3rd European Quality of Life Survey

Data editing & cleaning report

EU27 and non-EU countries

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2. OVERVIEW

In autumn 2011, GfK EU3C conducted the 3rd European Quality of Life Survey (EQLS) in the 27 EU Member States on behalf of the European Foundation for the Improvement of Living and Working Conditions (Eurofound). In the first half of 2012 the EQLS was organised in 7 non-EU countries: Iceland, Turkey, Croatia, Macedonia, Kosovo, Serbia and Montenegro.

GfKEU3C in cooperation with the national agencies interviewed a total of 35,516 people in EU27, and 8,120 people in the non-EU countries. The EQLS puts a strong emphasis on quality. Each stage of the study was subjected to detailed documentation, and specific controls were put in place to verify compliance with the technical specifications. As part of the Quality Control for the 3rd EQLS data validation checks and following this data cleaning actions have been carried out by GfK EU3C. In this report one can find an overview of the data editing and the data cleaning that was done by GfKEu3C on these obtained data.

3. DATA VALIDATION: GENERAL APPROACH

Due to the use of one programming software with one master questionnaire a big part of the cleaning process is facilitated because of the good implementation of for example filters. Question Q3 "In your job, are you …" for example is only applicable to employed respondents, unemployed respondents were not able to respond to the given question. Filters and skips were thoroughly checked before the beginning of the field (via test interviews and dummy data files).

GfK EU3C accords great importance to data validation and data editing. The data editing rules and an overview of the error/warning messages to alert the interviewer in case of implausible/unaccepted responses are provided in Annex.

In order to draw the line between data manipulation and responsible data editing we follow a three step process:

- Screening Phase: systematically looking for problems with the data;
- Diagnostic Phase, identifying the condition of the suspect data;
- Treatment Phase, deleting or editing the data or leaving it as is.

Figure 1: source: Vandenbroeck J, Argeseanu cunningham S, Eeckels R, Herbst K (2005) Data cleaningDetecting, Diagnosing, and Editing Data Abnormalities, PLoS Med 2(10):e267

Screening phase

On regular moments frequencies were drawn for every question to check if the base is correct and logical for all questions. Normally every question should be answered by all respondents unless filters or skips have been set. These frequencies (descriptive research) aim at summarizing the results of all questions so as to gain deeper insight in the quality of the data obtained. Simultaneously, by systematically evaluating the summary content of each variable, the data can be assessed at a face validity level: do the results for the different questions seem plausible, do we get results that fall within our range of expectancy, can we make a common-sense interpretation of the scores?

Summarizing data is done on the basis of two main parameters:

- Central tendency: a description of the most typical response to a question
- Variability: the degree to which all of the respondents share this typical response or in other words how similar the respondents are with respect to a particular variable (or question).

Depending on the measurement level of the variables, central tendency and variability are calculated in a different manner. For categorical or qualitative variables (measurement level: nominal or ordinal), central tendency is computed by the mode (the value that occurs most frequently) or the median (the middle value when the data are arranged in a descending of an ascending order). The variability is given by the frequency or the percentage distribution. For metric variables (measurement level: interval or ratio scale), central tendency is represented by the average. The variability is given by the range and/or the standard deviation or the variance.

The descriptive research focuses on five different kinds of possible errors:

1. Lack of data – Do some questions have far fewer answers than surrounding questions?
2. Excess of data – Are there duplicate responses?
3. Outliers/inconsistencies – Are there values that are so far beyond the typical that they seem potentially erroneous? Is the interview duration in line with the expected length of the questionnaire?
4. Strange patterns – do patterns exist that imply cheating rather than honest answers? For instance, does a respondent alternate between ratings or does he consistently answers the maximum score?
5. Suspect analysis results – Do the answers to some questions seem counterintuitive or extremely unlikely?

The descriptive research is a process conducted in SPSS by means of syntaxes and via the GfK "Alberta" tool. Via SPSS syntaxes we focus on the "lack of data" and "outliers/inconsistencies". The "Alberta" software focuses on the 3 remaining steps as well as "outliers/inconsistencies". The checks conducted by "Alberta" are described in greater detail in a separate subchapter.

Diagnostic phase

The screening phase highlights data that needs investigation.

If the screening phase showed outliers, e.g. someone claims to have 80 rooms in his house (question Q17), the data will be put into perspective. Are we only questioning rich people or the general population, do other answers in the questionnaire indicate the respondent has reason to have this many rooms? If an explanation can be given, the result will be considered as a true extreme. If no obvious explanation can be given, Eurofound will be contacted to discuss a maximum[1] level. Responses

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[1] During the meeting of the 22nd February 2012 GfK and Eurofound will discuss which values are considered as outliers.

exceeding this level will be set as user missing values, and thus considered as an error. (see also treatment phase)

Next to outliers, also **missing values** will be examined in depth. Missing values can be random or non random. Non random missing values are people who didn't need to answer a certain question, they arise out of the filters which have been set. Random missing values do not result of a filter, they reflect the fact that people are not willing to answer a certain question or that they were not asked the question. This last isn't possible, because of the central programming and thorough checking process. But if a certain number of people refuse to answer a question, it should be checked if the respondents answering the question still reflect the population. If this is no longer the case, the question will not be analyzed further, because it is no longer a representative result.

For this diagnostic phase it is a necessity to have a good communication with the different countries present in the survey. Certain values might seem high, but can be perfectly logic from the view of a certain country.

Treatment phase

Once data are classified as not ok, three choices can be made:

1. Leave it unchanged – The most conservative course of action is to accept this data as a valid response and make no change to it. The larger your sample size, the less that one suspect response will affect the analysis; the smaller your sample size, the more difficult the decision.
2. Correct the data – If the respondent's original intent can be determined, than answers can be fixed. Within the EQLS main questionnaire, GfK EU3C already implemented several build in checks in the script itself e.g. if a respondent indicates "retired" and at the beginning of the questionnaire he/she stated the current age to be younger than 45 years; it pops up a warning to request a double check from the interviewer. Next to the build in checks, GfK EU3C verified consistency between contact sheet and the main questionnaire: number of household members 18+ as well as gender of those household members and selected respondent need to match. Inconsistencies were verified with the agency and amended if necessary.
3. Delete the data – If the data seems illogical and the value is so far from the norm that it will affect descriptive or inferential statistics, the data will be set as user missing values. If several errors are detected among one respondent, we will consider whether to delete this respondent as a whole.

4. DATA VALIDATION: CHECKING PROCESS IN "GFK ALBERTA-TOOL"

A decade ago, GfK developed "Alberta", an automatic checking tool. The purpose of this tool is multiple:

*   To improve the quality of surveys

- To reduce the input for an intensive unassembled examination of interviews
- To make data check more efficient
- To find implausible cases in the data before the statistical analyses
- For supervision of interviewers

The automated checking of interviews is becoming increasingly important within the area of data collection. Firstly the automatic checking of interviews leads to improvements in the quality of surveys. This makes it possible to ensure firstly that the client does not find implausible results in his data. Secondly the costs of checking individual interviews in detail can be substantially reduced. This makes it possible to organize the checking of interviews more efficiently. Furthermore, automated interview checking makes it possible to assess the interviewers.

These considerations formed the basis for developing a program for checking the quality of data generated by interview. The Interview Quality Program (ALBERTA) makes possible automated checking of interview quality.

Alberta provides four tests to check the quality of interviews and interviewers:

- Comprehensive check of consistency
- Interview variance analysis
- Internal check of consistency
- Identification of doubled interviews

A variety of methodological procedures are used for these quality checks.

The methodological procedures used in the ALBERTA Program for the automated checking of interviews are described in detail in the next paragraphs. It is necessary to note that this methodological procedure never leads to the automatic exclusion of interviews. Such decisions are the responsibility of GfK EU3C.

1. „Doubled Interview" analysis

When checking for doubled interviews, it is assumed that interviews which have been knowingly duplicated will differ at least in some details. The objective therefore is to identify interviews which are very similar.

The identification of doubled or very similar interviews is done by calculation the variance of responses to min 100 question. Interviews with small variances are categorized as suspicious.

The calculation of the variance is done using the following formula:

$$s_f = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left[X_{if} - \overline{X}_f \right]^2}$$

where:

s_f	= variance in Question f
n	= number of interviews (i = 1, 2,…, n)
X_{if}	= answer in Interview i to Question f
$\overline{X}_f$	= arithmetic mean of the answers to Question f, applied to all interviews.

Using this variance, the 100 variables with the greatest variance are identified.

In order to make the individual answers comparable, a Z-transformation is undertaken for each answer-value. A distribution which has been subject to a z-transformation has a mean of 0 and a variance of 1.

$$Z_{if} = \frac{X_{if} - \overline{X}_f}{s_f}$$

where:

Z_{if}	= the interval on Question f in Interview i, which has been submitted to a z- transformation
X_{if}	= answer to Question f in Interview i
$\overline{X}_f$	= arithmetic mean of the answers to Question f, applied to all interviews
s_f	= variance in Question f

The squared interval between answer-values is calculated with the following formula:

$$A_{ij} = \sum_{f=1}^{k} \left(Z_{if} - Z_{jf} \right)^2$$

where:

A_{ij}	= the squared interval between answer-values from interviews i and j

k   = number of questions (f = 1, 2, …, k).

A_{ij} can therefore be regarded as a measure of the similarity between interviews i and j. The smaller the difference, the greater the similarity between the two interviews. If the measure takes on the value of 0, then the two interviews being checked are completely identical in terms of the relevant variables with the greatest variance.

„Item Block" analysis

The internal consistency check is undertaken by checking the standard deviation in the answers to item blocks.

The standard deviation is calculated separately per item block and interview:

$$T_{1j} = \sqrt{\frac{1}{k-1}\sum_{j=1}^{k}[X_{ij} - \bar{X}_i]^2}$$

where:

$$\bar{X}_i = \frac{1}{k}\sum_{j=1}^{k}X_j$$

where:
k   = the number of items in the item block (j = 1,2,…,k)
i   = interview

$\overline{X}_i$ = mean answer by interviewee i to all items

Background:
The more frequently an interviewee enters a cross in the same place, the less he is thinking about the individual question. Excessive deviations suggest that the questions have probably been completed/answered on a chance basis. In order to evaluate the deviation, it is necessary to calculate T_{22}.

In a further stage, the average standard deviation per item block for each respondent is calculated. This leads to the determination of the following score:

$$T_{21} = \frac{1}{n} \sum_{i=1}^{n} \sqrt{\left(\frac{1}{k-1} \sum_{j=1}^{k} \left[X_{ij} - \overline{X}_i \right]^2 \right)}$$

where:
n   = number of interviewees/interviews (i = 1, 2,…, n)
k   = number of items in the item block (j = 1, 2, …, k)
i   = interview
$\overline{X}_i$ = mean answer by interviewee i to all items

Equally for each item block, the „standard deviation of the standard deviations" across all interviews is calculated:

$$T_{22} = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left\{ \sqrt{\frac{1}{k-1} \sum_{j=1}^{k} \left[X_{ij} - \overline{X}_i \right]^2} - \frac{1}{n} \sum_{i=1}^{n} \sqrt{\frac{1}{k-1} \sum_{j=1}^{k} \left[X_{ij} - \overline{X}_i \right]^2} \right\}^2}$$

where:
n   = number of interviewees/interviews (i = 1, 2,…, n)
k   = number of items in the item block (j = 1, 2, …, k)
i   = interview
$\overline{X}_i$ = mean answer by interviewee i to all items

This formula can be simplified as follows:

$$T_{22} = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left\{ T_{1,i} - \overline{T}_1 \right\}^2} = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left\{ T_{1,i} - T_{21} \right\}^2}$$

For further identification values the total mean value of a item block is calculated for all interviewees

$$\overline{X} = \frac{1}{n*k} \sum_{j=1}^{k} \sum_{i=1}^{n} X_{ij}$$

as well as the standard deviation of the mean answers of the interviewee.

$$S(\overline{X}_i) = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (\overline{X}_i - \overline{X})^2}$$

Four scores are generated for each interview. (The value of x is to be determined by the user – for instance 2.5%.)

