interviewers find it difficult to persuade sample members to participate. Yet attempts to increase the telephone response rate by offering shorter interviews (45 mins, or two stages of 30 mins each) still did not bring the response rates up to the level of the face-to-face interviews. Given that Switzerland was one of the countries where telephone response rates were estimated to be better than face-to-face response rates generally, these experiments cast doubt on the adoption of telephone interviews for the ESS.

Web questionnaires

Single-mode web surveys also frequently suffer from high rates of non-response, and when participation is solicited by e-mail, there is usually a high degree of uncertainty about the causes of nonresponse (e.g. about whether the e-mail ever reached its intended recipient) (Vehovar et al. 2002). However, in a WCMM design the first contact with respondents would be likely to be established by methods other than e-mail, so this weakness of the web mode would not be an issue.

Practical complexity

Mixed mode designs are more complex than single-mode designs from a practical perspective. Special specifications, questionnaires and fieldwork documents have to be produced for each mode (even if a particular mode is only applied in one ESS country), data from diverging question formats have to be made compatible across modes, and

[13] These seven countries were: Denmark, Finland, France, Iceland, Norway, Sweden, and Switzerland.

special documents advising data analysts of the possibility of measurement effects due to mode have to be prepared and published along with the data.

The real complexity starts, however, when we consider WCMM designs. The most likely WCMM designs will be those that involve non-respondents to a contact attempt in one mode who are then followed up in a different mode. This means that fieldwork will have to be carefully organized so that respondents are "switched" from one mode to another, as well as, possibly, back again in the course of the fieldwork period. As fieldwork gets more complex, the need for additional fieldwork monitoring by the National Coordinating Teams arises, further increasing the workload of a WCMM design relative to a single-mode design.

An example from the ESS Mixed Mode Methodology Programme illustrates how difficult it can be to implement a rigorous WCMM design. In the WCMM experiment conducted in the Netherlands parallel to ESS Round 4 (already referred to above), respondents were offered (either concurrently or sequentially) a choice of three modes: a web self-completion questionnaire, telephone interviews, or face-to-face interviews. Where telephone numbers were available, sample members were contacted by telephone first, and depending on their expressed preference, completed a telephone interview on the spot or arranged a telephone interview at a later time, arranged a visit by a personal interviewer, or arranged to receive the link to an online questionnaire. Of those who chose web, however, less than two thirds completed the questionnaire after receiving up to ten telephone reminders. Ideally, these respondents should have been followed up by a visit from a face-to-face interviewer, in order to maximize the response rate. But they were not, and the fieldwork process was not monitored closely enough to prevent this oversight. While such problems are not impossible to overcome, it is clear that doing so requires meticulous planning as well as additional resources during fieldwork.

Intermediate conclusions: Which mixed mode designs might be feasible for the ESS?

If mixed mode data collection is the future of survey research, then this will be because single mode face-to-face surveys will be considered too expensive to conduct. From a scientific point of view, any money saved by introducing new modes is offset by increased measurement error. Such error is often unquantifiable, but may lead to artifactual results in statistical analysis. Yet if care is taken to make questions and questionnaires equivalent across modes (e.g. by following the unimode design principle suggested by Dillman, Smyth and Christian 2009), measurement effects can be kept small on many variables.

The ESS is less well suited to mixed mode data collection than many other surveys, for the following reasons:

- the long questionnaire increases respondent burden and makes it difficult to survey respondents by telephone and through self-completion questionnaires;
- any adaptation of core module questions to make these questions compatible with different modes of data collection would endanger the equivalence of measurement over time;
- whichever mixed mode design would be implemented, the details of implementation would probably differ between countries, and within the same country across time, thereby endangering the principle of equivalence (Jowell 1998) that is at the heart of what the ESS stands for.

