Final Report: Sampling for the European Social Survey

1. Introduction

The European Social Survey is a new, academically-driven social survey designed to chart and explain the attitudes, beliefs and behaviour patterns of Europe´s diverse populations. The survey covers 23 nations and aims at asserting the most rigorous methodologies. Therefore, a methodological overhead with ten Work packages has been installed.[1] One of them deals with sampling: A panel of experts was signing off all sampling designs in advance of the fielding periods in the different countries[2].

In this report we firstly want to explain the principles of sampling for the ESS. Secondly we want to show which way we organised the process of "Signing off" the sampling designs. Thereafter, a short description of the design of each participating country is given. Finally, we present some comprising ideas.

2. Principles and requirements of sampling for the ESS

The objective of the Sampling Work package was the "design and implementation of *workable and equivalent sampling strategies* in all participating countries". This concept stands for random samples with comparable estimates. From the statistical point of view full coverage of the population, low non-response rates and consideration of design effects are prerequisites for the comparability of unbiased or at least minimum biased estimates. In the following we want briefly to describe these requirements and to show some examples, how the requirements could be kept in the practices of the individual countries.

2.1 Basic principles for sampling in cross-cultural surveys

Kish (1994, p. 173) provides our starting point: "Sample designs may be chosen flexibly and there is no need for similarity of sample designs. Flexibility of choice is particularly advisable for multinational comparisons, because the sampling resources differ greatly between countries. All this flexibility assumes probability selection methods: known probabilities of selection for all population elements." Following this, an optimal sampling design for cross-cultural surveys should consist of the best random practice used in each participating country. The choice of a specific design depends on the available frames, experiences and, of course,

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[1] see www.europeansocialsurvey.org (Technical annex).

[2] "The precise sampling procedures to be employed in each country, and their implications for representativeness, must be documented in full and submitted in advance to the CCT for reference to the expert panel and 'signing off'." see www.europeansocialsurvey.org, Specifications for Participating countries.

also the costs in the different countries (Häder/Gabler 2003). If adequate estimators are chosen the resulting values can be compared. This comparability stands for equivalence and is the goal of the sampling strategy and its implementation for the ESS.

2. 2 Discussion of standards set in the Specification for participating countries[3]

Only random samples provide a theoretical basis, which allows us to infer from the sample to the population or sub-sets of this. As design-based inference is one important goal in the project, probability samples are required. However, this is related to other requirements:

- full coverage of the target population

- high response rates

- no substitution

- the same minimum effective sample sizes in participating countries (ESS: n_{eff} = 1,500 or 800 where population is smaller than 2 million inhabitants) and a minimum net sample size of n_{net} = 2,000.

These requirements can only be sensibly discussed in the context of random samples. They form a theoretical system that in the end ensures equivalence.

Full coverage of the residential population

An important step in planning a survey is the definition of the population under study (target population). In the case of the ESS it contains in each country persons 15 years or older who are resident within private households, regardless of nationality and citizenship, language[4] or legal status. This definition applies to all participating countries. Thus, every person with the defined characteristics should have a non zero chance of being selected. This implies, that the more completely the frame covers the persons belonging to the target population, the better the resulting sample will be. However, the quality of the frames – e.g. coverage, updating and access – differs from country to country. Therefore, frames have to be evaluated carefully. The results of these evaluations are documented and have to be taken into account when the data are analysed.

Among others, we found the following kinds of frames:

a) countries with reliable lists of residents that are available for social research such as the Danish Central Person Register that has approximately 99.9% coverage of persons resident in Denmark

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[3] see www.europeansocialsurvey.org
[4] In countries in which any minority language is spoken as a first language by 5 % or more of the population, the questionnaire will be translated into that language.

b) countries with reliable lists of households that are available for social research such as the "SIPO" database in the Czech Republic, that is estimated to cover 98% of households

c) countries with reliable lists of addresses that are available for social research such as the postal delivery points from "PTT-afgiftenpuntenbestand" in the Netherlands

d) countries without reliable and/or available lists such as Portugal or France

In all cases, fortunately, there is some aggregated demographic information available that can be used for the sampling strategy. The update of this information varies to some extent, from some months until a few years.

Drawing a sample is more complicated if no registers (lists) are available (group d). In this instance area based designs are usually applied, in which the selection of municipalities forms the first stage and the selection of households within these municipalities the second stage. Because no sampling frames are available, the crucial problem is the selection of households. There are two main ways to go about this. The first is to list all the addresses within certain areas of each selected community. The target households are drawn from these lists. It is possible to assess this procedure as one way of drawing a random sample, even if one which is fairly strongly clustered. A design of this kind is applied in Greece. Another frequently used way to find target households is the application of random route elements. The question here, however, is the extent to which random routes can be judged to be "strictly random". That depends on both, the definition of the rules for the random walk and the control of the interviewers by the fieldwork organisation in order to minimise the interviewer´s influence on the selection of respondents. In Austria, e.g., there is a design with a random route element. The survey institute together with the National Co-ordinator of the ESS operationalised the general rules for various household types (like large apartment buildings, small houses within densely populated areas, houses in the countryside, etc). Moreover, all selected households will be checked by the supervising team. This approach was convincing for the sampling expert panel.

Even in countries where reliable frames exist, some problems had to be solved. For example, in Italy there is an electoral register available. But it contains, of course, only persons 18 years or older. Therefore, it had to be used as a frame of addresses. In Ireland, we found the same situation.
People with illegal status will be underrepresented because they are not registered. Such systematic losses because of undercoverage cannot be ruled out in practice. However, they must be documented carefully.

Response rates

Non-response is the next problem for the representativeness of the target population in the sample. A carefully drawn gross sample from a perfect frame can be worthless if non-contacts and refusals lead to systematic biases. Therefore, it is of essential importance to plan and implement a sufficient number of contacts as well as appropriate fieldwork strategies for the persuasion of the target persons to participate in the survey. For the ESS a target response rate of 70% has been fixed. This may be particularly challenging for some countries where response rates between 40 and 55 percent are common (Lyberg 2000). Nevertheless, all efforts should be done to avoid non-response because it includes the danger of biased samples, and cell weighting is not as global a means of "repairing" samples as is sometimes argued. The expected response rates among the ESS countries range from 30% (Luxembourg) to 75% (e.g. Sweden and Denmark). In Switzerland (40%) a special methodological experiment is integrated to study possibilities of achieving a higher response rate. Most countries hope to get a response rate of about 70%. How realistic this hope is will be seen after the end of the fielding process. In any case, many different techniques for increasing the response rates such as advance letters, toll-free telephone numbers for potential respondents to contact, extra training of interviewers in response-maximisation techniques and doorstep interactions are applied in all countries.

Substitution

Connected with non-response and the resulting fear of biased samples is the problem of substituting non-cooperative or not reachable primary sampling units, households or target persons by others. This practice is sometimes applied to get "better samples". However, substitution cannot be defended on theoretical grounds, because co-operative and easy-to-reach people would be over-represented in the sample. Furthermore, uncertainties concerning the inclusion probabilities are the result. Another important disadvantage of substitution in the field is that it tends to reduce the extent of interviewer efforts to gain a response at the original addresses/households (Elliot 1993). Thus, for the ESS substitution of non-responding households or individuals (whether 'refusals' or 'non-contacts') is not permitted. One exception is as follows: at the first stage of the sampling process administrative considerations may mean that addresses cannot be obtained for specific areas, which originally belonged to the sample. In these exceptional cases it is allowed to replace the areas with areas of the same strata.

Design Effects/ Effective Sample Size

Design effects indicate the precision of estimates (Kish 1987). In this sense they are criteria for the quality of the estimates and have influence on their equivalence. We chose a model based approach for the estimation of the design effects (Gabler/Häder/Lahiri 1999) for determining the sample sizes for each country. Depending on the available frames and the available funding[5] we have more or less complex sampling designs, ranging from simple random sampling (Finland) to multistage stratified and clustered sampling (e.g. Poland, Spain). These different designs lead to various design effects. We found the following:

- Design effect due to differing selection probabilities (DEFFp)

In some countries, it is necessary to select the sample in stages, with the penultimate stage being residential households. In this case, each person's selection probability depends on the respective household size. Design effects of this kind have to be predicted e.g. for Ireland, Israel, Portugal, or the Czech Republic. Another reason why differing selection probabilities are used is that minority groups are over-sampled. Examples for this are Germany, where the East German population is over-sampled or Israel, where the Arab population is over-sampled. A third design effect due to differing selection probabilities occurs in countries with the above described multi-stage designs where the PSUs are selected proportional to the size of individuals but not to the size of households such as in Israel or Ireland.

To give an idea of the sizes of the predicted design effects due to unequal selection probabilities here are some values: 1.33 for Ireland, 1.25 for Switzerland, 1.19 for the Netherlands, 1.16 for Czech Republic and 1.01 for Italy.

- Design effect due to clustering (DEFFc)

The cluster size of the selection units and the intra-class correlation also influence the design effect. The cluster size should be chosen as small as possible since: The larger the average cluster sizes are, the lower the effective sample size is and the more interviews have to be conducted to reach the minimum effective sample size of 1,500. In that sense a large number of selection units with only a few interviews in each is the goal – but cannot be reached in each country because of funding restrictions.

In some countries calculations were made to estimate intra-class correlation coefficients from earlier surveys with similar variables. If there was no available empirical evidence at all upon which to base an estimate of the intra class correlation coefficient, then a value of 0.02 has

been suggested in the instruction material. This value was used in most countries. Because of the varying cluster sizes and intra-class correlations we estimated fairly different DEFFc. Here are some examples: 1.38 for Germany, 1.22 for Israel, 1.20 for Ireland, 1.18 for Switzerland, 1.15 for Greece and 1.14 for Poland.

The total design effect is the product of the design effect due to differing selection probabilities (DEFFp) and the design effect due to clustering (DEFFc). These total design effects vary largely between the countries and the net sample sizes had to exceed the target of 2,000: For instance, in Ireland will be conducted 2,400 interviews (total design effect: 1.6), in Switzerland there will be 2,205 interviews (total design effect: 1.47) and in Spain there is a net sample size of 2,085 (total design effect: 1.39).

2.3 Summary

Comparability of sampling means that the national surveys must provide estimates that are subject to minimal bias of parameters of the equivalent populations. The basic requirement to use probability samples together with the additional requirements discussed in this paper leads *theoretically* to comparable estimates with the same accuracy level for each country. However, in the end the quality of the data depends also on the implementation process, e.g. the *practical* applications[6]. Therefore, this process has to be monitored carefully.