1. **First: wide variance score**

The number of item blocks which have the x% highest standard deviations **and** whose individual standard deviation (T_{1i}) exceeds in an upwards direction by more than two standard deviations of the average standard deviation' (T_{22}) the average standard deviation (T_{21}).

2. **Second: narrow variance score**

The number of item blocks which have the x% lowest standard deviations **and** whose individual standard deviation (T_{1i}) is 0 or falls below the average standard deviation (T_{21}) by more than two ,standard deviations of the average standard deviation' (T_{22}).

There are 3 categories:

- suspiciously weak variance at a high mean value, if the mean value of the item block of the interviewee is higher than the total mean value of the item block plus the standard deviation of the mean values of the interviewees: $\overline{X}_i > \overline{X} + S(\overline{X}_i)$
- suspiciously weak variance at a low mean value, if the mean value of the item block of the interviewee is lower than the total mean value of the item block minus the standard deviation of the mean values of the interviewees: $\overline{X}_i < \overline{X} + S(\overline{X}_i)$
- suspiciously weak variance in the middle: The rest.

Background:
A low variance or no variance at all within an item block may be suspect but doesn't has to be suspect. It is not suspect e.g., if the low variance appears in the middle of a scale, where you can also find the mean value of the scale. Especially if there are contrary poled variables, it may be possible that it is illogical if a test person has a very low variance only on the very high and very low scale values. This is why test persons who have a mean value at a item block which differs more than one standard deviation up or down from this scale's average mean value, will be marked separately.

3. **Third: Special case: Item blocks with exclusive missings**

Missings may contribute to the fact that the result of the analyses will be misunderstood. An item block will be marked as suspicious if no answer whatsoever has been given. (no answer -> variance = 0 -> suspicious). Though it is quite interesting to identify such cases, these blocks are considered together with the „real" suspicious item blocks, in order to mix the two models of conspicuousness. To avoid this fact, such cases are treated separately.

4. Fourth: Total score

This is the sum of the other three scores. Interviews, which based on the scores, generate warning signals, should then be checked manually.

„Across Consistency" analysis

In the across consistency check, an examination of all significant correlations between data occurs. This does not rest on a particular theory. It is checked to what extent there are significant correlations between individual variables. If significant correlations are identified, then the pattern of answers provided by each interviewee is examined. Depending on the plausibility of the answers provided, points are awarded. These points are named penalty points. The more unlikely the answers provided, the more penalty points are awarded. The interviews with the highest number of penalty points are to be checked for plausibility.
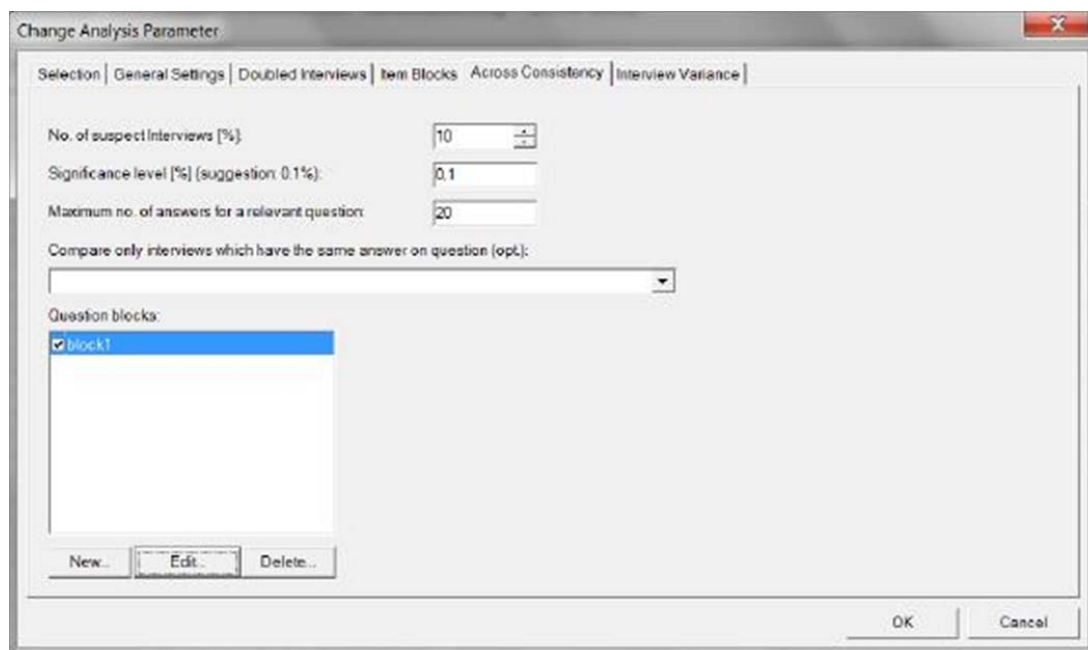
The across consistency check makes it possible to submit a large number of variables to simultaneous checking. That means that all variables which correlate with other variables can be included in the check. Particularly with very extensive surveys that is not always the most appropriate procedure. It is much better to submit a number of blocks of variables to separate checks, where individual variables

can appear in more than one block. The penalty points calculated as a result of these parallel procedures are then standardised. Finally the standard penalty points are summated.

Moreover, the quantity of the interviews can be segmented by a so called split question. This makes sense, if a separated report of interviews is wanted in which the interview behaviour varies strongly (e.g. drivers of compact- and luxury cars).

As a result of both practical and theoretical considerations, questions which can generate values, which can be defined in a number of different ways, are not included in the analysis. This is often the case on numerical questions where there is a wide variance, or with open-ended questions.

These steps are described in detail in the following paragraphs.

5. The Identification of Highly Significant Dependences

The basis for the checking of consistency is the identification of significant clusters. In order to identify them, it is necessary to reduce all variables to what are called dummy variables, which only have the values of 0 or 1. There is also for each question a dummy variable for „no answer".

Initially, only answer 1 is recorded. For each additional answer i, the following table is set up:

	answer i		
answer 1	0	1	sum
0	n(00)	n(01)	n(0*)
1	n(10)	n(11)	n(1*)
sum	n(*0)	n(*1)	n(**)

Within this table, n(00) is the absolute number of occasions when answer 1 with value 0, and simultaneously identifier i with value 0 occurs. The other values are defined in the appropriate way.

The content of the individual cells in the matrix of expected values is calculated with the formula $\dfrac{n(*k) \cdot n(l*)}{n(**)}$, where k, l = 0, 1.

This can be demonstrated with an example.

Initial matrix:

	answer i		
answer 1	0	1	sum
0	60	250	310
1	260	70	330
sum	320	320	640

The following matrix of expected results is calculated from the initial matrix:

	answer i		
answer 1	0	1	sum
0	155	155	310
1	165	165	330
sum	320	320	640

The content of cell n(00) is calculated as follows:

k = 0, l = 0:

$$\frac{n(*0) \cdot n(0*)}{n(**)} = \frac{320*310}{640} = 155$$

In the following step, the cell contents are calculated using the formula

$$\frac{(initial\ value - calculated\ value)^2}{calculated\ value}$$

This generates the following matrix:

	answer i		
answer 1	0	1	sum
0	58,23	58,23	
1	54,70	54,70	
sum			225,85

The content of cell n(00) is calculated as follows:

k = 0, l = 0:

$$\frac{(initial\ value - calculated\ value)^2}{calculated\ value} = \frac{(60-155)^2}{155} = 58.2258$$

If the sum of these four values exceeds 11, then there is a highly significant dependence between the two answers (e.g. using a χ^2-test with 99,9% certainty). In the case of combinations, where there is no data in certain cells, the χ^2-test cannot be used. In this particular case, there is certainly a significant result.

This procedure is undertaken to check consistency on all answers on a paired basis. That means that answer number 1 is compared with the second to the nth. answer, answer 2 with the third to nth. answer etc. Highly significant combinations are identified.

6. Calculation of Penalty Points

For all highly significant correlations, a score is calculated for each interview:

$$K = \sum_{j}^{s} -\ln(h_{rj})$$

where:

K = score
j = highly significant correlation
s = number of highly significant correlations in the survey, which need to be checked
h_{rj} = frequency with which the answer r occurs on the second characteristic, when it also occurs on the first characteristic

The calculation of penalty points is illustrated below with an example:

If an interviewee in the above example has given the value 0 at answer 1, and at answer 2, the value 1 (n(01) = 250), that is a plausible result. The score is increased by $-\ln\left(\dfrac{250}{310}\right) = 0.2151$. If however both the answer 1 and the answer 2 have the value 0, that is an implausible result. The score then moves up by $-\ln\left(\dfrac{60}{310}\right) = 1.6422$. The more improbable a result, the higher is the score. The higher the score, the more suspicious the interview.

As already mentioned, the score must be equivalent to the penalty points, which are awarded. Accordingly, the more penalty points are given, the less probable the answers.

7. Standardisation of Penalty Points

In order to make the penalty points mutually comparable, they must be standardised.

The penalty points are standardised with a maximum value of 10,000 points per block.

The standardisation of the penalty points is calculated using the following formula:

$$\frac{Penalty\ points}{maximum\ penalty\ points\ in\ the\ current\ block} * 10,000$$

Since the maximum number of penalty points that is achievable within a block is 10,000, the maximum number of penalty points in the total *number of blocks* column can comprise 10,000*.

8. Suspect questions

When an interview has become suspect, it is interesting to know which questions have contributed to the suspicion of the interview. Therefore, you add for each interview the penalty points for all dummy variables of one question. The suspect questions are those with the 20 highest penalty points. If several questions have the same penalty points and if this points achieve the 20 highest penalty points, all questions with this penalty points will be marked as suspect. In the case of a number of blocks of variables, only 10 questions of each block will be used.

„Interview Variance" Analysis

The central hypothesis of the Interview Variance Analysis is, that interviewers who fake complete interviews produce less variance than real respondents. Fakers tend to answer all questions, they avoid extreme answers and they usually do not misunderstand the questionnaire, therefore interviews of fakers contain fewer missings and less conspicuous answers. The test is based on the comparison of variance of interviewers: the less the variance of an interviewer, the more likely it is that this interviewer is a faker.

In analogy to the Across Consistency Check, interviews having a very large variance might be conspicuous as well. In this case the test rather refers on respondents than on interviewers.

The calculation of the interview variance should be done analogous to the "Doubled Interviews Analysis" only with those variables which have a comparable large deviation. The user can decide on the percentage (default= 20%) of used variables with the largest variance. 100 variables will be used at the minimum, regardless the amount of variables selected by the user. If there are less than 100 variables in the data, all variables are used. The mean of the variance of each interviewer is calculated and put to the result of each respondent as an additional output.

The primary idea of this analysis was to identify faking interviewers. Therefore the option exists to choose a variable as a split variable to distinguish between the interviewers for example.

The calculation of the variance is done using the following formula:

$$s_j = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left[X_{ij} - \overline{X_j} \right]^2}$$

where
s_j = variance in Question j
n = number of interviews (i = 1, 2,…, n)
X_{ij} = answer in Interview i to Question j
$\overline{X}_j$ = arithmetic mean of the answers to Question f, applied to all interviews.