The ESS faces the decision whether to adopt modes other than face-to-face interviews at a key time in terms of survey technology. Pure telephone surveys, which had enjoyed a period of great popularity in many countries where almost every household had, until recently, a fixed-line telephone, are now becoming more problematic as fixed-line coverage is declining and there are few, if any, sampling frames or RDD methods that can provide random samples of mobile phone users. On the other hand, new data collection methods involving the internet are gaining popularity, but are not yet feasible to be conducted as single-mode surveys to ESS standards in any country, because internet coverage is still below 90 % in all ESS countries, and well below 90 % in many.

Projections into the future are always subject to a degree of uncertainty. But it seems likely that fixed-line telephone coverage will decline in the countries where it is currently high (i.e., where it is still around 90 %), whereas internet coverage (as well as the proportion of people who are familiar with the internet and use it regularly) will increase across Europe.

It would seem, then, that a switch to a *single* mode other than face-to-face is not feasible or promising for any ESS country at the current point in time. A switch to a pure telephone survey, apart from being problematic in its own right, is likely to introduce a design of data collection into the ESS that will probably be outdated soon. This argument does rule out the inclusion of telephone data collection as part of WCMM designs, but it would seem to speak strongly against a switch, in any country, to a single-mode telephone design. Similarly, a switch to pure web-questionnaire data collection is not yet feasible, and might never be, given the low response rates self-completion methods tend to achieve.

This leaves WCMM designs as the remaining possibility. As has been laid out above, WCMM designs are more complicated to put into practice than single-mode designs; and they can result in measurement artifacts that not only bias comparisons between countries, but also between population subgroups within a single country. Yet they offer the chance to achieve response rates approaching those of single-mode face-to-face surveys, a significant reduction in data collection costs, and a mechanism by which the

ESS could remain at the forefront of methodological innovation without abandoning its quality goals.

WCMM designs

Which mixed mode designs are feasible for the ESS? The precise designs will vary by country, depending on differences in the available sampling frames, as well as on the modes of data collection selected. In general, two types of design are conceivable:

1. Stringent cost-reduction WCMM design: Here, the strategy would be to collect data from as many respondents as possible in the cheapest mode, using the more expensive modes for tenacious follow-ups in order to maximize the response rate cost-effectively to a level approaching that of single-mode face-to-face surveys.

2. Supplementary WCMM design: The idea of this design would be to allow countries with remote, thinly populated areas to save costs by collecting data from respondents that live in such areas by modes other than face-to-face. In this design, face-to-face would remain the default mode of data collection, but would be substituted by other modes in cases where face-to-face data collection would be extremely expensive and cumbersome to arrange.

These two designs constitute mutually exclusive alternatives from the perspective of a single country, but they might well both be used by different countries within a single round of the ESS.

How many modes?

The ESS Mixed Mode Methodology Programme tested a three-mode WCMM design in the Netherlands in 2008/09, as was already reported. Yet there are a number of arguments that would seem to speak in favour of limiting the number of modes to two – at least within a single country. These reasons are:

1. Limiting the number of modes to a maximum of two would reduce the complexity of the fieldwork and fieldwork monitoring, thereby reducing the likelihood of errors that inhibited following-up of web-nonrespondents in the Dutch WCMM experiment.

2. If no more than two modes were used, if a comparison sample of a face-to-face only survey was available (see below), and if the two achieved samples were equivalent, it would be possible to estimate measurement effects and selection effects separately (Eva et al. 2010: : Annex 7). Such estimates would constitute valuable methodological data, both for the purposes of the ESS and for the wider community of survey researchers.

Both arguments – reduction of complexity and the possibility of separating measurement and selection effects – pertain to the design within a single country. Yet even if each country used at most two modes, it would still be possible that the ESS as a whole might use three modes or more, namely if some countries use different combinations of modes than others. Limiting the whole ESS to two modes would have several advantages. It would reduce complexity, limit the number of questionnaire versions to be produced, and ease the task of advising secondary analysts about how to deal with possible mode effects. Nonetheless, limiting the whole ESS to two modes would also mean foregoing cost reductions that individual countries might be able to achieve with more flexibility in mode choice.