For the ESS we could find ways to develop probability sampling methods in all participating countries that satisfy the specified rules.

3. The process of "Signing off" the sampling designs

In the following we want to describe how we organised the "signing off" of the sampling designs in the different countries. It may be of interest because an approach like that has never been used before in planning a cross-national survey.

Firstly, an expert panel with five members was installed[7].

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[5] For face to face studies frequently clustered designs are used because they are usually less expansive (shorter ways for the interviewers) then unclustered designs.

[6] Of course, there are also other influences on the data quality besides those because of sampling – such as features of the interviewers, question wording, translation problems and so on. However, we cannot deal with them in this paper.

[7] Susan Purdon had to leave the panel in August, 2002. From that point in time the panel consisted of four experts.

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- Peter Lynn (University of Essex, U.K.)
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- Susan Purdon (National Center for Survey Research, U.K.)
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Each of the experts was assigned about five countries to liase and support. The panellists contacted "their" National Co-ordinators asking for information about the foreseen sampling design. Following that a process of co-operation between the National Co-ordinators, the survey organisations and the sampling experts started. In many countries completely new designs had to be developed to meet the strict methodological requirements of the ESS. In other countries, it was only a matter of clarifying details. In particular, support in calculating the effective sample sizes often was necessary. The sampling experts also had to visit some countries for a detailed discussion of problems such as an expected low response rate, the selection of a well suited survey organisation or the development of a completely new design. After the clarification of all questions the design of a country was "Ready for Signing off". The Expert panel had developed a form, where details of the design of each country had to be filled in. This task was done by the experts for "his/her" countries. For that the expert used the information from the previous discussion with the National Co-ordinator and the Survey Organisation in the country concerned. This procedure ensured that the terms used in the forms are standardised "statistical language" and that the design was really clear defined. Then the expert presented the form to the other panellists. If all of them agreed the design was "signed off". Otherwise, the discussion with the National Co-ordinator had to carry on. Thus, the decision of signing off a design was always made by the whole team together.

At the third meeting of the expert panel on 15th October 2002 in Helsinki most countries could be signed off. However, a few countries without experience in probability sampling kept the expert panel occupied till May 2003 when we could sign off the design of the last country. At the meeting on 19th May in London the National Co-ordinators evaluated the work of the sampling expert panel as very helpful.

Time schedule:

- 17th December 2001 in London: First sampling panel meeting. Discussion of the general approach for the process of "signing off" the sampling designs of the different countries

- 18th December 2001 in London: Kick-off meeting of the National Co-ordinators. Explanation of the principal requirements of sampling for the ESS, introduction of the expert panel.

- 6th and 7th May 2002 in Mannheim: Second sampling panel meeting. Discussion of current status of ESS countries and outstanding issues.

- 26th August 2002 in Copenhagen: Presentation of a paper on sampling for the ESS at the International Conference on Improving Surveys.

- 15th October 2002 in Helsinki: Third expert panel meeting. Signing off most countries.

- May 2003: ´Signing off´ of the 23rd country

4. Description of the designs and deviations from the "Specifications for participating countries"

In the following section we describe the designs of the different countries in a standardized form. Special emphasis is placed on the nature of the frames, the sampling procedure and the computation of the sample sizes. For deviations from the "Specifications for participating countries" reasons are given. The forms are in alphabetic order.

A summary of the most important figures such as predicted design effects, anticipated response rates and number of Primary Sampling Units is given in Appendix 1.

Country:	**Austria**
NC:	Karl H. Müller
Survey Institute:	Institute for Panel Research (IPR), Richard Költringer
Expert:	Sabine Häder

Target Population, Population coverage	Persons 15 years or older who are resident within private households in Austria, regardless of nationality and citizenship, language or legal status. Homeless and institutional populations are excluded.
Problems	People not understanding German language are excluded.

Sampling frame	For Stratification: Census 2001 For selection of households: Austrian Telephone Book (CD), which is updated four times a year
Problems	The Austrian Telephone Book covers only about 90% of the households. Not covered are households without any telephone and households with secret numbers.

Sampling design	Stratified three stage probability sampling Regional stratification: 363 strata in 121 districts $*$ 3 classes of population sizes of municipalities (small: $< 2,500$, medium: $< 10,000$, large: $\geq 10,000$) Stage 1: Primary sampling units: 324 clusters in 251 municipalities (incl. 23 districts of Vienna). The number of clusters in a stratum is proportional to the size of its population (15 years and older). The allocation is done by controlled rounding (Cox 1987). The selection within a stratum is done by systematic proportional-to-size random sampling. Stage 2: In each of the clusters 12 individuals are selected for the gross sample. For that, in each cluster 6 addresses of households are drawn from the telephone book. These households are the first part of the sample. To include also households not listed in the telephone book the interviewer takes each "telephone household" as starting point to visit the fifth household after the start household (according to a specified rule for random route). The households found with that method are the second part of the sample. Stage 3: Within all households the target persons are drawn with the Next-Birthday-Method.
Remark	The allocation and selection of clusters was done at ZUMA.

Design effects	$DEFF_c = 1+ (7-1) * 0.02 \approx 1.1$ $DEFF_{p1} = 1.25$, $DEFF_{p2} = 1.1$ $DEFF = 1.25 * 1.1 * 1.1 \approx 1.5$
Remark	$DEFF_{p1}$ is due to unequal selection probabilities within households. Note, that $DEFF_{p1}$ is computed on the basis of data for the whole population (not 15+). $DEFF_{p2}$ is due to unequal selection probabilities of listed and unlisted households. A $DEFF_p$ for unequal selection probabilities of households in general is also included.

Target response rate	A response rate of 65% seems to be reasonable.
Problems	The target response rate of 70% will (probably) not be achieved.

Sample size	A net sample of size $n_{net} = n_{eff} * DEFF = 1{,}500 * 1.5 = 2{,}250$ interviews will be conducted. With 10% of ineligibles and a response rate of 65% the gross sample size must be: $2{,}250 / (0.90 * 0.65) = 3{,}847$. For each cluster 12 individuals have to be drawn. With 10% ineligibles and a response rate of 65% that results in an average of 7 interviews per cluster.

Special Features of the design	During the interviews it has to be asked whether a household is listed in the telephone book or not. These data have to be used for weighting adjustments.

Country:	**Belgium**
NC:	Geert Loosveldt
Survey Institute:	Institute for Social and Political Opinion Research
Expert:	Sabine Häder

Target Population, Population coverage	Persons 15 years or older who are resident within private households in Belgium, regardless of nationality and citizenship, language or legal status. Homeless and institutional populations are excluded.

Sampling frame	Frame of individuals: In Belgium there is a National Register. The coverage and the updating of the register can be considered as excellent.

Sampling design	Stratified two stage probability sampling Regional stratification: 10 provinces and Brussels Stage 1: The primary sampling units (PSUs) are clusters located in municipalities. The number of clusters for each province is proportional to the size of the population in each province. For that a list of municipalities with a population distribution (+15 years) for each province is used. The number of clusters in a municipality is proportional to the size of its population. Stage 2: In each of the 324 clusters in 202 municipalities 10 individuals are selected for the gross sample. The clusters within the municipalities are 'virtual', i.e. they are not regionally defined. That means for each cluster 10 individuals within a municipality are selected from the register by simple random sampling.

Design effects	The intra class correlation coefficient proposed in the specifications for participating countries ($\rho = 0.02$) is used. $DEFF_c = 1 + (6.2 - 1) * 0.02 = 1.10$ $DEFF_p = 1$ $DEFF = 1.10$
Remark	The mean cluster size is computed as number of respondents divided by number of communities, i.e. $2,000 / 202 = 9.9 \approx 10$. The clusters within the communities are not taken into account, because they are only virtual, that means they do not constitute a residential area.

Target response rate	A response rate of 65% seems to be reasonable.
Problems	The target response rate of 70% will (probably) not be achieved.

Sample size	A net sample of 2,000 interviews will be conducted. With a response rate of 65% and 5% of ineligibles the gross sample size must be: $2,000 / (0.65 * 0.95) \approx 3,239$. The effective sample size is $2,000 / 1.10 = 1,818$. For each cluster 10 individuals have to be drawn. With a response rate of 65% and 5% ineligibles that results in an average of 6.17 interviews per cluster.

Country:	**Czech Republic**
NC:	Klára Plecitá-Vlachová (vlachova@soc.cas.cz)
Survey Institute:	STEM
Expert:	Susan Purdon / Peter Lynn

Target Population, Population coverage	All persons aged 15 and over living in households in Czech Republic

Sampling frame	The "SIPO" database of households. This is compiled by merging utility lists of households that subscribe to electricity, gas, radio, television or telephone. It is estimated that 98% of households are on SIPO. The database is managed by a private company, VAKUS, and updated monthly. There is no official population register or register of addresses available for academic purposes in Czech Republic.

Sampling design	Stratified two stage probability sampling Stratum 1: 100 large towns/cities, accounting for 52% of population according to 2001 Census. Divided into regional sub-strata. In each sub-stratum, households are ordered by postal code and a systematic random sample selected using a fixed interval. For each household selected in this way, the 2nd, 4th, 6th and 8th following households on the list are also included, thus making a cluster (PSU) of 5 selected households. In total, 374 clusters (1,870 households) will be selected in stratum 1. Stratum 2: 6,140 localities, 48% of population. Divided in to 28 sub-strata, defined by NUTS2 region and population size of locality. In each sub-stratum, clusters of 5 households will be selected systematically, exactly as in stratum 1. 292 clusters (1,460 households) selected. The sampling interval will be the same in all sub-strata (both main strata), except for some small variation to anticipate likely differences in response rate (e.g. slightly smaller interval in the largest towns). At each household, one person aged 15+ will be selected using a Kish grid procedure.
Remarks	The clusters may be quite "dense" (almost adjacent addresses in some cases), but there is no practical alternative at this stage.

Design effects	$DEFF_P$ = 1.16, based on estimate of household size distribution from Census 2001. $DEFF_c = 1 + (3.15 - 1) * 0.05 = 1.1$ $DEFF = 1.16 * 1.11 = 1.29$
Remarks	No evidence on roh. 0.05 is a deliberately pessimistic guess, reflecting the "dense" clusters. Even with this pessimism, DEFF is still acceptably small.

Target response rate	70%
Remarks	Believed to be possible, though 65% is more common for this kind of sample design.