Using this variance, the variables with the greatest variance are identified and the user defined number of variables is selected.

In order to make the individual answers comparable, a Z-transformation is undertaken for each answer-value. A distribution which has been subject to a z-transformation has a mean of 0 and a variance of 1.

$$Z_{ij} = \frac{X_{ij} - \overline{X}_j}{s_j}$$

where

Z_{ij} = the interval on Question j in Interview i, which has been submitted to a
  z- transformation

The calculation of the interview variance is based on the variance respectively on the standard deviation of the z-transformed variables of each interview:

$$V_i = \sqrt{\frac{1}{f-1} \sum_{j=1}^{f} \left[Z_{ij} - \overline{Z}_i \right]^2}$$

where

V_i = = Standard deviation of the z-transformed variables f of each interview i
f = Number of included variables (j=1,2,...,f)
$\overline{Z}_i$ = mean z-score of respondent i of all included variables

The overall mean $\overline{Z}_i$ of the relevant variables for respondent i is calculated as follows:

$$\overline{Z}_i = \frac{1}{f} \sum_{j=1}^{f} Z_j$$

In case a split variable is selected, the average deviation per Interviewer is calculated as follows:

$$V_l = \frac{1}{g} \sum_{k=1}^{g} \sqrt{\frac{1}{f-1} \sum_{j=1}^{f} \left[Z_{ij} - \overline{Z}_i \right]^2}$$

respectively

$$V_l = \frac{1}{g} \sum_{i=1}^{g} V_i$$

where:
n = number of interviews (i = 1, 2,..., n)
b = Number of Interviewers (l=1,2,...,b)
g = Number of Interviews (k=1,2,...,g) per Interviewer b

When all 4 analyses are conducted, we receive following output. We can easily compare the results of all 4 tests and decide whether or not an interview needs to be deleted.

	Interview id	Missings	Suspicious			Delete	Doubled Interviews	Item Blocks									Across Consistency	Interview Variance	Attributes				
	SERNUM		D	I	A	V		C1	C2	C3	C4	q2a	q3	q2b	rcs1	rcs3	block1	SERNUM	RESPID	sex	age	hhsize	s04
1	700325	3,78%	X				15,64 (700326), 6	0	0	0	0	0	0	0	0	0	6208,178	0,759	325	Fe	41	4 peopl	2 ch
2	700326	12,71%	X				15,64 (700325), 7	0	0	0	0	0	0	0	0	0	6777,806	0,808	326	Fe	41	4 peopl	2 ch
3	700074	3,44%	X				27,48 (700077), 5	0	0	0	0	0	0	0	0	0	5988,033	0,809	74	Fe	35	4 peopl	2 ch
4	700077	3,44%	X				27,48 (700074), 6	0	0	0	0	0	0	0	0	0	6400,237	0,794	77	Fe	35	4 peopl	2 ch
5	700123	3,44%	X				37,36 (700147), 4	0	0	0	0	0	0	0	0	0	6258,191	0,853	123	Mal	26	1 pers	No
6	700147	3,44%	X				37,36 (700123), 5	0	0	0	0	0	0	0	0	0	6405,191	0,920	147	Mal	24	2 peopl	No
7	700030	3,78%	X				39,60 (700031), 7	0	0	0	0	0	0	0	0	0	6080,269	0,945	30	Fe	36	3 peopl	1 ch
8	700031	3,78%	X				39,60 (700030), 5	0	0	0	0	0	0	0	0	0	6406,203	0,905	31	Mal	38	3 peopl	1 ch
9	700097	3,44%	X				39,62 (700306), 6	0	0	0	0	0	0	0	0	0	6219,248	0,678	97	Fe	60	2 peopl	No
10	700306	3,78%	X				39,62 (700097), 6	0	0	0	0	0	0	0	0	0	5670,855	0,720	306	Mal	60	2 peopl	No
11	700412	5,15%	X				40,91 (700414), 5	0	0	0	0	0	0	0	0	0	6249,173	0,741	412	Fe	73	2 peopl	No
12	700414	13,75%	X				40,91 (700412), 4	0	0	0	0	0	0	0	0	0	7080,167	0,935	414	Fe	63	2 peopl	No
13	700447	1,37%	X				45,84 (700450), 4	0	0	0	0	0	0	0	0	0	6302,955	0,543	447	Mal	48	2 peopl	No
14	700450	3,78%	X				45,84 (700447), 5	0	0	0	0	0	0	0	0	0	6066,349	0,562	450	Fe	28	2 peopl	No
15	700145	3,44%	X				46,20 (700123), 5	0	0	0	0	0	0	0	0	0	6289,937	0,801	145	Mal	26	2 peopl	No
16	700023	3,44%	X				46,32 (700040)	0	0	0	0	0	0	0	0	0	6503,562	1,024	23	Fe	57	2 peopl	No
17	700040	3,44%	X				46,32 (700023), 5	0	0	0	0	0	0	0	0	0	6017,643	0,938	40	Mal	62	2 peopl	No

The Alberta tool applied on the EQLS survey

The Alberta tool allows a multitude of combinations that identifies suspect cases. It however is a human decision in which cases have to be deleted and which don't. The input for the decision forms the different analysis. The Alberta checks were applied on the data file of the EQLS 3 main questionnaire in which the cases with a high item non response and/or low back check score already were corrected for.

1) Doubled interviews

The doubled interview analysis identifies identical interviews. When checking for doubled interviews, it is assumed that interviews which have been knowingly duplicated, will differ at least in some details. The objective therefore is to identify interviews which are very similar. This check is based on variance analysis (formulas and more detail in the above part). The standard Alberta settings are changed in order to conduct this analysis on all (100%) of the questions instead of n=20% or a minimum of 100 questions.
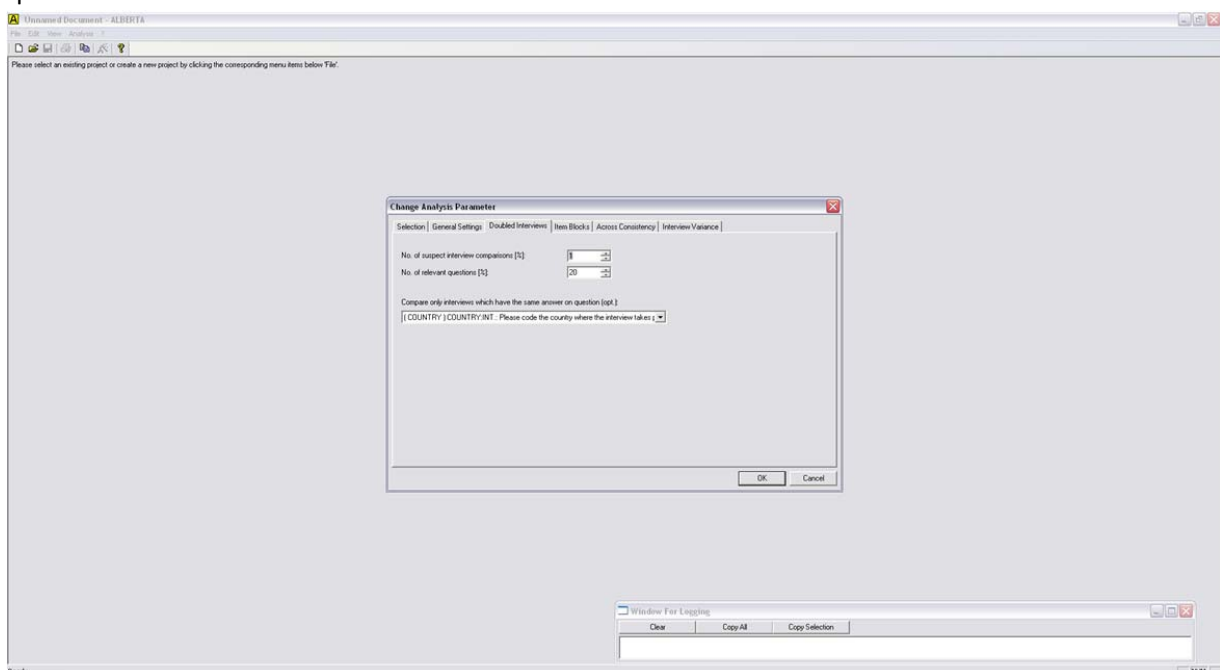
The output of this analysis indicates how many percent of the questions are identical with another interview (and indicating with which ones).

In order to decide if it really consists of a "duplicated" interview the program highlights the questions where different answers are given on.
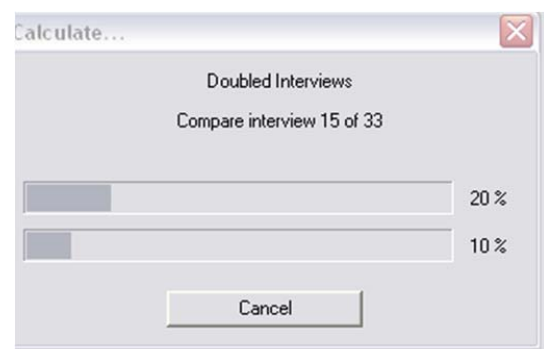
All interviews with maximum 25% difference (n=16) were examined. The table below indicates an example of the outcome.

Interview id	Interviewer id	Doubled Interviews		
CZ1307112	5055 (-1)	31,92 (CZ1307718	-	5055)
EL1148620	9077 (-1)	29,66 (EL1172314	-	9077)
EL1148822	9077 (-1)	31,94 (EL1172314	-	9077)
EL1173416	9077 (-1)	22,71 (EL1149823	-	9077)
EL1149823	9077 (-1)	22,71 (EL1173416	-	9077)
DE1233716	6320 (-1)	30,73 (DE1234616	-	6320)
RO1362820	23126 (-1)	29,20 (RO1354821	-	23126)
CZ1307718	5055 (-1)	31,92 (CZ1307112	-	5055)
RO1354821	23126 (-1)	29,20 (RO1362820	-	23126)
DE1234616	6320 (-1)	30,73 (DE1233716	-	6320)
RO1363114	23126 (-1)	31,18 (RO1354922	-	23126)
DE1815015	6212 (-1)	30,92 (DE1816117	-	6212)
DE1816117	6212 (-1)	30,92 (DE1815015	-	6212)
DE1816016	6212 (-1)	31,23 (DE1815621	-	6212)
EL1133513	9053 (-1)	32,86 (EL1134716	-	9053)
DE1815621	6212 (-1)	31,23 (DE1816016	-	6212)
RO1354417	23126 (-1)	29,41 (RO1354518	-	23126)
DE1609925	6206 (-1)	20,72 (DE1610311	-	6206)
DE1610311	6206 (-1)	20,72 (DE1609925	-	6206)
FR1419116	12134 (-1)	31,43 (FR1420512	-	12134)
DE1240007	6235 (-1)	29,62 (DE1240108	-	6235)
SE3015615	24002 (-1)	0,00 (SE1226415	-	24002)
SE1226415	24002 (-1)	0,00 (SE3015615	-	24002)