Conditions for WCMM

If the ESS were to permit modes other than face-to-face interviewing, how should the transition from single-mode to mixed-mode data collection be organized? It needs to be:

- well prepared;
- conditional on evidence that the new design can retain (most of) the quality and equivalence of measurement obtained by face-to-face data collection;
- more economical than face-to-face only;
- monitored for evidence of effects on measurement; and
- followed up by extensive documentation that allows data analysts to gauge the potential implications of the mixed mode design on their analyses.

The only conceivable way in which a country could demonstrate the achievability of its WCMM design is to set up the requirement of a "trial run" of the ESS with its desired design. A country that wants to introduce WCMM would have to find the funding to perform a WCMM experiment parallel to an ordinary, single-mode face-to-face ESS round (if necessary with a reduced sample). The CCT would cooperate on the experiment with the NC and the fieldwork agency of the country concerned.

The experiment would need to involve two design groups: (1) the 'ordinary' face-to-face survey, and (2) the new WCMM survey. Permission to adopt the WCMM design for subsequent rounds would be conditional on whether it was able to meet a number of quality criteria.

There are six crucial questions a WCMM design must be able to answer to prove its viability for the ESS.

(1) Does the sampling frame allow for a probability sampling design that gives every member of the survey population a known and non-zero chance of being included?
(2) Does the sampling frame cover (almost) the whole target population?
(3) Can the design achieve a response rate approaching that of face-to-face interviewing?
(4) Can the design achieve a representative sample?
(5) Can the design achieve equivalence of measurement with single-mode face-to-face data collection? Perfect equivalence may not be achievable; yet the ESS would have to specify the limits of acceptability when it comes to departure from measurement equivalence, and assess the extent to which departures may be correctable.
(6) Does the design result in cost savings relative to single-mode face-to-face data collection?

Only if the answer to all six of these questions is "yes" should a country ideally be permitted to use the tested WCMM design in their mainstage data collection. Margins of tolerance for "near misses" (say, in terms of response rates or measurement precision) would need to be discussed and stipulated.

Substantive conclusions

Social scientific surveys aim for precision of measurement. Yet this ideal will only ever be imperfectly reached. While some sources of error can be statistically controlled for (through estimation of standard errors, weighting, and so forth), others are less easily tamed, and their extent and effect on the accuracy of results is often not exactly known. Non-response, non-coverage, and subtle measurement effects may all introduce error into survey measurement that cannot, in practice, be completely quantified or controlled. The introduction of mixed modes of data collection into the ESS time series would add another source of error – not necessarily more serious than any of the others, but nonetheless an additional layer of potential uncertainty and concern. This constitutes a disadvantage of mixed mode data collection for an international time series like the ESS. The present report has examined whether the advantages of mixing modes may outweigh the risks.

In the foreseeable future, most countries will probably carry out the ESS as a single-mode face-to-face survey, as before. But a small number of countries – especially those where interviewer-led fieldwork is expensive or where internet penetration is high – may wish to adopt a mixed-mode design for data collection, combining face-to-face interviews with web questionnaires, or possibly with telephone interviews.

This report has laid out the potential advantages as well as the risks involved in permitting some countries to conduct its data collection (partly) via modes other than face-to-face. I have argued that single-mode data collection in a mode other than face-to-face is currently not feasible in any ESS country, if the ESS's high standards of population coverage are to be upheld.

I have then gone on to argue that the ESS should open itself to WCMM designs, and put in place mechanisms to allow countries to test WCMM designs in a trial run alongside an ordinary ESS round. This would allow mixed mode data collection to be introduced in a controlled and monitored way. With such a procedure, the ESS would create the opportunity not only of reducing data collection costs, but also of becoming a source of methodological data for investigations into measurement effects and practical challenges in mixed mode data collection.

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