Sample size	Gross sample size n_{gross} = 3,330 With 10% ineligibles, 70% response: Net sample size n_{net} = 2,100 interviews Effective sample size n_{eff} = 1,630
Remarks	Effective sample size should be large enough so long as response rate exceeds 65%

Special Features of the design	Disproportionate sampling by strata to reflect anticipated variation in response rates.

Country: **Denmark**
NC: Torben Fridberg
Survey Institute: SFI Survey
Expert: Peter Lynn

Target Population, Population coverage	Persons 15 years or older who are resident in Denmark, regardless of nationality and citizenship, language or legal status.

Sampling frame	Danish Central Person Register (CPR). The CPR has approximately 99.9% coverage of persons resident in Denmark. All persons who expect to stay in Denmark for at least 3 months are included. Homeless persons without an address are excluded.
Remarks	It is not yet clear whether persons in institutions will be excluded – it is possible that prisons will be the only institutions to be excluded. However, this is not important as the sample is large enough that persons in institutions could be excluded at the analysis stage if needed (they will be few in number and identifiable).

Sampling design	Simple random sample of persons born before 1-9-1987

Design effects	No stratification, no clustering, equal probabilities, so DEFF = 1.00

Target response rate	75% is a realistic expectation, based upon other household surveys in Denmark.

Sample size	Gross sample size n_{gross} = 3,000 75% response rate Net sample size n_{net} = 2,250

Country:	**Finland**
NC:	Heikki Ervasti
Survey Institute:	Statistics Finland
Expert:	Peter Lynn

Target Population, Population coverage	All residents aged 15 and over, excluding only those in institutions (defined as prisoners plus those in permanent care in hospitals and similar institutions), commercial sailors, those temporarily away from their usual address (a small group - mainly people studying or working abroad) and those with no valid address information on the register. The total number of exclusions from all these categories is estimated at 70,000 (cf. Population of nearly 4 million). Foreign citizens are included if they have residency status.

Sampling frame	Population register

Sampling design	Single stage equal probability systematic sample (no clustering). Implicit stratification by region, sex and age.

Design effects	DEFF = 1.0 (no clustering, equal probabilities).

Target response rate	75%
Problems	It is thought that this is realistic

Sample size	With a gross sample size n_{gross} = 2,800, 1.5% ineligibles and a response rate of 75% a net sample size n_{net} = 2,800 ∗ 0.985 ∗ 0.75 > 2,050 can be expected.

Country:	**France**
NC:	Bruno Cautres, Etienne Schweisguth, Nadine Mandran
Survey Institute:	ISL
Expert:	Siegfried Gabler / Sabine Häder

Target Population, Population coverage	Persons 15 years or older who are resident within private households in France, regardless of nationality and citizenship, language or legal status.

Sampling frame	For stratification: INSEE population data (15 years or older) from the last census 1999
Remarks	Foreigners are excluded in the INSEE population data

Sampling design	Stratified three stage probability sampling
	Stratification: Table with 9 ZEAT areas and 6 agglomeration classes, i.e. 54 cells (9 empty). Each cell contains the corresponding population size.
	Stage 1: Allocation of 125 Primary Sampling Units to the defined cells using Cox Method of controlled rounding (done by ZUMA). Selection of PSUs (communities) from the cells according to the allocation.
	Stage 2: Selection of a fixed number of households from the selected PSUs via a random route procedure. Four start addresses per PSU are selected from the telephone book (no interview in these starting points). Thus, five more households have to be found via random route to get 20 households in the PSU. The households are listed in advance.
	Stage 3: Selection of an individual within a household via Last-Birthday-Method. An average of 12 interviews will be conducted in each PSU.

Design effects	$DEFF_c = 1 + (12 - 1) * 0.02 = 1.22$ $DEFF_p = 1.3$ $DEFF = 1.58$
Remark	$DEFF_p$ is due to unequal selection probabilities within households. Note, that $DEFF_p$ is computed on the basis of data for the whole population (not 15 +).

Target response rate	It is extremely difficult to estimate the response rate since a survey like this with strict probability sampling has been conducted in France only very rarely. The response rate is estimated to be about 60 %.
Problems	The target response rate of 70 % will probably not be achieved.

Sample size	Effective sample size $n_{eff} = 950$ Net sample size $n_{net} = 950 * 1.58 \approx 1,500$. Gross sample size n_{gross}: $1,500 / 0.6 = 2,500$. This means, in each registry about 20 households have to be drawn for the gross sample and 12 individuals have to be interviewed.
Problems	The effective sample size as well as the net sample size is below the ESS requirements. This is because of funding restrictions.

Country:	**Germany**
NC:	Jan van Deth, University of Mannheim
	Katja Neller, University of Stuttgart
Survey Institute:	Infas
Expert:	Seppo Laaksonen
Reference Survey:	ALLBUS 2002

Target Population, Population coverage	All persons aged 15 and over who are resident in Germany; two independent target populations, one for West Germany incl. West Berlin, and the other for East Germany incl. East Berlin.

Sampling frame	For stratification and selection of communities: Data base provided by the German Statistical Office (2002) and the Federal Statistical Offices. For selection of individuals: The registers of local residents' registration offices will be used for the selection of the individuals. In these offices, all foreigners living in Germany as well as German citizens are listed. The registers are updated continuously.

Sampling design	Stratified two-stage probability sampling separately for East and West Germany. Stratification: districts ∗ regional size categories; 1,085 strata in West Germany and 435 strata in East Germany. Stage 1: Selection of 100 communities (clusters) for West Germany, and 50 for East Germany. The communities are selected with probability proportional to the population size of the community (aged 15+). The number of communities selected from each stratum is determined by a controlled rounding procedure. The number of sample points is 108 in the West, and 55 in the East (some larger communities have more than one sample point). Stage 2: In each sample point an equal size of individuals will be selected by a systematic random selection process. This is done by using the local registers of residents' registration offices.

Design effects	DEFF is derived from the first stage of the sampling design, that means because of clustering, and from differing selection probabilities because of oversampling in East Germany. Given a mean cluster size of $b = 20$ and an intraclass correlation coefficient of $\rho = 0.02$ we get $DEFF_c = 1 + (20 - 1) * 0.02 = 1.38$ $DEFF_p \approx 1.1$; $DEFF = DEFF_c * DEFF_p = 1.52$

Target response rate	70%
Problems	A response rate of 70% seems to be rather unrealistic. In surveys with a comparable content and the same design about 50% are usual.

Sample size	Gross sample size $n_{gross} = 4,868$, Ineligibles: 10% Net sample size $n_{net} = 3,066$ persons (1,020 for the East and 2,046 for the West) The target sample size is so big that there will not be any problem to achieve the ESS effective sample size n_{eff} (3,066 / 1.52 = 2,017 > 1,500).

| Special Features of the design | - | Generally, the advantage of sampling from address registers is that at least minimal information is available on non-response cases (such as age, sex). For these variables the extent of sample bias can be estimated by matching participants and non-participants. Infas also offers selectivity analyses using information on individuals. If required, Infas can calculate redressment/adjustment weights, otherwise self-weighting is used. |
| | - | Oversampling of the East German population |

Country:	**Greece**
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Survey Institute:	EKKE (Greek National Centre for Social Research)
Expert:	Peter Lynn

Target Population, Population coverage	All persons aged 15 and over living in private households in Greece, excluding the Cyclades islands and the Dodecanese islands, apart from Rhodes. The "homeless" and institutionalised population are excluded.

Sampling frame	Area-based sampling, using frame of area units constructed from 2001 Greek Census.

Sampling design	Stratified three-stage probability sampling
	stages: area units (average 40 households), households, persons.
	Stage 1: Area units (PSUs) are sorted into 101 strata. Greater Athens is divided into 31 geographical strata, Greater Salonica into 9, and the rest of Greece into 61 strata, defined by degree of urbanisation (up to 8 categories) and region (10 regions). Sample size is allocated to strata in proportion to the (Census) number of households. The sample size is then divided into PSUs, based on 6, 7, or 8 sample households per PSU (fixed within strata). Within each stratum, PSUs are selected PPS. Total number of sampled PSUs is 438.
	Stage 2: Within each sampled area unit, interviewers will make a complete listing of all resident households (dwellings/ doors). For all towns and cities (83% of PSUs), the interviewer will be given a Census map clearly showing the area unit; for rural areas field supervisors will create a rough map and description of the boundaries. The completed listing will be passed to a field supervisor, who will then apply a random start and interval to select households systematically.
	Stage 3: 1 resident (15+) selected at random using Kish grid.

Design effects	$DEFF_p = 1.18$ (guess); $DEFF_{str} = 0.99$ (guess); $DEFF_c = 1.15$, based on $\rho = 0.04$, $b = 4.\overline{8}$ $DEFF = 1.18 * 0.99 * 1.15 = 1.34$
Problems	None. These are guesses, but sample size assumes DEFF will not exceed 1.4.

Target response rate	70%
Problems	This is really difficult to predict as there has been no similar survey in Greece

Sample size	Gross sample size $n_{gross} = 3,100$ 68% response rate Net sample size $n_{net} = 2,100$ interviews Effective sample size $n_{eff} = 1,570$ if DEFF = 1.34

Special Features of the design	The design produces an equal-probability sample of households. The only variation in selection probabilities - and hence weighting - will be due to selection of a random person within households.

Country:	**Hungary**
NC:	Peter Robert
Survey Institute:	Tarki
Expert:	Seppo Laaksonen
Reference Survey:	ISSP surveys carried out between 1986 and 2002

Target Population, Population coverage	All persons aged 15 and over who have a status of permanent residents in the territory of Hungary

Sampling frame	For selection of individuals: The logs of Central Register and Election Office are used. The Central Register and Election Office data are fully up-to-date, they can be used as a high quality source for sampling purposes. The database is updated online according to any kind of change in the population records (births, deaths, migration). All residents in Hungary are recorded and followed reliably and the database is accessible for sampling purposes on a legal way.
Remarks	Some groups of people are hardly accessible with the help of the residents' database, such as homeless people, people living temporarily abroad, people with uncertain residential background

Sampling design	Stratified two-stage probability sample: Stage 1: Settlements are categorized by size, geographical area and administrative status in different groups. The selection of 143 settlements (PSUs) is done Proportional to population size. Stage 2: For each settlement a number of individuals is specified taking into account the population size relative to the whole target population. The target sample units (individuals meeting the age criteria, i.e. being older than 15 years) are selected randomly from the pre-selected register database. The pre-selection of the register database follows the specified age criteria. According to the above described sampling procedure it is assured that each person being resident in Hungary and meeting the specified age criteria has equal likelihood to be chosen.