2) Item blocks

The item block analysis checks for "straigthliners". The more frequently an interviewee/respondent enters a cross in the same place, the less he is thinking about the individual question. Excessive deviations however suggest that the questions have probably been completed/answered on a chance basis. The check is undertaking by checking the standard deviation in the answers to item blocks. Following blocks were determined from the main questionnaire: Q12, Q14, Q21, Q22, Q25, Q28, Q29, Q33a to c, Q34a to c, Q35, Q36, Q39b to d, Q40, Q45, Q45, Q47, Q50, Q51, Q53, Q55, Q56, Q59.
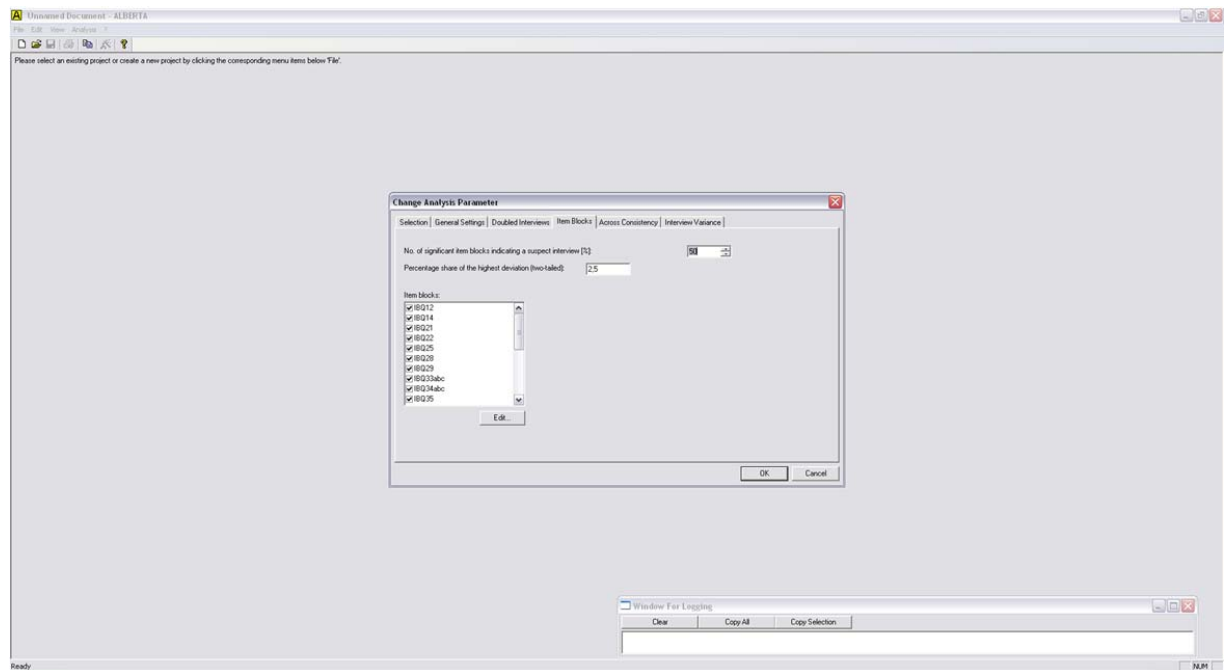
22 item blocks were tested on straightlining. The item block analysis not indicates item blocks with a low mean value (all answers within the block are equal) – code 4 - , but also item blocks with:

- A normal variance: code 0
- A suspiciously large variance: code 1
- A variance at mean value: code 2
- A high mean value: code 3
- Only missings in the item block (refusal, don't know or question not received due to filters): code 5

The table below indicates an example of the outcome. In the EU27 data file 17 cases were identified with more than 80% of the item blocks consisting of either a low mean value or a suspiciously large variance. In the non-EU data file no cases were identified in which more than 80% of the item blocks have a low or suspiciously large variance.

uniqueid	Y11_P1	item block	IBQ12	IBQ14	IBQ21	IBQ22	IBQ25	IBQ28	IBQ29	IBQ33abc
AT1001204	1061	X	2	3	3	2	0	0	2	0
AT1001406	1061	X	2	2	3	2	0	0	0	0
AT1001810	1061	X	2	3	3	2	2	0	2	0
AT1002003	1061	X	3	5	3	0	0	0	0	0
AT1004207	1061	X	0	0	3	2	2	0	3	0
AT1005814	1061	X	2	5	3	2	5	0	0	4
AT1008615	1064	X	5	5	0	0	2	0	1	5
AT1009111	1064	X	5	5	0	0	0	0	0	4
AT1009616	1039	X	0	2	0	2	0	0	0	2
AT1013207	1026	X	0	5	0	2	0	0	0	0
AT1013409	1026	X	5	5	0	0	2	0	0	0
AT1013712	1026	X	5	5	0	2	0	0	0	0
AT1014915	1050	X	5	5	0	2	2	0	0	0

3) Across consistency

The across consistency analysis checks if the answers on questions that we supposed to be alike are alike. In the across consistency check, an examination of all significant correlations between data occurs. It is checked to what extent there are significant correlations between individual variables. If significant correlations are identified, then the pattern of answers provided by each interviewee is examined. Following blocks were determined from the main questionnaire: Q29a to c, Q29d to g, Q40 + Q41, Q45, Qq46
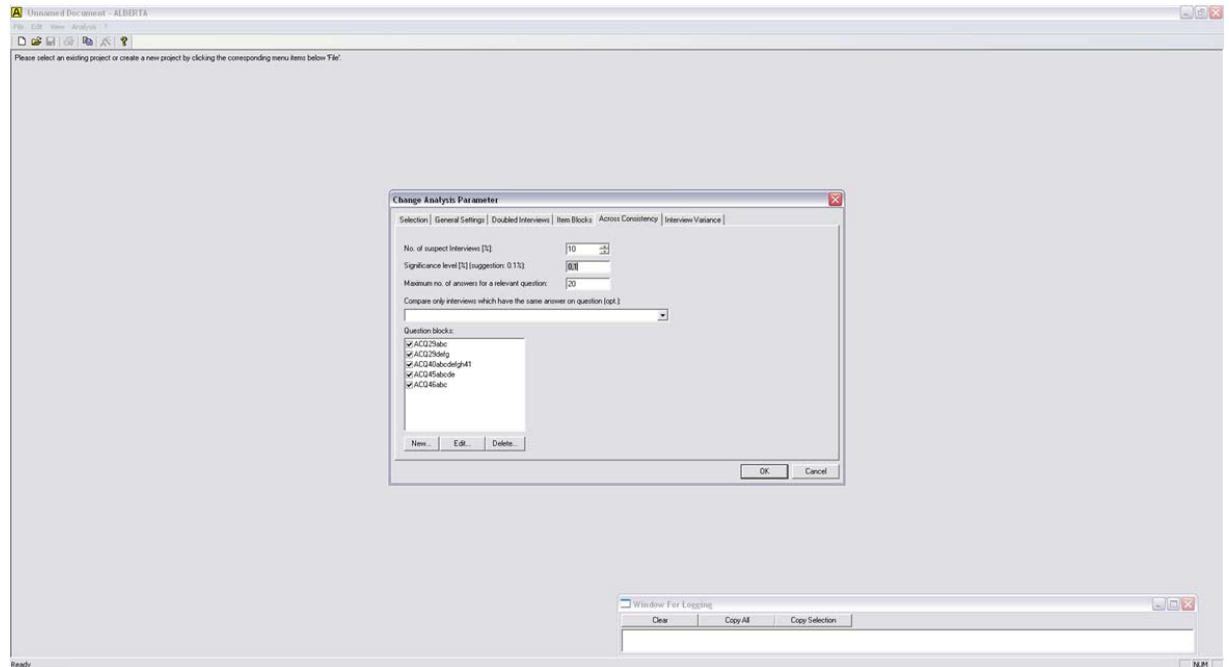
5 item blocks were tested on across consistency. The analysis identifies per block a value between 0 and 10000. The higher the score, the greater the number of dependencies between variables within a single question block. A low total score - sum of the scores of the blocks – reflects a poor across consistency in an interview.

66% was used as a cut off point; which means:

- In total an interview at least needs to score 33000 points (=66% x 5 item blocks x max 10000 points)
- Or 3 individual item blocks (66% of the n° of item blocks checked; 66% x 5) score less than 66% of the max value within that item block (= less 6600).

For the EU27 data the analysis turned out to 7 interviews where the "total" score was less than 33000 points and in 6 additional interviews 3 item blocks scored less than 6600 points. In the non-EU field 26 interviews obtained a total score less than 33000 points; and there were 16 interviews with item blocks that obtained a score less than 6600 points.

The table below indicates an example of the outcome.

uniqueid	Y11_P1	ACQ29abc	ACQ29defg	ACQ4041	ACQ45	ACQ46	Total
AT1000001	1023	9600,7	8701,4	9364,0	9255,7	9333,0	46254,9
AT1001204	1061	7729,3	7590,2	9303,0	9389,6	9333,0	43345,2
AT1001406	1061	8088,2	9345,9	9621,7	9389,6	9102,4	45547,8
AT1001810	1061	7729,3	7590,2	9081,7	9389,6	9102,4	42893,2
AT1002003	1061	7729,3	7792,1	9089,9	9648,7	9102,4	43362,4
AT1003408	1023	9379,9	9577,7	9368,2	8925,9	9054,9	46306,6
AT1004207	1061	8080,7	9345,9	9468,9	9389,6	8866,1	45151,1
AT1005208	1073	9262,3	9298,6	9282,6	9485,6	9043,4	46372,4
AT1005814	1061	8542,0	9345,9	9081,4	9389,6	8614,9	44973,9
AT1006714	1073	9832,6	8423,7	9432,1	9935,5	8866,1	46490,0
AT1007614	1064	8991,0	9802,3	9343,8	9648,7	9500,7	47286,4

4) Interviewer variance

The interview variance analysis highlights interviewers that are possibly cheating. The central hypothesis of the Interview Variance Analysis is, that interviewers who fake complete interviews produce less variance than real respondents. Fakers tend to answer all questions, they avoid extreme answers and they usually do not misunderstand the questionnaire, therefore interviews of fakers contain fewer missings and less conspicuous answers. The test is based on the comparison of variance of interviewers: the less the variance of an interviewer, the more likely it is that this interviewer is a faker.

Interviews having a very large variance might be suspicious as well. In this case the test rather refers on respondents than on interviewers.

The standard Alberta settings are changed in order to conduct this analysis on all (100%) of the questions instead of n=20% or a minimum of 100 questions.
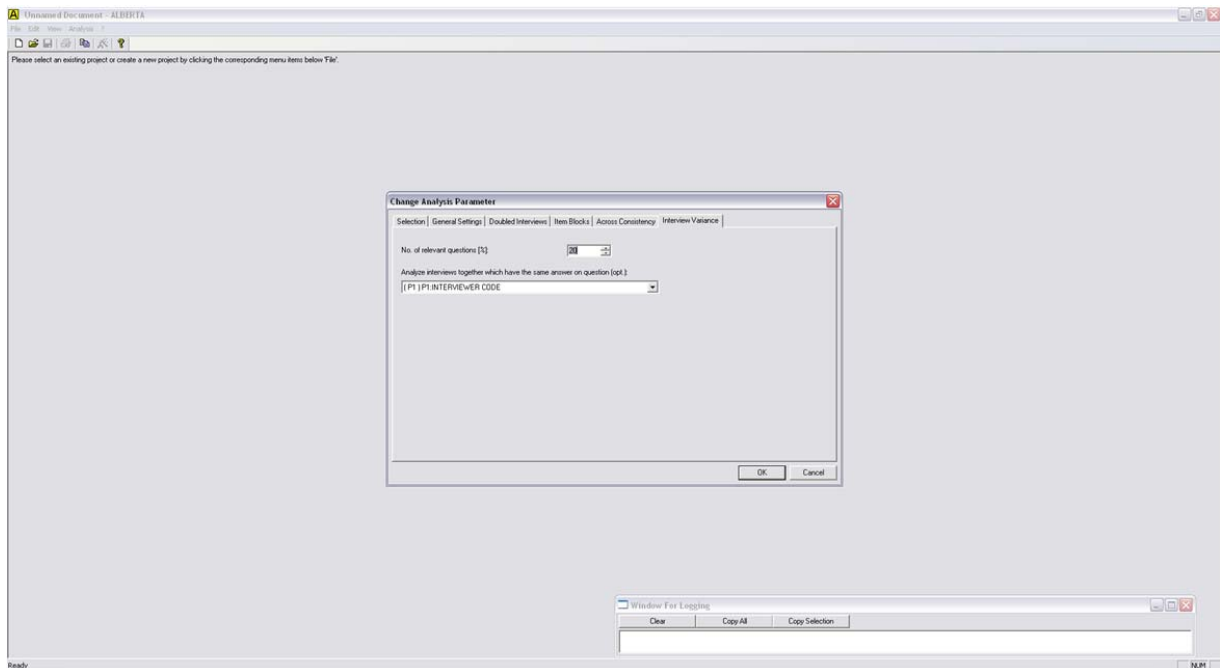
The mean of the variance of each interviewer is calculated and put to the result of each respondent as an additional output. An interview is marked as suspicious if the variance of the interview more than 2 standard deviations of the mean variance of the interview upward or downward.

Within the outcome 3 types of cut off points were used:

- An absolute difference of at least 2 points between the average interviewer variance and the variance of an individual interview of that interviewer.
- An interviewer variance of above 1,5
- An interview variance of above 3

For the EU27 data the analysis turned out to 12 interviews that fulfilled the 1st cut off point and 19 interviewers that fulfilled the 2nd cut of point, 7 additional interviews fulfilled the 3rd cut off point. In the non-EU field no records fulfilled any of the above criteria.

The table below indicates an example of the outcome.

uniqueid	Y11_P1	Interview Variance	Interviewer Variance
AT1000001	1023	1,194	1,051
AT1001204	1061	0,848	0,846
AT1001406	1061	0,82	0,846
AT1001810	1061	0,876	0,846
AT1002003	1061	0,853	0,846
AT1003408	1023	0,967	1,051
AT1004207	1061	0,84	0,846
AT1005208	1073	0,856	0,975
AT1005814	1061	0,881	0,846
AT1006714	1073	1,066	0,975

Cases that turned out to be suspicious were examined on following parameters:

- their score on other indicators – such as across consistency, interviewer variance …
- verified against the interviewer (is it the only issue for the interviewer or were there other issues).
- in depth look at several questions:
    - Whether they had equal scores on Q45 as well as on Q46, which given the fact that the Questions are to a certain extend contradictory is highly unlikely
    - Whether their answers on Q29 were all equal or not
    - Whether there was consistency or not in the answering pattern between Q40 (a to h) and Q41
    - Questions like Q21 related to socio demographic questions: age, gender, profession, household size (e.g. no internet usage vs youngsters)
- the fieldwork agencies were in case of doubt also contacted to verify
- the suspect interviews were compared with the back check scores where available

In the EU27 data file 113 cases were examined and 9 cases have been deleted. In the non-EU file 12 cases have been deleted.

5. BACK CHECKING

As part of the Quality Control Plan for the 3rd EQLS back checks have been carried out by the agencies in the different countries during the fieldwork. Back checking aims at checking the Quality of the work of the interviewers and the response data that are gathered. Regular back checking is also likely to prevent interviewers from working incorrectly or inaccurately.
Feedback on the basis of the outcomes of the back checks is looped back to the local field responsible and the individual interviewer with the aim to address problematic aspects and to optimise Quality throughout the field.

Back checks in the 3rd EQLS involved re-contacting three types of target persons to verify important issues in the contact procedure, the interview process and the data collection:
- respondents with whom a completed interview has been conducted (back check of completes),
- individuals who refused to participate in the study (back check of refusals), and
- addresses/households whom the interviewer has not been able to contact during the EQLS field (back check of non-contacts).

For each back check round a fixed percentage of the completes, refusals and no contacts in each country has been randomly selected. The table below presents the percentages that were back checked per country and gives an overview of the successive back checks rounds that were organized during the fieldwork period. The week number indicates in which week the back check round was launched. Each round covered the back check of interviews that were added to the sample since the previous back check round, which means that back checks covered the entire fieldwork period. No contacts and refusals were backchecked less often as this was not a final outcome code. "No contacts" at the 1st and 2nd visit could be revisited and result in an appointment, refusal or completed interview.

Table 15 Overview Backchecks

Country	%	BACK CHECK COMPLETES						BACK CHECK REFUSALS			Back Check NO CONTACTS
		Round1	Round2	Round3	Round4	Round5	Round6	Round1	Round2	Round3	Round1
AT	30%	week 7	week 9	week 11	week 13	week 15		n/a	n/a	n/a	week 15
BE	10%	week 7	week 9	week 11	week 13	week 15	week 18	week 12	week 14	week 18	week 19
BG	15%	week 7	week 9	week 11	week 13	week 15		n/a	n/a	n/a	n/a
CY	20%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 19
CZ	15%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
DE	10%	week 7	week 9	week 11	week 13	week 15	week 18	n/a	n/a	n/a	week 21
DK	10%	week 7	week 9	week 11	week 13	week 15	week 18	week 12	week 14	week 18	week 21
EE	10%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 19
EL	20%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
ES	10%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
FI	10%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 19
FR	10%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	n/a
HU	10%	week 7	week 9	week 11	week 13	week 15	week 18	week 12	week 14	week 18	week 19
IE	10%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
IT	20%	week 7	week 9	week 11	week 13	week 15	week 18	n/a	n/a	n/a	n/a
LT	15%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
LU	10%	week 7	week 9	week 11	week 13	week 15		n/a	n/a	n/a	n/a
LV	15%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 19
MT	10%	week 7	week 9	week 11	week 13	week 15		week 12	week 14		week 15
NL	10%	week 19	week 21	week 23				week 19	week 21	week 23	week 23
PL	10%	week 7	week 9	week 11	week 13	week 15		n/a	n/a	n/a	week 15
PT	20%	week 7	week 9	week 11	week 13	week 15	week 18	week 12	week 14	week 18	week 19
RO	20%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 19
SE	10%	week 7	week 9	week 11	week 13	week 15	week 18	week 12	week 14	week 18	week 19
SI	20%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
SK	30%	week 7	week 9	week 11	week 13	week 15		week 12	week 14	week 18	week 15
UK	10%	week 7	week 9	week 11	week 13	week 15	week 18	week 12	week 14	week 18	week 21

Country	%	BACK CHECK COMPLETES				BACK CHECK REFUSALS		Back Check NO CONTACTS	
		Round1	Round2	Round3	Round4	Round1	Round2	Round1	Round2
TR	15%	X	X	X	X	X		X	
HR	10%	X	X	X		X		X	
MK	15%	X	X	X		X	X	X	
KO	15%	X	X	X	X	X		X	
RS	15%	X	X	X	X	X	X	X	
ME	15%	X	X	X	X	X	X	X	
IS	10%	X	X	X		X		X	X

The back check Questionnaire has been programmed as a web Questionnaire and was considered by the majority of the countries as a "Web CATI", which means backchecks were mainly conducted by telephone. If telephone interviews were chosen a link was made between the national CATI system and the central programmation. Per type of back check (completes, refusals, no contacts) a set of appropriate Questions from this Questionnaire were automatically selected. Thus depending on the sample uploaded a different Questionnaire was displayed.

Back checks have been conducted by experienced interviewers (different from the ones conducting the EQLS 3 main Questionnaire survey) based on the instructions the agencies received from GfK EU3C.

Back check of completes

The first type of back checks involved re-contacting a respondent who took part in the survey to verify the following issues:

- Correct target person selection
- Interview procedure (the use of laptop / paper Questionnaire)
- Use of field materials (showcards, information letter…)
- Perceived length of the interview
- Data consistency (re-asking a number of Questions from the Questionnaire)
- Consistency of respondent data (e.g. age and gender)
- Other comments of respondent

The interviews to be back checked have been randomly selected. On the basis of the answers collected during the back check interview a global score, indicating the Quality of the conducted interview, was calculated. The global score is the sum of ten dichotomous item-scores. Each item refers to a certain Quality aspects of the EQLS interview procedure and data.

Selection respondent	1 item
Perceived length of the interview	1 item
Use of field materials	2 items
Interview procedure	1 item
Data consistency	3 items
Consistency of respondent data	2 items

The table below gives an overview per country of:

- the total numbers and percentages of back checks on completes
- an average Quality score
- the number of interviews with Quality problems and which may be deleted because of Quality problems

The final number of deletes in the 3rd EQLS is 67 on a total of 4946 conducted back checks (1.4%).

Table 16a Overview back check completes per country – EU27

Country	N° Back Checks to realise	N° Back Checks conducted	% Back Checks conducted	Mean score	Number of interviews to delete	%deletion
EU	**4875**	**4946**	**101.5%**	**9**	**67**	1.4%
AT	300	300	100.0%	9	0	0.0%
BE	100	119	119.0%	8	5	4.2%
BG	150	154	102.7%	10	0	0.0%
CY	200	201	100.5%	10	0	0.0%
CZ	150	151	100.7%	10	0	0.0%
DE	300	307	102.3%	8	8	2.6%
DK	100	103	103.0%	9	0	0.0%
EE	100	101	101.0%	9	3	3.0%
EL	200	201	100.5%	10	0	0.0%
ES	150	150	100.0%	10	0	0.0%
FI	100	101	101.0%	9	1	1.0%
FR	225	225	100.0%	9	6	2.7%
HU	100	103	103.0%	8	1	1.0%
IE	100	101	101.0%	9	0	0.0%
IT	450	452	100.4%	10	2	0.4%
LT	150	179	119.3%	9	21	11.7%
LU	100	100	100.0%	9	1	1.0%
LV	150	152	101.3%	9	1	0.7%
MT	100	104	104.0%	9	3	2.9%
NL	100	104	104.0%	9	1	1.0%
PL	225	231	102.7%	9	0	0.0%
PT*	200	171	85.5%	10	4	2.3%
RO	300	300	100.0%	9	5	1.7%
SE	100	100	100.0%	8	0	0.0%
SI	200	206	103.0%	8	0	0.0%
SK	300	300	100.0%	7	4	1.3%
UK	225	230	102.2%	9	1	0.4%

*The agency in Portugal has not been able to reach the targeted number of back checks on completes timely.

Table 16b Overview back check completes per country – non-EU

Country	N° Back Checks to realise	N° Back Checks conducted	% Back Checks conducted	Mean score	Number of interviews to delete	%deletion
Non-EU	**1100**	**1108**	**100.7%**	**9.2**	**4**	**0.3%**
TR	300	300	100.0%	9.1	4	1.3%
HR	100	101	101.0%	9.5	0	0.0%

MK	150	154	102.7%	9.8	0	0.0%
KO	150	150	100.0%	9.9	0	0.0%
RS	150	152	101.3%	9.2	0	0.0%
ME	150	151	100.7%	9.0	0	0.0%
IS	100	100	100.0%	8.0	0	0.0%

Follow up on Quality check

Since the launch of the first round the agencies received a data file export containing the number and Quality check outcomes of the back checks, on a daily basis. These frequent reports allowed agencies have been able to closely follow up the Quality control.

On the basis of the data obtained via the back check interview a Quality score (on 10) for the EQLS interview was calculated: two categories of scores are distinguished with scores between 0 and 7 indicating that the interview has not been conducted properly and needs a closer look and scores between 8 and 10 telling that the interview has been conducted properly.