Design effects	$DEFF_p = 1$ $DEFF_c = 1 + (10.5 - 1) * 0.02 = 1.19$ $DEFF = 1.19$

Target response rate	65%
Remarks	In earlier similar surveys the response rate has been between 55-65%.

Sample size	$n_{gross} = 2,450$, ineligibles 6.5% (n = 160), response rate 65% $n_{net} = 1,500$ $n_{eff} = 1,500/1.19 = 1260$
Remarks	Both the net sample size and the effective sample size are below the ESS requirements.

Special Features of the design	There is no special oversampling or weighting technique used during the sampling procedure, however, after the data processing, there is a weight calculated for the whole sample based on the four-dimensional distribution of the demographic variables: gender, age, school, type of settlement. This weight provides an adjustment to the distribution of the target population.

Country:	**Ireland**
NC:	Richard Sinnott
Survey Institute:	Economic and Social Research Institute (ESRI)
Expert:	Sabine Häder
Reference study:	Irish Social and Political Attitudes Survey 2002 and others

Target Population, Population coverage	Persons aged 15 years and over who are resident in private households in the Republic of Ireland
Problems	15 year olds will only be interviewed with parental consent

Sampling frame	For stratification and selection of addresses: Computer-based National Electoral Register. This register is updated annually. The version of 2002/03 will be used.

Sampling design	Stratified three-stage probability sampling PSUs are aggregates of District Electoral Divisions (DEDs). There is a total of 3,440 DEDs in Ireland. PSUs are ordered geographically (north-south, east-west). This makes it possible to take a systematic sample giving an implicit stratification. Stage 1: Selection of 220 PSUs proportional to size of population. Stage 2: Systematic sample of 19 to 20 addresses within each PSU. Addresses are sorted by geographical propinquity. Stage 3: Random selection of one individual within each household (Next-Birthday-Method)
Problems	- Given the nature of the sampling frame, which is the only one available in Ireland, one is constrained to use the population aged 18 and over in selecting the PSUs. - The sample from the electoral register is a sample of addresses. In effect this is very close to a sample of households in Ireland as there is a very low level of multi-household occupancy at addresses in Ireland. If there is more than one household behind an address the household to be interviewed is selected via Kish grid (given the nature of the electoral register the chances of more than one household at any address are very small indeed).

Design effects	$DEFF_c = 1 + (11 - 1) * 0.02 = 1.2$ $DEFF_p = 1.33$ $DEFF = 1.6$
Remark	Differential household sizes between PSUs are already included in the calculation of the design effect $DEFF_p$.

Target response rate	About 63%
Problems	The target response rate (70%) will not been reached.

Sample size	A net sample of size $n_{net} = n_{eff} * DEFF = 1,500 * 1.6 = 2,400$ interviews will be conducted. With 10% of ineligibles and a response rate of about 63% the gross sample size must be $n_{gross} = 2,400 / (0.63 * 0.9) = 4,233$. For each cluster 19 to 20 addresses have to be drawn. That results in an average of 11 interviews per cluster.

Special Features of the design	Given the sample design it is necessary to re-weight the data according to household size due to unequal selection probabilities. This is implemented as a standard procedure in our samples and is discussed in the written documentation previously provided by the ESRI.

Country:	**Israel**
NC:	Noah Lewin-Epstein (noah1@post.tau.ac.il)
Survey Institute:	Institute for Social Research/Cohen Institute
Expert:	Siegfried Gabler

Target Population, Population coverage	The survey will be representative of all persons aged 15 and over (no upper age limit) resident within private households in Israel, regardless of their nationality, citizenship, language or legal status. A) The target population includes the Jewish population residing in West-Bank and the Gaza-Strip (about 200,000). B) The target population does not include the Palestinian residents of (East) Jerusalem (about 200,000). The size of the target population is 3,835,994.
Remarks	Concerning A) This is a deviation from the ESS-specifications but „these individuals are very much a part of the fabric of Israeli society". Concerning B) "This is mostly for practical and technical reasons. These residents refuse to cooperate with Israeli official or semi-official activities. The Israeli Central Bureau of Statistics (CBS) has noted the extreme difficulties in collecting data in these areas and has essentially given up on it. Moreover, in the current situation interviewers would be at risk walking in these neighbourhoods and searching for addresses."

Sampling frame	For selection of households: The sampling frame is the telephone directory (containing 95% of all households; matching the list of addresses is possible)
Problems	Population of - nomads (Beduin), not included in the sampling frame - Arabs in small rural communities (1/3 do not have a phone)

Sampling design	Stratified three stage probability sampling: Israel is stratified into 11 strata consisting of 2,356 statistical areas (PSUs). Stage 1: Statistical areas 200 PSUs are selected proportional to sizes (all persons aged 15 and over within a statistical area) Stage 2: Housing units Fixed number of 18 housing units inside a statistical area is selected by simple random sampling. If a housing unit contains more than one household each of them belongs with equal probability to the sample. Stage 3: Individuals A person aged 15 and over in each of the selected households is selected by Last Birthday Method

Design effects	The intra-cluster correlation is assumed to be $\rho = 0.02$
	$DEFF_c = 1 + (12 - 1) * 0.02 = 1.22$
	$DEFF_{p1} = 1.29$
	$DEFF_{p2} = 1.01$ (Oversampling)
	$DEFF = DEFF_c * DEFF_{p1} * DEFF_{p2} = 1.59$
Remark	The sample size in the first stratum is 0.84 of the whole sample size.

Target response rate	70%

Sample size	Gross sample size $n_{gross} = 200 * 18 = 3,600$
	Net sample size n_{net} = (Gross sample size - p% ineligibles) * Target response rate = $3,600 * 0.95 * 0.7 = 2,394$
	Effective sample size n_{eff} = Net sample size / DEFF
	$= 3,600 * 0.95 * 0.7 / 1.59 = 1,506$

Special Features of the design	Oversampling (about 1.4) of Arab-residents
Problems	Oversampling influences the design effect

Country:	**Italy**
NC:	Antonio Schizzerotto, University of Milano Biccocca
Survey Institute:	TNS Abacus
Expert:	Peter Lynn

Target Population, Population coverage	All persons aged 15 and over, currently resident at a private address in Italy, regardless of nationality or legal status.

Sampling frame	For selection of addresses: Electoral register
Problems	Persons living at an address where there are no registered electors are excluded. The number of such persons is not known, but is believed to be very small.

Sampling design	Stratified four stage probability sampling.
	Stage 1: Municipalities are divided into 4 strata. Stratum A contains all municipalities with a population of 100,000+ residents. The other municipalities are divided into 3 regional strata (north-west; north-east and centre; south and islands). In each stratum, the number of selections is proportional to the total population of the strata. Muncipalities are selected *with replacement* with probability proportional to population size. The number of selections will be 125, though the number of distinct selected municipalities will be smaller, as some will be selected more than once (the largest municipality, Roma, would be expected to be selected 6 times, for example, and the second-largest, Milano, 3 times).
	The number of addresses to select from each municipality, n_i, is 24 multiplied by the number of times the municipality was selected.
	Stage 2: $n_i/6$ electoral precincts are selected (electoral precincts contain an average of 600 electors.) For logistical reasons, it is not possible to select precincts PPS so they will be selected with equal probabilities. However, there is very little variance in size of precincts, and the size will in any case be captured for possible use in weighting if needed.
	Stage 3: 6 addresses are selected from each electoral precinct with probability proportional to the number of electors at the address. This is achieved by selecting a simple random sample of electors.
	Stage 4: The interviewer will list all persons aged 15+ currently resident at the address and will randomly select one for interview using a Kish-grid method.
	The first stage will be carried out by the National Co-ordinator; the second, third and fourth stages will be carried out by the fieldwork contractor.

Design effects	There is some small variation in selection probabilities to be expected, due to differences between number of electors at an address and number of residents aged 15+: $DEFF_p = 1.01$ $DEFF_c = 1 + (4 - 1) * 0.03 = 1.09$ $DEFF = 1.10$

Target response rate	70%
Problems	Realistically, high-60s are possible. Sample size calculation is based on assumption of 68% response.

Sample size	n_{gross} = 3,000; anticipated 98% eligible, 68% response, n_{net} = 2,000 n_{eff} = 1,820

Special Features of the design	Weighting by N_j/E_j, where N_j is number of current residents aged 15+ at address j and E_j is number of registered electors at address j. Note that <u>both</u> of these data will be collected by interviewers, as it is not possible to collect E_j at the time of sampling from the electoral registers.

Country:	**Luxembourg**
NC:	Uwe Warner, CEPS (uwe.warner@ceps.lu)
Survey Institute	CEPS
Expert:	Peter Lynn

Target Population, Population coverage	All persons aged 15 and over living in private households in Luxembourg.

Sampling frame	Social security register (Inspection générale de la sécurité sociale (IGSS), as at December 2001). This is a list of "tax units" (one or more persons who are treated collectively for tax purposes). Approximately 91% of resident adults are on the IGSS, the exceptions being EU civil servants and employees of international organizations and foreign banks.
Problems	Persons living in households where no household member is on the IGSS have no chance of selection. This under-coverage of the target population, will consist mostly of the categories mentioned above. It will also include some persons who were in the same household as a tax unit head in December 2001, but not at the time of ESS fieldwork. This could include some young persons who have become tax registered for the first time in this period and some members of couples who have "split" during this period.

Sampling design	Stage 1: The IGSS is sorted into 41 strata, defined by labour market status (14 categories) x size of household (3 categories) (there is one empty stratum). An independent random sample of tax units is selected from each stratum, using variable sampling fractions in order to achieve a minimum selected sample of 60 units per stratum (with one exception, a particularly small stratum where only 11 units are to be selected). The largest sampling fraction is 20 times the smallest one, and the DEFF due to variable sampling fractions at this stage is estimated to be 1.33. In total, 5,033 tax units will be selected. The sample will **not** be clustered. Stage 2: The household to which each of the 5,033 tax unit heads belongs will be identified in the field and a random selection of one person aged 15 or over in the household made using the last birthday method.
Remark	The selection probability for each person in household i in stratum j is proportional to $F_j R_{ij}/N_{ij}$, where R_{ij} is the number of tax reference persons in the household, N_{ij} is the total number of eligible persons in the household, and F_j is the sampling fraction of tax units in stratum j. Both R_{ij} and N_{ij} will be collected in the ESS interview and included on the data set, to permit calculation of design weights.

Design effects	DEFF$_P$ = 1.40 (guess); DEFF$_C$ = 1.00 (no clustering); DEFF = 1.40
Remark	DEFF is difficult to predict, as the distribution of R_{ij}/N_{ij} is unknown. If $R_{ij}/N_{ij} = 1.0$ in all cases, then DEFF can be expected to be 1.33. Extra variation in R_{ij}/N_{ij} is likely to increase DEFF above this figure. DEFF could easily be as high as 1.60 if most households have $R_{ij} = 1$.

Target response rate	30%
Problems	The target response rate will not be reached.

Sample size	Gross sample size n$_{gross}$ = 5,033; 30% response: Net sample size n$_{net}$= 1,510 interviews Effective sample size n$_{eff}$= 1,080 if DEFF = 1.40

Special Features of the design	The need to estimate selection probabilities from the interview data, as described above.

Country:	**The Netherlands**
NC:	Peer Scheepers
Survey Institute:	GfK
Expert:	Siegfried Gabler

Target Population, Population coverage	The survey will be representative of all persons aged 15 and over (no upper age limit) resident within private households in the Netherlands, regardless of their nationality, citizenship, language or legal status. Intra-murals (1.3%) and the sailing and trucking persons are excluded from the gross sample.

Sampling frame	For selection of addresses: Postal delivery points from 'PTT-afgiftenpuntenbestand'

Sampling design	Two stage probability sampling: (no stratification) Stage 1: Postal delivery points (excluding P.O. boxes and business addresses) selected with equal probabilities Stage 2: Person within a household are selected with Next-Birthday- Method If more than one household belongs to a postal delivery point up to 5 households are added to the gross sample and one person within a household is selected (Next-Birthday-Method).
Problems	Under-representation of persons living in larger households, which is very rarely.

Design effects	The sampling design does not contain any clustering. The design effect is only due to differing selection probabilities. $DEFF_p = 1.19$

Target response rate	70%

Sample size	Gross sample size $n_{gross} = 3,565$ persons Net sample size n_{net} = (Gross sample size - 5% ineligibles) ∗ Target response rate = 2,371 Effective sample size $n_{eff} = n_{net}$ / $DEFF_P \approx 2,000$

Country:	**Norway**
NC:	Kristen Ringdal (kristen.Ringdal@svt.ntnu.no)
Survey Institute:	Statistics Norway (Oyven Kleven = kle@ssb.no)
Expert:	Seppo Laaksonen
Reference Survey:	The Norwegian Electoral Survey

Target Population, Population coverage	All persons aged 15 and over living in Norway.

Sampling frame	For selection of individuals: The BEBAS Population Register which is a working copy of the National Population Register from 1st January 1999. This will be updated monthly. For the ESS, the latest update will be available from July 2002. The frame covers Norwegian citizens who are not registered living in another country and non-Norwegian citizens who are registered living in Norway excluding students.

Sampling design	Stratified two-stage probability sampling Stage 1: The country is divided into a set of PSUs. The starting point are the 435 municipalities in 19 counties. Some municipalities are collapsed and thus 363 PSUs are obtained. These are divided into 109 strata. All PSUs with more than 30,000 inhabitants, and some with a population number between 25,000 and 30,000, constitute separate strata. For the remaining PSUs as homogeneous strata as possible are formed. As stratification variables are used: industrial structure, number of inhabitants, centrality, communication structures, commuting patterns, trade areas and local media coverage. The stratification is done in such a way that no PSU has less than 7% of the total population in its stratum, and separately for each county. PSUs that are separate strata (thus, larger municipalities) are drawn with certainty (type I). The remaining are drawn with a probability proportional to the number of inhabitants in the sample area (type II). Thus, one PSU (sample area) from each stratum is selected, together 109 PSUs. Stage 2: A sample of survey units = persons is selected from the 109 strata using systematic random sampling. The sampling fraction at the second stage is proportional to the inverse selection probability at the first stage. For type I, 12 units are selected and for type II, 8 units, respectively. It is thus aimed at giving self-weighting when both weights are taken into consideration.
Remarks	Stratification was done in 1994, but Statistics Norway does not see any problems with the lack of update. They normally keep the plan for around 10 years. Next round they will have an exact estimate of the costs based on simple random sampling.

Design effects	Total design effect DEFF = 1.5 based on the experience of the previous surveys. For $\rho = 0.02$, $DEFF_c \approx 1.18$, $DEFF_p \approx 1.27$

Target response rate	70%

Sample size	$n_{gross} = 3,215$, for about 10 – 20 ineligibles and a response rate of 70% $n_{net} = 2,250$ $n_{eff} = n_{net}$ / DEFF = 1,500

Country:	**Poland**
NC:	Pawel B. Szabinski, Institute of Philosophy and Sociology, Polish Academy of Sciences (psztabin@ifispan.waw.pl)
Survey Institute:	Center for Social Survey Research, Institute of Philosophy and Sociology (survey organisation and fieldwork); MRInsight (sampling and data processing) (e-mail: Z.Sawinski@MRInsight.pl)
Expert:	Seppo Laaksonen
Reference Survey:	Poles-2000, Eurobarometer 38.1

Target Population, Population coverage	All persons aged 15 and over who have a status of permanent residents in the territory of Poland.

Sampling frame	For selection of individuals:
	The logs of the Ministry of Internal Affairs and Administration (PESEL) are used. The PESEL data are a high quality source for sampling purposes. It is updated online for births, deaths, and any change of permanent living address.
	Some categories of people are not covered by PESEL data: institutional population, foreigners working at black market, homeless, people temporary not available.

Sampling design	Stratified one / two - stage probability sampling
	The country will be divided into two exclusive and exhaustive parts.
	Stage 1: The first part covers the population living in towns of 100,000 inhabitants or more. This part of a sample will be selected as a simple random sample.
	The number of this kind of towns is 42, and their target population about 31% of the whole population.
	Stage 2: The second part corresponds to the rest of the population – people living in towns of 99,999 inhabitants or less and people living in rural areas. This part of the sample will be stratified and clustered (158 clusters).
	The sampling of the second part is based on a two-stage design:
	The sampling frame is first stratified by geography (8 regions) and urbanicity (4 categories), providing 32 strata. For each stratum, the required number of PSUs is established, taking into account a constant cluster size. Then the PSUs are selected with probability proportional to size. The definition of a PSU is different for urban vs. rural areas. For urban areas, a PSU is equivalent to a town, whereas for rural areas, it is equivalent to a village.
	In the second stage, a cluster of respondents is selected in each PSU. The procedure bases on generating random numbers and checking, if a pointed person meets the criterion of a date of birth. It is assumed that the strategy is equivalent to simple random sampling. A cluster size of 12 individuals seems to be optimal.

Design effects	There is no clustering design effect in the first part of the sample.
	In the second part, the clustering design effect is anticipated to be $DEFF_c = 1.22$. Thus, the weighted average for the total sample is $DEFF_c = 1.14$. The $DEFF_p = 1.02$ results from unequal probabilities of selection in different urbanicity categories.
	The average total DEFF = 1.16.

Target response rate	70.7% on average but lower in big cities and higher in rural areas.

Sample size	Gross sample size $n_{gross} = 2,978$
	Overcoverage and ineligible cases = 151
	Net sample size $n_{net} = 2,000$ persons
	Effective sample size $n_{eff} = 1,718$

Special Features of the design	The differences in anticipated response rates by region (e.g. in Warszawa just above 50% and in some rural areas higher than 80%) are taken into account.

Country:	**Portugal**
NC:	Jorge Vala, University of Lisbon (jmvs@ics.ul.pt)
Survey Institute:	Euroteste (euroteste@ip.pt)
Expert:	Seppo Laaksonen
Reference Survey:	European Values Study 1999

Target Population, Population coverage	All persons aged 15 and over who are resident in the mainland of Portugal (this excludes some islands) and who are not permanently living in institutions or in similar environments. However, there are some population groups which cannot be reached and factually will be excluded from the target population (altogether the proportion of these groups – people living in localities with less than 10 dwellings – is less 3%):
	- people who cannot be interviewed due to language (foreign-based) and ability (mainly elderly people) problems,
	- some small rural villages which are to be too expensive to interview,
	- homeless people,
	- people who are residents of Portugal but working most of time outside the country,
	- retired and other non-employed foreigners mainly in Algarve who's status is not clear and who are living in special residences.

Sampling frame	For stratification: The frame covers all regions of the mainland of Portugal, except some rural villages. The information for the frame is available from the population census of 2001 for all persons 15 years and older.

Sampling design	Stratified four-stage probability sampling
	Stratification:
	- 5 regions by gender,
	- 3 age groups by gender,
	- 5 regions ∗ 5 municipality (habitat) size classes
	Altogether 22 strata because the biggest size class is missing in three regions. Within each stratum, the number of the so-called localities (these are administrative areas with varying sizes; e.g. the major part of Lisboa is one locality) is known. For the ESS 100 localities are selected. This number is allocated to each stratum proportionally to size. Respectively, the number of the anticipated respondents for each stratum is determined based on proportional allocation. Moreover, some over-sampling for such strata where the anticipated response rate is lower than the average is required.
	Stage 1: Selection of 100 localities
	Stage 2: Selection of one or more PSUs from each locality proportionally to size (all together 150 PSU's)
	Stage 3: In each PSU street study (random-route technique) for selection of households. The starting point is defined using two different ways: For the localities where a good map is available (this is a typical case), the select the co-ordinates for the starting point with a random method, and for the others localities, they use a random selection with the help of the telephone book. The proportion will be 50% for each method. In the small localities is more difficult to obtain a good map.
	Stage 4: Selection of the individuals: Last birthday Method.

Design effects	Average cluster size = 7.5, hence $DEFF_c = 1 + (7.5 - 1) * 0.02 = 1.13$
	$DEFF_p = 1.1$
	$DEFF = DEFF_c * DEFF_p = 1.13 * 1.1 = 1.24$
Problems	$DEFF_p$ seems to be to low

Target response rate	75%
Problems	The estimation is very optimistic.

Sample size	$n_{gross} = 2,260$
	$n_{net} = 1,695$
	$n_{eff} = 1,367$
Problems	Does not fulfil the two requirements of the ESS, that is, the effective sample size is below 1,500, and the anticipated net sample below 2,000, respectively.