Next the following steps were taken:

Step 1

1. Agencies in countries with an average Quality score lower than 8 were informed. They were given detailed information about the global Quality issues that were pointed out in the back check. They were also requested to address these Quality issues with the interviewers and re-brief them in order to increase the Quality in the fieldwork.
    This measure has been taken for Belgium, Germany and Slovakia after round 1. Quality scores effectively improved afterwards, although the average score in Slovakia remained too low (< 8). In the non-EU field the issue of lower quality has been taken up with the Turkish agency after round 1. Also here the quality improved significantly afterwards.

2. For the interviews in the first category (score between 0 and 7) it was checked whether they showed problems on a number of crucial aspects (inconsistencies in respondent data and/or violations against the interview procedure). If that was the case, the interviews were flagged as 'interview with Quality problem'.

Step 2

1. The IDs of the interviews flagged as problematic plus the detailed back check information (respondent answers) were provided to the agency concerned for closer inspection. Agencies were also asked to take up the Quality issue with the field supervisor and the interviewer(s) who conducted the problematic interview(s).

2. When the agency could not provide an adequate explanation for the low back check scores of a given interview (e.g. back check interviewer did register a wrong code, back check interview was not conducted entirely, …), this interview became flagged as 'to delete'.

When the agency could provide an adequate explanation the interview was unflagged. This was the case for one of the flagged interviews in Malta: the person, 75 years old, answering the phone during the back check got mixed up with the National Survey which was being carried out simultaneously to the EQLS, resulting in mismatches between answer data in the interview and the back check. After a screening of all the Questionnaire data this interview was found to be adequate and is retained in the final data file. In the non-EU field 6 interviews in Turkey were flagged as problematic after they were back-checked. After in-depth screening 2 of them became un-flagged as there were misunderstandings on the coding during the back check.

Step 3

1. Agencies with more than 5% interviews flagged as problematic in week 19 extra measures were taken. It concerned Belgium (5,6%), Lithuania (11,7%) and Slovakia (14,3%).
   - Back check procedures were thoroughly checked
   - When PAPI: data on the paper Questionnaires was checked to check if possible data entering errors were made
   - Respondents to the back check were called back to re-check the answer data
   - Additional back checks were carried out
   - EQLS Questionnaire data of the interviews conducted by the interviewer with 1 or more 'delete' was screened

   In the non-EU field in none of the countries more than 5% inter views were flagged as 'problematic'.

2. In Belgium and Lithuania the respectively 5 and 21 interviews remain 'deletes' because of Quality problems.

   In Slovakia the agency found problems in the process of the back check for 7 of the 11 cases: e.g. respondent's wife answered in back check control; husband (respondent) has problems with hearing, he could not speak to the phone, it is possible that wife did not know about showcards.

   On the basis of a re-call with the respondent in Question we can conclude for these 7 interviews that the interview procedures, respondent and response data are valid and reliable. The other 4 interviews remain flagged as 'to delete'.

Step 4

1. Interviews flagged as 'to delete' are deleted from the Questionnaire micro-data file and stored in a separate file. They do not count for the final number of interviews that are realized by a country.

2. For each deleted interview the stratum is identified. When necessary, to maintain the intended target number of EQLS interviews and/or to have sufficient interviews per stratum, the agency conducted extra interviews in the corresponding strata. This was the case for Malta: after deletion of three interviews because of Quality issues, Malta[2] carried out three extra interviews to maintain a net sample of 1000 interviews. In the other countries no extra interviews needed to be conducted to maintain the targeted net sample after low Quality interviews were deleted. In the non-EU field Turkey conducted 4 extra interviews in the strata from which the problematic interviews had been deleted.

Step 5

1. Detailed controls via the Alberta software on the interviewers providing "interviews to delete" did not result in more suspicious interviews, which ensure the data Quality of the 3rd EQLS and the respective interviewers. This was also the case for Turkey in the non-EU field.

Back check of refusals

With the back check interviews we conducted a Quality check on two aspects:
-   firstly, it is checked whether the respondent or someone else in the household has been contacted for the EQLS and indeed refused to take part in the study and why; and
-   secondly, the consistency between data obtained during the contact procedure and the back check is checked (i.e. gender of the refusing person).

Iceland also conducted the back check on refusals in the same way as the other countries, though with a slightly amended questionnaire (taking into account the specific contact procedure).

Follow up on Quality check

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[2] the sample in Malta was not stratified

When both checks are positive no further action was taken. When inconsistencies or violations were found we checked whether they were systematic for an individual interviewer. In the case of systematic inconsistencies for an individual interviewer potential fraud was investigated.

In the EU27 the Quality check on the refusals turned out to be highly satisfying: only 11 cases on a total of 2092 back checked refusals - 2 cases in France and 9 in Hungary - did not pass the Quality check. The contacts in Question were made by different interviews. These 11 refusal records were not counted in the total refusal rate and final response rate. Only 15% of the cases the respondent refused to take part in the back check and no Quality check could be conducted.

In the non-EU field the respondent refused to take part in the back check in 25.1% of the cases and no actual quality check could take place. All cases that have been controlled have passed the quality check.

The following table presents an overview of the back checks on refusals.

Table 17a Overview back check refusals per country – EU27

Country	N° Back Checks to realise	N° Back Checks conducted	% Back Checks conducted
EU	2633	2092	79.5%
AT	Not possible because unacceptable in field research in Austria		
BE	76	76	100.0%
BG	Not possible because of practical and financial limitations		
CY	41	41	100.0%
CZ	135	136	100.7%
DE	Not possible due to legislation on privacy matters		
DK	146	32	21.9%
EE	35	56	160.0%
EL	242	245	101.2%
ES	180	131	72.8%
FI	97	97	100.0%
FR	265	267	100.8%
HU	136	51	37.5%
IE	31	31	100.0%
IT	Not possible due to legislation on privacy matters		
LT	110	110	100.0%
LU	Not possible due to legislation on privacy matters		
LV	61	63	103.3%
MT	27	27	100.0%

NL	130	130	100.0%
PL	Not possible due to legislation on privacy matters		
PT	126	126	100.0%
RO	92	93	101.1%
SE	98	98	100.0%
SI	156	159	101.9%
SK	118	85	72.0%
UK	331	43	13.0%

Table 17a Overview back check refusals per country – non-EU

Country	N° Back Checks to realise	N° Back Checks conducted	% Back Checks conducted
Non-EU	**970**	**998**	**102.9%**
TR	191	191	100.0%
HR	74	81	109.5%
MK	42	42	100.0%
KO	19	19	100.0%
RS	154	158	102.6%
ME	182	183	100.5%
IS	322	324	100.6%

Problems with back checks on refusals

In four countries, Germany, Italy, Luxembourg and Poland, legislation on privacy matters prohibit re-contacting respondents who refused to participate in the study. These countries have provided the legal documents treating this issue: more details and references to the relevant legislation are listed in the Table 18.

In addition, two countries, Austria and Bulgaria, argued that in their countries back checking refusals is unacceptable for the public and would seriously damage the agency's reputation. Next to that refusal back checking in the two countries is also regarded as impossible due to the practical and financial implications of not having the telephone numbers in the back check sample. Their argumentation is presented in more detail in the table below.

In the non-EU field no privacy issues or problems with the acceptability of this type of back check have been raised.

Back checking refusals was also less obvious due to a more practical reason: the countries do not have telephone numbers for most of the cases in the randomly drawn back check samples. In order to be able to re-contact respondents that refused an interview extra measures will need to be taken. In some countries the samples can be enriched with telephone numbers from existing registers; in countries not having this possibility, the back checks were conducted by regular mail or by revisiting the addresses in person. Especially for regular mail the response was slow and extremely low.

Due to the reasons mentioned a number of countries were not able to reach the targeted percentage of back checks. This was the case for Denmark, Spain, Hungary, Slovakia and the UK.

The following table lists more details, if provided, on how the countries have proceeded with these back checks.

Table 18 Extra Information back check refusals per country

COUNTRY	Back checking refusals - Information, argumentation, reference to legislation
AT	Market research institutes in Austria do not have the possibility to re-contact respondents who refused to participate in the study – the interviewer (hence the institute) has to accept the answer of the respondent. In the past GfK Austria has been facing many threats of legal claims only because of contacting people for market research projects. GfK is therefore not willing to undertake any steps to risk such legal claims on the basis of legitimated reasons. This issue for Austria has already been presented and discussed at the seminar of Sep 2 in Brussels.
BE	Back checking of refusals happens by telephone. We have enriched the sample with telephone numbers.
BG	The agency indicates that the back check of refusals by phone is practical impossible as the sample cannot be enriched with telephone numbers. Therefor BG has sent out the back check Questionnaire by post/mail (prestamped, so no additional cost for the household except the time to fill out the short Questionnaire). This however results in a very tiny response.
DK	Back check of refusals is conducted by phone for those respondents who gave their telephone number. For the others the agency will conduct the back check among refusals by post.
ES	The agency faced serious practical problems to conduct the back check of refusals by telephone as only very few telephone numbers were registered and there is no access to an adeQuate register with telephone numbers. Therefore the agency in Spain chose to conduct this back check by regular mail; results of these postal interviews are not entirely available yet.
HU	In Hungary the back checks are being conducted by regular mail. Results of these postal interviews will only be available in a later stadium.
IT	The agency points out that there are some serious legal implications concerning re-contacting people who had specifically refused to cooperate during interviewing activity. This law (Privacy Law) has recently been made more severe in comparison to the pre-existing one. The agency therefore consider the back check of refusals as impossible. Decreto Legislativo 30 giugno 2003, n. 196

		"Codice in materia di protezione dei dati personali" pubblicato nella Gazzetta Ufficiale n. 174 del 29 luglio 2003 - Supplemento Ordinario n. 123 Art. 1 - 45 http://www.camera.it/parlam/leggi/deleghe/Testi/03196dl.htm
	LU	The agency calls on European and Luxembourgish legislation on privacy matters for not conducting back checks of respondents who refused to participate in the study. They specifically refer to the following legislation: the law of 2 August 2002, the European Directive on Data Protection (Directive 95/46/EC of the European Parliament and the Council of 24 October 1995) and the national law of data protection. http://www.cnpd.public.lu/fr/legislation/droit-lux/index.html (Loi Luxembourgeoise)
	PL	The mail legal act can be found here: http://www.giodo.gov.pl/144/id_art/171/j/en/
	UK	The agency is going to be reissuing refusals as part of strategy for boosting response and will combine the refusal conversion attempt with a check that the initial contact was carried out correctly and that someone really did refuse. The data will be entered into the central system after the back check has been conducted face-to-face.

Back check of no contacts

Only after a country had finalized the field work all the addresses became *closed* and the no-contact status could be regarded as final. Therefore the countries received the sample to back check no contacts upon ending the field.

The back checks of non-contacts included:

- Do the people know about the survey?
- Did they receive an introduction letter, a "sorry you were out card", an information leaflet?

Follow up on Quality check

In the EU27, 53% of the cases no contact with the respondent/household selected for the back check could be established after two contact attempts (one during working hours and one in the evening/weekend). ConseQuently, no Quality check could be done.

The other 47% of the respondent/households could be contacted. The Quality control for this group yielded the following outcomes:

- In 45% of the cases the respondent indicated that he/she found the SYWO card and/or the information letter
- In another 40% the respondent told that he/she had not found any information about the survey but indicated too that he or she could have missed it

- In 15% the respondent had not found any information about the survey and thought that he/she could not have missed it.

The last proportion indicates a problem in the use of the field materials in the case of no contact at the address could be made. Feedback on this issue has been communicated to the agencies concerned.