Special Features of the design	Small regional over-sampling due to anticipated response rates

Country:	**Slovenia**
NC:	Brina Malnar (brina.malnar@Uni-Lj.si)
Survey Institute:	Public Opinion and Mass Communication Research Center (CJMMK)
Expert:	Siegfried Gabler

Target Population, Population coverage	The survey will be representative of all persons aged 15 and over (no upper age limit) resident within private households in Slovenia, regardless of their nationality, citizenship, language or legal status. The size of Slovenian population is sligthly below 2 million (1,965,000).

Sampling frame	For selection of individuals: The sampling frame is the Central register of population (CRP) and includes all residents with permanent address, citizens and non-citizens (in principle at least 99% of the population). Institutionalized persons (army, prisons) are included with their permanent addresses, but are unlikely to be reached by interviewers. The Central register represents a rather 'ideal' sampling frame for survey research. It is regularly updated. A maximum of 10% ineligible cases is expected, which is a conservative estimate, based on previous surveys.

Sampling design	Stratified two stage probability sampling: Slovenia can be divided into Clusters of Enumeration Areas(CEA). The total number of CEA is about 9,000. CEA are first stratified according to 12 regions ∗ 6 types of settlements. Stage 1: Selection of 150 PSUs Selection of fixed numbers of CEA inside strata is made by probability proportional to size of CEA. Stage 2: Selection of 15 SSUs per PSU Fixed number of individuals inside CEA is selected by simple random sampling.

Design effects	The intra-cluster correlation coefficient is estimated as $\rho = 0.05$, which is a conservative estimate, based on a 1997 sample with 140 PSUs. $DEFF = DEFF_c = 1 + (9 - 1) * 0.05 = 1.4$

Target response rate	66%

Sample size	$n_{gross} = 150 * 15 = 2,250$ $n_{net} = (n_{gross} - 10\% \text{ ineligibles}) * \text{Target response rate}$ $= (2,250 - 225) * 0.66 = 1,336$ $n_{eff} = n_{net} / DEFF = 1,336 / 1.4 = 955$

Country:	**Spain**
NC:	Mariano Torcal (mariano.torcal@cpis.upf.es)
Survey Institute:	Demoscopia (j.barandiaran@demoscopia.com)
Expert:	Seppo Laaksonen and Susan Purdon
Reference Survey:	EPA (Encuesta de Población Activa). It is the Spanish labor sample, conducted by the Public Statistical Office of Spain (INE)

Target Population, Population coverage	All persons aged 15 and over who have a status of permanent residents and living in private houses in Spain, except Ceuta and Melilla (the exclusion is based on a practical problem, covering 0.3% of the Spanish population)

Sampling frame	For stratification and selection of households:
	There are two official lists of inhabitants: the national Census conducted every ten years by the INE and the municipal roll continuously updated. INE (Public Statistical Office of Spain) has selected a master sample of electoral sections from this frame. This is a large representative sample with full sociodemographic data from Spain. The master sample is composed of nearly 3,500 sections (from a national total of 33,000) and 65,000 households. The master sample is continuously updated. The ESS sample will be drawn from the 2002 master sample.

Sampling design	Stratified two-step/three-stage probability sampling
	Step 1: Selection of the master sample
	Step 2: Selection of the ESS sample from the master sample
	Stratification: Set up of 34 strata resulting from the crossing of 17 regions with two categories of population sizes (areas with a population less than 500,000 inhabitants (= bracket 1) and over 500,000 inhabitants (= bracket 2)).
	Stage 1: Random selection of electoral sections in each stratum with probability proportional to the number of households in the section. The total number of sections is 346; 121 of them in urban areas. Sections will be selected by the INE from the INE master sample sections frame.
	Stage 2: Random selection of 10 (bracket 1) or 12 households (bracket 2) per section depending on the bracket. The households will be selected by the INE.
	Stage 3: Selection of an individual per household using the last birthday method.

Design effects	$DEFF_p = 1.16$
	$DEFF_c = 1.20$
	$DEFF = 1.39$

Target response rate	70%.
Remarks	Very optimistic. For the computation of the sample sizes much lower response rates were used.

Sample size	n_{gross} = 3,702 (2,250 in bracket 1 and 1,452 in bracket 2) Overcoverage and ineligible cases = very low. n_{net} = 2,076 (1,350 in bracket 1 and 726 in bracket 2) n_{eff} ≈ 1,500 It is expected to get 6 interviews per PSU (electoral section). For bracket 1 this means a response rate of 60%, for bracket 2 this means a response rate of 50%.
Remarks	The quality of the frame is very high and overcoverage and undercoverage are expected to be low.

Special Features of the design	There is some oversampling for bracket 2, areas with population 500,000+.

Country:	**Sweden**
NC:	Stefan Svallfors (stefan.svallfors@soc.umu.se)
Survey Institute:	Statistics Sweden
Expert:	Susan Purdon/Siegfried Gabler

Target Population, Population coverage	Persons 15 years or older who are resident in Sweden, regardless of nationality and citizenship, language or legal status.

Sampling frame	For selection of individuals: The frame to be used is the register of the population, which includes all individuals living in Sweden. The frame is extremely well suited for this kind of sampling due to the full coverage of the total population. Updating: The register is updated continuously. Individuals that do not reside on the address stated in the register will be traced through the use of complimentary registers. Individuals residing in the country illegally can, naturally, not be selected, but the proportion of such individuals is small in Sweden and is thus unlikely to cause any substantial bias. The sampling frame includes those living in institutions, since there is no way to filter them.
Remark	First contact in Sweden should be best done by telephone for setting up the interview. The register of the population does not include telephone numbers so the selected individuals will be matched for this after the selection process, both by registers and manually in those cases were registers prove to be non sufficient. This procedure will cause a very small number of individuals (about 200) that cannot be traced (due to e.g. non-registered phone numbers, 1.5%, and so on). An interviewer will be sent to call on the 200 for which no telephone number exists. In addition, "soft" telephone refusals are followed up with a face-to-face contact.

Sampling design	Single stage (without clustering) probability sampling Fully random sample of individuals (equal probability selection) born before 1 September 1987

Design effects	No stratification, no clustering, equal probabilities, so DEFF = 1.00

Target response rate	75% (14% non contact, 11% refusals)

Sample size	n_{gross} = 3,000 selected persons; n_{net} = (3,000 - 70) ∗ 75% response = 2,198 interviewed n_{eff} = 2,198 / DEFF = 2,198
Remark	The number of ineligibles (died/emigrated/disappeared/living abroad) is about 40, the number of people living in institutions is estimated as about 30.

Special Features of the design	No over-sampling of specific groups.

Country:	**Switzerland**
NC:	Dominique Joye
Survey Institute:	MIS Trend Lausanne
Expert:	Sabine Häder
Reference Survey:	Eurobarometer 2001

Target Population, Population coverage	Persons 15 years or older who are resident within private households in Switzerland, regardless of nationality and citizenship, language or legal status. Homeless and institutional populations are excluded.

Sampling frame	For stratification: The telephone numbers are coded geographically according to the "Numero postal d'acheminement" (NPA) which defines a general grid over the country. For the selection of households: The telephone register is the only available frame for national social surveys in Switzerland. The Swiss Statistical Office has the possibility to access to the whole telephone register – that means the non-published numbers are included as well – for public interest surveys. Users of mobile phones are also listed in this complete register if they have a long-term contract and no fixed line. The degree of coverage that can be obtained by using this frame is more than 95% of all households.
Remarks	Households without telephone or with mobile phones without long term contracts are not included in the frame (about 5% of the households). Holiday houses are rejected.

Sampling design	Stratified three stage probability sampling Regional stratification: six groups of NPAs Stage 1: Selection of 220 PSUs (NPAs). The sampling is done with probabilities proportional to the number of households listed in the telephone register. Stage 2: Simple random sampling of about 30 households in the chosen PSUs Stage 3: Random selection of a respondent in each household according to Kish grid

Design effects	$DEFF_c = 1 + (10 - 1) * 0.02 = 1.18$ $DEFF_p = 1.25$ $DEFF = 1.47$

Target response rate	A response rate of about 40% has to be expected in the case of telephone recruitment, even a little bit lower in the case of direct recruitment.
Problems	The target response rate of 70% will not be achieved. This expectation results from the Eurobarometer 2001 where also only about 40% could be reached

Sample size	Given the target effective sample size (n_{eff} = 1,500) and the design effect (DEFF = 1.47), the net sample will include at least $1,500 * 1.47 = 2,205$ respondents for Switzerland.
	The gross sample size will be n_{gross} = 6,660, approximately three times the expected number of interviews. 14% ineligibles (3% non contact, 8% bad number, no household, etc., 3 % still of holidays houses) are expected.
	In case of telephone recruitment (170 PSUs) a response rate of 40% is expected, in the case of face to face recruitment (52 PSUs) a response rate of 35% is realistic. That means n_{net} = 2,224.
	Case telephone recruitment, 170 clusters:
	n_{net1} = $5,100 * 0.86 * 0.4 = 1,754$
	Case FAF recruitment, 52 clusters
	n_{net2} = $1,560 * 0.86 * 0.35 = 470$
	n_{net} = $1,754 + 470 = 2,224$

Special Features of the design	First contact and selection of the target person will be done via face to face in 52 clusters and telephone in 170 clusters with a visit in case of refusal or non-response. The clusters are assigned to the two contact modes randomly, stratified by region. That is a specific method in order to increase the response rate in Switzerland.

Country:	**Turkey**
NC:	Yilmaz Esmer
Survey Institute:	
Expert:	Sabine Häder / Siegfried Gabler

Target Population, Population coverage	Persons 15 years or older who are resident within private households in Turkey, regardless of nationality and citizenship, language or legal status.

Sampling frame	To select the provinces and registries: Population data from the last census 2000. To select the households: Voter registries, updated for last election in November 2002.
Problems	- The data used for the selection of the provinces and registries are from the whole population, not only from those who are 15 years or older. However, the correlation between both distributions is about 0.99. - Foreigners can only be reached if they live in a household where at least one Turkish voter is resident. However, the response rate of foreigners living in Turkey is predicted to be extremely low anyway (language problems). To verify this, an experiment is conducted (see Special Features Box below) - People living in households without any voter cannot be reached. The number of these households is small enough to be neglected.

Sampling design	Stratified four stage probability sampling Stage 1: One part of the sample: 7 Self-representing provinces with a population of more than 1.7 Mio inhabitants each. Second part of the sample: Remaining provinces Implicit stratification of these remaining 73 provinces: 9 regions, Human Development Index Selection of provinces: 33 provinces are selected with systematic proportional to size random sampling Thus, altogether 40 out of 81 provinces are considered. Stage 2: Selection of voter registries within provinces: 200 PSUs (voter registries) are allocated proportional to population size to the selected 40 provinces (done by ZUMA) as follows: 75 registries are selected within the self-representing provinces and 125 registries are selected within the remaining provinces. Voter registries within the provinces are selected with systematic random sampling.

Sampling design	Stage 3: Selection of households: From each voter registry a list of households is derived. From that, a fixed number of households is selected randomly. Stage 4: Selection of individuals: The person to be interviewed is selected with a "Lottery-method". To do this, the interviewer prepares cards with the names of all persons living in the household. A person belonging to the household draws one card with the name of the person to be interviewed. About 11 individuals have to be interviewed in each registry.
Remark	With the "Lottery-Method" we hope to increase the acceptance of the within-household-selection.

Design effects	$DEFF_c = 1 + (11 - 1) * 0.02 = 1.2$ $DEFF_p = 1.23$ $DEFF = 1.48$
Remark	$DEFF_p$ is due to unequal selection probabilities within households. Note, that $DEFF_p$ is computed on the basis of data for the whole population (not 15 +).

Target response rate	The response rate is estimated to be about 60 %.
Problems	It is extremely difficult to estimate the response rate since a survey like this (i.e. interview length 90 minutes, strict probability sample) has never been conducted in Turkey before. The target response rate of 70 % will probably not be achieved.

Sample size	Effective sample size n_{eff} = 1,500. Net sample size n_{net} = 1,500 $*$ 1.48 = 2,220. Gross sample size n_{gross} = 2,220 / 0.6 = 3,700. This means, in each registry about 18-19 addresses have to be drawn for the gross sample and 11 individuals have to be interviewed.

Special Features of the design	An experiment will be conducted to explore the co-operation rate of foreigners. For that, in 15 additional registries we do not select households but streets. Within these streets the target households will be identified by a random route. This way it is also possible to reach households with only foreigners. The interviews conducted in these experimental registries will not be included in the official ESS data set.

Target Population, Population coverage	Persons 15 years or older who are resident in the United Kingdom (i.e. England, Wales, Scotland and Northern Ireland), regardless of nationality and citizenship, language or legal status.

Sampling frame	For selection of addresses: There is a postcode address file (PAF) as sampling frame with over 27 million addresses in 1.71 million Postcodes. PAF is the main Address Database for Royal Mail, containing all known UK Postal Addresses and their associated Postcodes and Delivery Point Suffix information. Daily updated by Royal Mail.
Remark	- It has been estimated by the Office of National Statistics that PAF coverage is 96% of households and 97% of individuals. This is the best available sample frame in Britain. - Some of the delivery point information in a small part of Northern Ireland is excluded. - PAF contains also Jersey, Guernsey, and the Isle of Man.

Sampling design	For Great Britain (i.e. England, Wales, Scotland): Stratified three stage probability sampling: The (grouped where these have less than 500 delivery points) sectors will be stratified on the basis of 38 region and 1991 Census information. Within each region, sectors are to be listed in increasing order of population density. Stage 1: 162 postcode sectors (or grouped sectors) will be selected systematically with probability proportional to delivery point count. Stage 2: Selection of 24 delivery points Stage 3: one person aged 15+ at the selected address. This will be done by random methods as follows: - If there are several occupied dwelling units, one dwelling unit is selected using a Kish grid and computer-generated random numbers; - Within the (selected) dwelling unit, one person aged 15+ is selected using a Kish grid and computer-generated random numbers. For Northern Ireland: Unclustered sample of 125 addresses drawn from the Valuation and Land Agency's list of domestic properties (not available in Britain).
Remark	In Scotland, where multiple dwelling units at the address are common, the selection probabilities of addresses are expanded by the 'Multiple Output Indicator' (MOI) which is available on PAF. Thus, multiple-dwelling unit addresses already have higher selection probabilities. To correct for this we calculate the weights as follows: $$\frac{\text{number of dwelling units} \times \text{number of adults in selected household}}{\text{MOI}}$$ Wherever the MOI is correct, the number of dwelling units and MOI cancel each other out, reducing the size of the weights.

Design effects	DEFFc = 1.26 (estimated)
	DEFFp = 1.23 (after very slight trimming)
	DEFF = 1.55

Target response rate	Aim 70% but calculations for the issued sample are based on 65% response rate.

Sample size	n_{gross} = 4,013 addresses
	n_{net} = 4,013 ∗ 0.9 ∗ 0.65 = 2,348 interviewed
	(England 83%, Wales 5%, Scotland 9%, Northern Ireland 3%)
	n_{eff} = 2,348 / 1.55 = 2,348 / 1.55 = 1,515
Remark	10% ineligibles
	The computation of the effective sample size is not quite correct, since there is a boosted sample in Northern Ireland, but which is small compared to the sample in England + Wales + Scotland

Special Features of the design	No over-sampling in Great Britain.
	Funding has just been confirmed for a boosted sample in Northern Ireland, the aim being to achieve an additional 950 cases there.

5. General assessment

Altogether, almost all countries met the sampling requirements for the ESS. Although some countries never had applied a strict random method before we do not have to state any quota elements or any substitution of individuals or households in the plans we signed off. In so far the ESS samples are really a new quality in cross-cultural research. One exception from the ESS requirements is the target response rate of 70%, that was assessed as not realistic in some countries. Another exception affects the target net sample size. In some countries it was not possible to conduct 2,000 interviews due to budget limitations.

We want to give some remarks concerning details of the work of the sampling expert panel:

- The process of co-operation between the National Co-ordinator and the sampling expert usually started with a short description of the planned design given by the NC. As a reminder for the next round here is fixed what should be included:
  - the nature of the sampling units at each stage (e.g. addresses, persons);
  - description of the frame(s);
  - relative selection probabilities (e.g. equal probabilities or disproportionate);
  - any stratification to be used, implicit or explicit;
  - selected sample size, expected proportion ineligible, expected response rate; etc.
  - prediction of design effect
- The target response rate of 70% was realistic for most countries. Some countries expected to get between 60% and 70%. In a few countries this was not possible and an even lower response rate had to be expected. On the other hand, some countries hoped to get 75%. In the meantime most countries have finished their fielding period. From that we know that the anticipated response rates were realistic in most countries.
- The minimum net sample size (n=2,000) could be reached in most countries.
- For the evaluation of the effective sample sizes (n=1500) further analysis are necessary because the n_{eff} depends on the assumptions concerning design effects due to clustering and weighting in each country. In almost all countries there was no experience with taking design effects into account when calculating sample sizes.

  For two countries we have already estimated the "true" design effects. They are very similar to the predicted response rates (Gabler/Häder/Lynn 2003).

  The National Co-ordinators and the Survey Organisations in most countries were not very familiar with the concept of design effects. Therefore, they needed help from the sampling panel in estimating the different components of DEFF and in calculating the sample sizes.

In the next round this problem will be of less relevance because experiences from the first round can be considered.

- In countries with a Design effect $1 \leq DEFF \leq 1.33$ we had problems to convince the National Co-ordinators that a net sample size of 2,000 interviews is required. In a way, the ESS rule that fixes an effective sample size of 1,500 interviews and a net sample size of 2,000 interviews is not very motivating for improving the designs. But it has to be taken into consideration, that a large sample size is a prerequisite for sensibly analysing subgroups of the sample. For the next round an effective sample size of neff=1,500 is fixed in the "Specifications for participating countries". However, because of the above mentioned reason a minimum net sample size is not specified.

- In some countries it is usual practice to make first contacts via telephone. In particular, the Northern countries insisted on that procedure because otherwise the response rate would decrease rapidly. Contacting via telephone is of course no problem with an existing frame of individuals and the possibility of detecting the telephone numbers of the selected individuals. Therefore, we changed the rule that first contacts generally had to be attempted in all countries face to face. In Switzerland a special experiment is conducted as part of the ESS to lighten the question whether it is increasing or decreasing the response rate when first contacts are made via telephone.

- We have a large range in the numbers of PSUs. For example, Germany has only 163, Belgium and Austria have 324, Greece has 438 and so on. From the sampling point of view a possibility to decrease the total survey error is to motivate countries with a low number of PSUs to enlarge them.

- In more countries than we had expected we found regularly updated and more or less complete frames of individuals or households that could be used for sampling. The nature of theses frames is of course that they do not contain people who have an illegal status. The only countries where we theoretically could catch them are those few with random route elements in their designs. In the light of this situation the definition of the target population are revised for the next round (rejection of "regardless of ... legal status").

- In a few countries we had to state that the fieldwork had started before we finally signed off the sampling designs. Of course there were only some minor last questions open for clarification but we want to emphasise again that according to the "Specifications for participating countries" the signing off is the precondition for starting the fieldwork.