In the non-EU field no contact with the respondent/household selected for the back check could be established after two contact attempts in 31,3% of the cases and no quality check could be conducted.

The other 68,7% of the respondent/households could be contacted, however in 6 cases the respondent refused to answer the back check questions. The quality control for the remaining 84 cases yielded the following outcomes:

- In 49 (58,3%) of the cases the respondent indicated that he/she found the SYWO card and/or the information letter
- In another 24 cases (28,6%) the respondent told that he/she had not found any information about the survey but indicated too that he or she could have missed it
- In 11 cases (13,1%) the respondent had not found any information about the survey and thought that he/she could not have missed it.

The last proportion indicates a problem in the use of the field materials in the case of no contact at the address could be made.

The following table presents an overview of the back checks on no contacts.

Table 19a Overview back check no contacts per country – EU27

Country	N° Back Checks to realise	N° Back Checks conducted	% Back Checks conducted	Outcome: problem in the use of field material (SYWO/intro letter)
EU	**1754**	**1584**	**90.3%**	**100**
AT	142	45	31.7%	8
BE	23	23	100.0%	9
BG	Not possible because of practical and financial limitations			
CY	7	9	128.6%	0
CZ	36	45	125.0%	0
DE	78	16	20.5%	3
DK	26	0	0.0%	0
EE	45	62	137.8%	0
EL	1	2	200.0%	0
ES	77	550	714.3%	0
FI	56	66	117.9%	21
FR	Unacceptable in country and not feasible because lack of phone numbers			

HU	1	43	4300.0%	0
IE	43	30	69.8%	6
IT	Not feasible because lack of phone numbers; postal and F2F alternatives are not regarded as sensible because of low response rates			
LT	90	96	106.7%	26
LU	Unacceptable in country and not feasible because lack of phone numbers			
LV	77	88	114.3%	4
MT	15	15	100.0%	3
NL	65	65	100.0%	2
PL	42	9	21.4%	0
PT	193	40	20.7%	10
RO	116	120	103.4%	4
SE	21	1	4.8%	0
SI	52	52	100.0%	0
SK	67	9	13.4%	4
UK	267	198	74,2%	

Table 19b Overview back check no contacts per country – nonEU

Country	N° Back Checks to realise	N° Back Checks conducted	% Back Checks conducted	Outcome: problem in the use of field material (SYWO/intro letter)
Non-EU	**131**	**131**	**100.0%**	**11**
TR	15	20	133.3%	3
HR	38	38	100.0%	0
MK	3	4	133.3%	0
KO	1	1	100.0%	0
RS	16	17	106.3%	2
ME	4	4	100.0%	0
IS	161	47	29.2%	6

*the target given to Iceland had been based on a preliminary version of their contact sheet file which contained a considerable smaller amount of no contacts.

Also with regard to no contacts practical limitations (limited availability of telephone numbers) hampered back checking. The table below lists argumentation from the countries for not (entirely) conducting back checks on no contacts due to practical, legal and country specific reasons.

Table 20 Information back checks no contacts

COUNTRY	Back checking no contacts - Information, argumentation, reference to legislation

AT	Austria conducted 32% of the targeted back checks but is forced to stop as they are confronted with strong unwillingness of respondents (no contacts) to participate in the no contacts back check interview.
DE	Germany chose to back check only the no contacts on addresses visited in January 2012 as for the other addresses the time elapsed between the visits and the back check was regarded as too long. For these addresses only 16 telephone numbers were retrieved.
DK	The agency sent out back check Questionnaires by regular mail but did not receive response.
FR	France argued that the back checking of no contacts is not feasible because of non availability of telephone number for no contact, deontological issues and expected strict reactions of inhabitants concerning privacy policy.
IE	Limited availability of telephone numbers
LU	Luxembourg also argued that the back checking of no contacts is not feasible because of non availability of telephone number for no contact, deontological issues and expected strict reactions of inhabitants concerning privacy policy.
IT	No telephone numbers available for the no contacts Personal visit: - low response rate (expected to remain non contactable / high degree of refusal) - expensive - did not see the intro letter/SYWO card - have forgotten about intro letter/SYWO cards because too long ago or not sure that respondent is actually the one that received / read the letter/SYWO card Postal - very low response rate (only 1%)
PL	Limited availability of telephone numbers
PT	Limited availability of telephone numbers
SE	Limited availability of telephone numbers
SK	Limited availability of telephone numbers
UK	UK conducted 74,2% of the targeted back checks. The agency had to stop back checking due to time pressure.

6. NON RESPONSE

The table below presents an overview of the average item non response per country. The item non response is calculated by summing the codes of "Refusal", "Don't know" and "Not applicable" of each Question. This sum is afterwards divided by the total number of Questions that a respondent was asked and contained at least 1 of these codes[1]. The result is represented as a percentage. Two cut off points were used in the analysis: more than 40% item non response and more than 25% item non response. This resulted in respective n=6 and n=58 cases of high item non response. A more detailed analysis of the 58 cases showed however a typical respondent pattern: lower educated, older people, who typically provide more item non response. Because of this pattern, the final cut off point is set at more than 40% item non response. The respondent(s) Qualifying on this cut off result in a dropped interview when the detailed back check also showed issues. GfK EU3C has chosen 40% as a cut of point which is stricter than the rule that Eurostat applies for his surveys: "Any Questionnaire containing more than 50% item non-response must be rejected".

Table 21. Information Item non response

	country	Avg. item non response	Item non response >25% (n=)	Item non response >40% (n=)
AT	Austria	2,5%	1	
BE	Belgium	2,3%	0	
BG	Bulgaria	5,4%	8	2
CY	Cyprus	2,4%	1	
CZ	Czech Rep.	3,0%	1	
DE	Germany	3,0%	3	
DK	Denmark	2,1%	0	
EE	Estonia	4,1%	2	1
EL	Greece	2,6%	1	1
ES	Spain	3,0%	0	
FI	Finland	1,8%	1	
FR	France	1,8%	1	
HU	Hungary	4,1%	3	
IE	Ireland	2,5%	0	
IT	Italy	2,6%	3	1
LU	Luxembourg	3,8%	1	
LT	Lithuania	3,1%	4	
LV	Latvia	4,2%	0	

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[1] This means that it is divided at a maximum by 181 questions.

MT	Malta	4,9%	2	
NL	Netherlands	2,4%	0	
PL	Poland	3,9%	4	
PT	Portugal	3,3%	0	
RO	Romania	4,6%	7	
SE	Sweden	2,6%	0	
SI	Slovenia	3,1%	3	
SK	Slovakia	4,1%	8	
UK	United Kingdom	3,2%	4	1
TR	Turkey	4,9%	26	6
HR	Croatia	2,5%	0	
MK	Macedonia	4,0%	5	
KO	Kosovo	6,3%	29	10
RS	Serbia	3,4%	0	
ME	Montenegro	5,2%	5	
IS	Iceland	2,0%	3	1

Table 22. Extra Tables Item non response

Y11_HH2d Which of these best describes your situation?	Frequency	Percent	Valid Percent	Cumulative Percent
1 at work as employee or employed/self-employed	9	15,5	15,5	15,5
3 at work as relative assisting on family farm or business	2	3,4	3,4	19,0
4 unemployed less than 12 months	1	1,7	1,7	20,7
5 unemployed 12 months or more	4	6,9	6,9	27,6
6 unable to work due to long-term illness or disability	3	5,2	5,2	32,8
7 retired	36	62,1	62,1	94,8
8 full time homemaker/responsible for ordinary shopping and looking after the home	1	1,7	1,7	96,6
9 in education (at school, university, etc.) / student	1	1,7	1,7	98,3
10 other	1	1,7	1,7	100,0
Total	58	100,0	100,0	

Y11_Agecategory Age of the respondent (categories)	Frequency	Percent	Valid Percent	Cumulative Percent
1,00 18-24y	2	3,4	3,4	3,4
2,00 25-34y	6	10,3	10,3	13,8
3,00 35-49y	5	8,6	8,6	22,4
4,00 50-64y	13	22,4	22,4	44,8
5,00 >64y	32	55,2	55,2	100,0
Total	58	100,0	100,0	

Y11_ISCEDsimple What is the highest level of education you completed? Is this	Frequency	Percent	Valid Percent	Cumulative Percent
,00 No education completed (ISCED 0)	3	5,2	5,2	5,2
1,00 Primary education (ISCED 1)	16	27,6	27,6	32,8
2,00 Lower secondary education (ISCED 2)	14	24,1	24,1	56,9
3,00 Upper secondary education (ISCED 3)	13	22,4	22,4	79,3
4,00 Post-secondary including pre-vocational or vocational education but not tertiary (ISCED 4)	1	1,7	1,7	81,0
5,00 Tertiary education – first level (ISCED 5)	2	3,4	3,4	84,5
97,00 Completed education abroad	3	5,2	5,2	89,7
99,00 Refusal	6	10,3	10,3	100,0
Total	58	100,0	100,0	

7. ERROR MESSAGES

In the programming of the Questionnaire, two kinds of error messages were included:

- hard error messages that highlight extreme/illogic answers and oblige interviewers to review their answers
- soft error messages, also referred to as warnings, show a pop up to the interviewer where an "illogic" answer is given and reQuest the interviewer to verify the response with the respondent. An interviewer can however continue with the next Question without changing the answer.

Despite the warning messages a number of "warnings" (i.e. illogic or rather implausible responses) remained in the interview. A high number of warnings per interview can be considered as suspicious. In the table below, the distribution of the number of warnings per country is presented. Given that the maximum number of warnings was only 5, on a total of 54 warning checks, we decided not to exclude interviews only based on this analysis as there is no excess of warnings. These results however were taken into account in addition to the back check results and data validation in Alberta. The same holds for the non-EU countries.

The table below also shows that PAPI countries tend to have a higher number of warnings arising in comparison to CAPI countries. The details – number and type of warnings – for respondents with at least one warning, can be found in a separate "warning" data file, where per respondent all information is available.

Table 22 Overview Warning Messages

	country	No warning	1 warning	2 warnings	3 warnings	4 warnings	5 warnings
AT	Austria	93%	6%	1%	0%	0%	0%
BE	Belgium	94%	5%	1%	0%	0%	0%
BG	Bulgaria	63%	34%	2%	0%	0%	0%
CY	Cyprus	98%	2%	0%	0%	0%	0%
CZ	Czech Rep.	94%	5%	1%	0%	0%	0%
DE	Germany	95%	4%	0%	0%	0%	0%
DK	Denmark	80%	18%	1%	0%	0%	0%
EE	Estonia	90%	8%	1%	0%	0%	0%
EL	Greece	90%	7%	3%	0%	0%	0%
ES	Spain	92%	6%	1%	0%	0%	0%
FI	Finland	91%	7%	1%	0%	0%	0%
FR	France	93%	6%	1%	0%	0%	0%
HU	Hungary	95%	4%	1%	0%	0%	0%
IE	Ireland	83%	12%	4%	1%	0%	0%
IT	Italy	96%	4%	0%	0%	0%	0%
LU	Luxembourg	93%	7%	1%	0%	0%	0%
LT	Lithuania	92%	7%	1%	0%	0%	0%
LV	Latvia	89%	10%	2%	0%	0%	0%
MT	Malta	82%	13%	5%	0%	0%	0%
NL	Netherlands	93%	5%	1%	0%	0%	0%
PL	Poland	91%	7%	1%	0%	0%	0%
PT	Portugal	93%	6%	1%	0%	0%	0%
RO	Romania	87%	10%	2%	1%	0%	0%
SE	Sweden	92%	7%	0%	0%	0%	0%
SI	Slovenia	94%	6%	0%	0%	0%	0%
SK	Slovakia	90%	8%	2%	0%	0%	0%
UK	United Kingdom	86%	12%	2%	0%	0%	0%
TR	Turkey	86%	13%	1%	0%	0%	0%
HR	Croatia	95%	5%	0%	0%	0%	0%
MK	Macedonia	98%	2%	0%	0%	0%	0%
KO	Kosovo	97%	3%	0%	0%	0%	0%
RS	Serbia	87%	12%	1%	0%	0%	0%
ME	Montenegro	93%	5%	1%	1%	0%	0%
IS	Iceland	87%	12%	1%	0%	0%	0%

8. OUTLIERS

In addition to a count of warnings in the interviews we also screened the data for possible outliers on the questions with a numeric (scale) level and for which the answers were not limited to a 10-point scale. It concerned 12 questions. Outliers were identified as values for which the absolute standardized score exceed 3.29 as in a normal distribution we would expect none of the absolute values greater than 3.29. In the table below the number of outliers per country and per question is presented.