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Appendix 1: Table of measures of the designs for all countries (Design effects, response rates, No of PSUs, sample sizes)
Appendix 2: Sampling issues in the "Specifications for participating countries"
Appendix 3: Annex 1 of the "Specifications for participating countries" (Rules for estimating design effects)

Appendix 1: Table of measures of the designs for all countries

	Frame	Design effect			Anticipated Response rate (%)	n_{net}	n_{gross}	n_{eff}	PSUs
		DEFF$_c$	DEFF$_p$	DEFF					
Austria	Selection of individuals: Telephone book	1.1	1.4	1.5	65	2,250	3,847	1,500	324
Belgium	Selection of individuals: National register	1.1	1.0	1.1	65	2,000	3,239	1,818	324
Czech Republic	Selection of households: SIPO database	1.1	1.2	1.3	70	2,100	3,300	1,630	666
Denmark	Selection of individuals: Central Person Register	1.0	1.0	1.0	75	2,250	3,000	2,250	-
Finland	Selection of individuals: Population register	1.0	1.0	1.0	75	2,050	2,800	2,050	-
France	Area based	1.2	1.3	1.6	60	1,500	2,500	950	125
Germany	Selection of individuals: Local residents registers	1.4	1.1	1.5	70	3,066	4,868	2,017	163
Greece	Area based	1.1	1.2	1.3	70	2,100	3,100	1,570	438
Hungary	Selection of individuals: Central register	1.2	1.0	1.2	65	1,500	2,450	1,260	143
Ireland	Selection of addresses: National Electoral Register	1.2	1.3	1.6	63	2,400	4,233	1,500	220
Israel	Selection of households: Telephone register	1.2	1.3	1.6	70	2,394	3,600	1,506	200
Italy	Selection of addresses: Electoral register	1.1	1.0	1.1	70	2,000	3,000	1,820	125

	Frame	DEFF$_c$	DEFF$_p$	DEFF	Anticipated Response rate (%)	n$_{net}$	n$_{gross}$	n$_{eff}$	PSUs
Luxembourg	Selection of households: Social security register	1.0	1.40	1.40	30	1,510	5,033	1,080	-
Netherlands	Selection of addresses: List of postal delivery points	1.2	1.0	1.2	70	2,371	3,565	2,000	-
Norway	Selection of individuals: National Population Register	1.2	1.2	1.5	70	2,250	3,215	1,500	109
Poland	Selection of individuals: Personal records of population	1.1	1.0	1.1	71	2,000	2,978	1,718	200
Portugal	Area based	1.1	1.1	1.2	75	1,695	2,260	1,367	150
Slovenia	Selection of individuals: Central register of population	1.4	1.0	1.4	66	1,336	2,250	955	150
Spain	Selection of individuals: Municipal rolls	1.2	1.1	1.4	70	2,076	3,702	1,500	346
Sweden	Selection of individuals: Population register	1.0	1.0	1.0	75	2,198	3,000	2,198	-
Switzerland	Selection of households: Telephone book	1.2	1.2	1.5	40	2,205	6,660	1,500	220
Turkey	Selection of households: Voters registries	1.2	1.2	1.5	60	2,220	3,700	1,500	200
UK	Selection of addresses: Postcode address files	1.3	1.2	1.6	70	2,348	4,013	1,515	162

Appendix 2: Sampling issues in the "Specifications for participating countries"; Round 1 of the ESS

Specification for the Survey

1.Population coverage

The survey will be representative of all persons aged 15 and over (no upper age limit) resident within private households in each country, regardless of their nationality, citizenship, language or legal status. [Please note that questionnaires are to be available in all languages spoken as a first language by 5 per cent or more of the population and interviewers must be available to administer them (see 5.12). For speakers of certain minority languages, however, it may be possible to use or adapt the questionnaire from another participating country.] Potential under-coverage of certain groups, say because of language problems or sampling frame deficiencies, or for any other reason, must be discussed with the CCT and their expert panel prior to deciding on the final sampling method, so that the problem can if at all possible be remedied.

2.The sample

The sample is to be selected by strict random probability methods at every stage and respondents are to be interviewed face-to-face (see section 5.13). Procedures for selecting a household from a multi-household address, and an individual within a household will be specified and agreed in advance. In any event, the relative selection probabilities of every sample member must be known and recorded, as should any remaining systematic non-coverage problems. Quota sampling is not permitted at any stage, nor is substitution of non-responding households or individuals (whether 'refusals' or 'non-contacts').

3.Effective sample size

The **minimum number of actual interviews to be achieved is 2,000** (except in countries whose total population is less then 2 million, when the minimum number is 1,000). Irrespective of the actual number of interviews, however, the **minimum 'effective achieved sample size' should be 1,500**, after discounting for design effects (see Appendix 1), or 800 in countries with populations of under 2 million. Thus, each country should determine the appropriate size of its initial issued sample by taking into account the realistic estimated impact of clustering, eligibility rates (where appropriate) and response rate on the effective sample size.

4.Over-sampling

Over-sampling (or using different selection probabilities) among certain subgroups or strata is acceptable provided that the total sample still complies with the effective sample size criterion. For instance, if a low response rate in certain strata (say large cities) is predicted, it would be efficient to over-sample in large cities by a factor because the resultant non-response weight would largely cancel out the selection probability weight, minimising any loss of precision due to weighting. Similarly, certain minority groups may be over-sampled to permit separate analysis of them. However, over-sampling will only help to ensure that certain cells are better filled than they otherwise would have been. It will not influence the target overall response rate. Moreover, since over-sampling will also necessitate subsequent additional weighting of the data to correct for the different selection probabilities, any proposals to over-sample must be discussed and agreed in advance with the CCT and their expert panel (see Appendix 1).

5.*Documentation of sampling procedures*

The precise sampling procedures to be employed in each country, and their implications for representativeness, must be documented in full and submitted in advance to the CCT for reference to the expert panel and 'signing off'. This precaution is to ensure that all countries within the ESS have defensible (and equivalent) national probability samples of their adult populations. The final sample design will be fully documented in the national technical report of the survey. It will include details of the definition and description of the sampling units used at each stage, the degree of clustering, any stratification factors applied to the sampling frame, any over-sampling, and an assessment of the ways in which selection probabilities might otherwise have varied at each stage. Such documentation will be translated into one or more variables within the national data file to indicate the relative selection probabilities of cases and to enable appropriate weighting strategies to be calculated.

6.*Target response rates*

Outcomes of all approaches to addresses, households and individuals in the sample will be defined and recorded according to a pre-specified set of categories that distinguish non-eligibility, non-contacts and refusals. The proportion of non-contacts should not exceed 3 per cent of all sampled units, and the **minimum target response rate** - after discounting ineligibles (and other 'deadwood', as defined by the CCT) - **should be 70%**. This figure is likely to be exceeded in certain countries and the ESS as a whole would be damaged if major national variations in response rates were to occur. Survey organisations should thus cost their surveys with this response rate in mind and consider what steps may be required to achieve it.

Appendix 3: Appendix 1 of the "Specifications for participating countries" (Rules for estimating design effects)

Effective Sample Size

The effective sample size (neff) is the size of a simple random sample which would produce the same precision (standard errors) as the design actually used. Typically, neff is less than the actual number of achieved interviews, m, as certain aspects of survey design - for example, clustering or the use of differing selection probabilities - tend to reduce the precision of estimates. The reduction of precision is known as the design effect (DEFF):

DEFF = Actual sampling variance / Sampling variance with simple random samples of same size;

DEFF = m/neff, so neff = m/DEFF

We therefore need to be able to predict the value of DEFF for a proposed sample design, in order to determine how many interviews should be achieved so as to produce a particular value of neff. We suggest that two components of *DEFF* should be taken into account at the design stage - the design effect arising from differing selection probabilities ($DEFF_p$) and the design effect arising from clustering ($DEFF_c$) . Then $DEFF = DEFF_p$ x $DEFF_c$. We then also need to predict the survey response rate (and the proportion of ineligibles on the sampling frame, if relevant) in order to determine the size of the initial sample (n) required in order to achieve approximately m interviews.

Design Effects due to Differing Selection Probabilities

In some countries which have accessible population registers, it will be possible to select an equal-probability sample from the survey population. In other countries, it will be necessary to select the sample in stages, with the penultimate stage being residential addresses. In this case, each person's selection probability will depend on their household size. Another reason why differing selection probabilities might be used is if important minority groups were to be over-sampled.

If differing selection probabilities are to be used - for whatever reason - the associated design effect should be predicted. This can be done very simply, using the following formula

$$DEFF_p = \frac{m(\sum_i m_i w_i^2)}{(\sum_i m_i w_i)^2}$$

where there are m_i respondents in the ith selection probability class, each receiving a weight of w_i, where α means 'proportional to'

$$w_i \alpha \frac{N_i}{m_i}$$

(This formula assumes that the population variance of survey variables will not vary over selection probability classes - a reasonable assumption in most situations)

Design Effects Due to Clustering

It is anticipated that in most countries it will be efficient to select a multi-stage, clustered, sample. In such situations there will also be a design effect due to clustering:

$$DEFF_c = 1 + (b\text{-}1)\ \rho$$

where b is the mean number of respondents per cluster and ρ is the intra-cluster correlation (or "rate of homogeneity") - a measure of the extent to which persons within a clustering unit are more homogeneous than persons within the population as a whole (see Kish, 1994, Survey Sampling, pp. 161-164 (New York: Wiley and Sons, Inc.)). This design effect can be estimated, at least crudely, from knowledge of other surveys and/or the nature of the clustering units.

In practice, all elements of the overall design effect, including that due to differing selection probabilities and that due to clustering, will take different values for different survey estimates. For sample design purposes, an average value should be used.

Example: How to determine the size of issued sample

We have prescribed neff > 1500.

To determine m, we must first estimate $DEFF = DEFF_p \times DEFF_c$

1. Suppose the proposed clustering units are administrative areas of around 5,000 households on average and that based on data from other surveys, we expect that for these areas, ρ will take values of around 0.02 for many variables. Then, if we are proposing a design with a mean of 15 interviews per cluster:

$$DEFF_c = 1 + (15 - 1) \times 0.02 = 1.28.$$

[Note: If there is no available empirical evidence at all upon which to base an estimate of Δ, then we suggest that a value of 0.02 should be used.]

2. Suppose that the only available sampling frame is a list of addresses and that these must be selected with equal probabilities. The proposed design is then randomly to select one person to interview at each address. This is the only aspect of the proposed design that involves differing selection probabilities. Then, we can use population statistics on the distribution of household size to estimate the number of respondents in each selection probability class, thus:

No. of persons aged 18+ in household i	Proportion of households in population H_i/H	No. of achieved interviews m_i	Relative weight		
			w_i	$m_i w_i$	$m_i w_i^2$
1	0.35	0.35m	1	0.35m	0.35m
2	0.45	0.45m	2	0.90m	1.80m
3	0.12	0.12m	3	0.36m	1.08m
4	0.06	0,06m	4	0.24m	0.96m
5	0.02	0.02m	5	0.10m	0.50m

The population distribution of household size appears in the first two columns. From this, we can predict that the sample distribution will be as shown in the third column. We can thus predict $DEFF_p$:

$$DEFF_p = m \text{ x } 4.69m/(1.95m)^2 \qquad = \qquad 4.69/1.95^2 \qquad = 1.23$$

3. Thus, we predict DEFF = 1.28 x 1.23 = 1.57. Consequently, to achieve neff > 1,500 with this design, we would need m > 1,500 x 1.57 = 2,355.

4.   The final stage is to calculate the sample size to select initially in order to be likely to achieve around 2,355 interviews. Suppose we anticipate a response rate of 80% and that 5% of the sampling frame units will be ineligible (e.g. addresses which do not contain a resident household), then:

n = (m / 0.80) / 0.95   = 3 ,098

So we would select a sample of at least 3,100 addresses.