Question	
Y11_Q7	How many hours do you normally work per week in your main job, including any paid or unpaid overtime?
Y11_Q7b	About how many hours per week did you work in this additional job or business or in agriculture? Please give an average figure for the last 4 working weeks.
Y11_Q8	If you could freely choose the number of your working hours while taking into account the need to earn your living, how many hours per week would you prefer to work at present?
Y11_Q9	How many hours does your partner normally work per week including any paid or unpaid overtime?
Y11_Q10	How many hours per week would you prefer your partner to work?
Y11_Q17	How many rooms does the accommodation in which you live have, excluding the kitchen, bathrooms, hallways, storerooms and rooms used solely for business?
Y11_Q32	How many children of your own do you have?
Y11_Q37a	On average, how many hours per week are you involved in any of the following activities outside of paid work? Caring for your children, grandchildren
Y11_Q37b	On average, how many hours per week are you involved in any of the following activities outside of paid work? Cooking and/or housework /
Y11_Q37c	On average, how many hours per week are you involved in any of the following activities outside of paid work? Caring for elderly or disabled relatives
Y11_Q52	About how much time (in minutes) in total do you usually spend getting to and from work or study using your usual mode of transportation?
Y11_Q63	Please can you tell me how much your household's NET income per month is? If you don't know the exact figure, please give an estimate.

Table 23 Overview outliers

Question/country	Q7	Q7b	8	9	10	17	32	37a	37b	37c	52	63	Total
AT	8	0	1	6	0	5	4	3	4	0	4	0	35
BE	8	0	2	9	0	27	2	0	3	3	13	0	67
BG	5	0	2	3	1	2	0	2	2	1	3	0	21
CY	3	0	0	0	0	1	3	0	1	0	3	0	11
CZ	1	1	0	4	0	2	0	4	7	1	5	0	25
DE	7	0	1	6	0	11	5	3	11	3	7	0	54
DK	3	0	1	1	0	7	2	9	1	0	10	0	34
EE	2	0	0	2	1	2	3	10	13	5	7	0	45
EL	17	0	1	5	0	1	1	3	8	3	7	0	46
ES	7	1	0	10	0	7	13	6	9	4	3	0	60
FI	5	2	1	5	1	2	4	12	4	1	4	0	41
FR	5	0	3	7	4	10	18	14	5	2	25	0	93
HU	1	1	0	3	0	0	3	4	5	1	10	336	364
IE	9	0	0	11	0	7	21	21	29	4	17	0	119
IT	4	0	2	6	0	7	4	7	2	3	15	0	50
LT	3	0	2	5	0	2	7	10	1	6	3	0	39
LU	2	0	0	2	0	11	2	6	1	1	6	0	31
LV	6	2	2	5	0	1	0	8	9	2	19	1	55
MT	3	1	1	2	0	8	8	3	26	1	17	0	70
NL	6	0	0	7	0	6	4	6	4	1	9	0	43
PL	7	1	1	13	0	6	14	17	17	9	21	0	106
PT	6	0	1	3	0	4	18	0	3	2	4	0	41
RO	11	2	4	8	0	4	7	8	56	2	3	0	105
SE	0	0	1	3	0	13	3	14	0	2	9	5	50
SI	1	1	0	2	0	1	1	3	5	3	3	0	20
SK	7	0	2	3	0	1	4	7	28	5	7	0	64
UK	11	0	0	10	2	12	12	76	23	17	22	1	186
EU	**148**	**12**	**28**	**141**	**9**	**160**	**163**	**256**	**277**	**82**	**256**	**343**	**1875**

Question/country	Q7	Q7b	8	9	10	17	32	37a	37b	37c	52	63	Total
TR	15	2	5	13	6	7	48	11	8	6	13	0	134
HR	0	2	2	0	2	7	3	5	8	5	6	0	40
MK	0	0	0	0	0	20	2	0	1	0	7	0	30
KO	1	0	1	0	1	22	5	0	0	0	1	0	31
RS	0	1	1	1	0	5	0	28	9	7	20	0	72
ME	0	0	2	0	3	3	1	9	14	3	4	0	39

IS	1	0	1	3	1	16	7	12	1	0	4	22	68
non-EU	17	5	12	17	13	80	66	65	41	21	55	22	414

We have to remark that outliers were identified on an EU level. Country specific distributions were not taken into account in this analysis. This implies that a number of the outliers on an EU level may be acceptable for a certain country. Especially for question 63, monthly income, this may be the case.

For the non-EU countries the identification of outliers happened on the basis of the data of these 7 seven countries together.

In a second step the raw values for the outliers were screened for

- their plausibility,
- their gap with the next less high values,
- the number of cases with this value, and
- answer data on other – relating – questions

After unflagging outliers that are regarded as acceptable, the following extreme values per question were identified. These extreme values are currently still included in the data file. GfK EU3C can replace these values by a code "don't know", so they are excluded from the average scores.

Table 24a Overview extreme values per question – EU27

Question	Extreme value	N° of cases with extreme values
Y11_Q7	n/a (the outlying values are acceptable)	0
Y11_Q7b	100 and higher	1
Y11_Q8	n/a (the outlying values are acceptable)	0
Y11_Q9	n/a (the outlying values are acceptable)	0
Y11_Q10	n/a (the outlying values are acceptable)	0
Y11_Q17	62 and higher	3
Y11_Q32	22 and higher	5
Y11_Q37a	n/a (the outlying values are acceptable)	0
Y11_Q37b	n/a (the outlying values are acceptable)	0
Y11_Q37c	n/a (the outlying values are acceptable)	0
Y11_Q52	n/a (the outlying values are acceptable)	0
Y11_Q63	n/a (the outlying values are acceptable)	0
Total		9

Table 24b Overview extreme values per question – non-EU

Question	Extreme value	N° of cases with extreme values
Y11_Q7	n/a (the outlying values are acceptable)	0
Y11_Q7b	100 and higher	1
Y11_Q8	n/a (the outlying values are acceptable)	0
Y11_Q9	n/a (the outlying values are acceptable)	0
Y11_Q10	n/a (the outlying values are acceptable)	0
Y11_Q17	n/a (the outlying values are acceptable)	0
Y11_Q32	n/a (the outlying values are acceptable)	0
Y11_Q37a	n/a (the outlying values are acceptable)	0
Y11_Q37b	n/a (the outlying values are acceptable)	0
Y11_Q37c	n/a (the outlying values are acceptable)	0
Y11_Q52	n/a (the outlying values are acceptable)	0
Y11_Q63	n/a (the outlying values are acceptable)	0
Total		1

9. DATAFILE EDITING DURING ANALYSIS

The following table contains the list of changes to the datafile since June 2012 addressing issues that were identified in the analysis stage. The edits are listed in chronological order, reflecting the ongoing process of improving the dataset.

Question	Issue	Cases affected	Solution
Y11_Incomecategory	This variable (labelled "Household income in euro (categories) based on information from Q63 and Q64") brings all answers together from the two income questions, in a euro-based categorical variable. However, when we looked at the distribution of respondents in the income categories by country, it was noticed that in some countries most respondents were in the highest category. The calculation of Y11_income Y11_incomecategory still reflected the original Y11_Q63.	All that reported income	Y11_Incomecategory updated to include both questions.
Q63 Q64 Y11_Income	Some values (999988, 99998, 99999) were not defined as missing, which also affected the averages to be used to calculate Y11_Income.	Unknown	Missing values defined
Y11_Incomequartiles	They were based on total household income rather than per capita household income.	All that reported income	Variable renamed Y11_Incomequartiles_total and new variable added named Y11_Incomequartiles_percapita.
Y11_HH3b	Family members were not ordered according to decreasing order of age	1115 cases	Reordered with new variables created for the HH grid
Y11_HH3b_4	Data entry issue: 117 years old person marked as child	1 case	Changed to 17
Y11_HH3c	Older family member marked as son/daughter	84 cases	Transferred code 2 to code 3 based on non-blocking error
Y11_HH3c	Older family member marked as grandchild	8 cases	Transfer code 5 to code 7 based on non-blocking error
Y11_HH3c	Older family member marked as son/daughter-in-law	13 cases	Impossible to tell the correct relationship Changed code 4 to code 9 - "unknown"
Y11_HH3c	Younger family member marked as parent	163 cases	Impossible to tell the correct relationship Changed code 3 to code 9 - "unknown"
Y11_HH3c	Less than 13 years between parent and	33 cases	These were examined on a

Question	Data-editing rule		Notes
	child		case-by-case basis. If the HH member was the same age as the respondent, the relationship was marked as "unknown" (20 cases). In 13 additional cases the relationship was made unknown with maximum 13 years of age difference allowed. Additionally, if a parent with sufficient age difference lives in the household, it was ok to also have a younger parent assuming it is a young stepparent.
Y11_HH3c	Multiple partners in household	111 cases	Impossible to tell the correct relationship Changed code 1 to code 9 - "unknown"
Y11_Q33a-c	Not applicable (don't have such relatives) code was 6		
Y11_Q34a-c	Not applicable (don't have such relatives) code was 6		Changed code to 97
Y11_Q32	Extreme values for number of children (over 20)	5 cases	Changed code to 98 - "unknown" (creating a category, as "don't know" was not allowed for this question)
Y11_Q7b	Extreme value for number of working hours in additional job (100 hours)	1 case	Changed code to 98 - "don't know"
Y11_Q17	Extreme values for number of rooms in the home (80, 70, 62 rooms)	3 cases	Changed code to 98 - "don't know"
Language of the interview	This variable was missing from final datafile	All cases	Language information received and merged into final file

10.   ANNEX: EQLS EDITING RULES

- F = hard error messages that highlight extreme/illogic answers and oblige interviewers to review their answers
- W = soft error messages, also referred to as warnings, show a pop up to the interviewer where an "illogic" answer is given and reQuest the interviewer to verify the response with the respondent. An interviewer can however continue with the next Question without changing the answer.

Question	Data-editing rule	Error/warning message	F =error W=

			warning
START	24:00 hr clock. No blanks accepted If start is before 08:00 = (F)	You may not interview before 8:00 am	F
START	24:00 hr clock. No blanks accepted If Start is after 22:00 = (F)	You may not start a new interview after 10 pm	F
HH1	if HH1 = 00 or 0 = (F)	Zero is not allowed	F
HH1	if HH1 > 10 = (F)	more than 10 is not allowed	F
HH2a	Only one answer. Male=1, Female=2. No blank accepted	A response is expected for Question	
HH2b	No blank accepted if HH2b is less than 18 = (F)	You may not interview anyone under 18	F
HH2b	if HH2b is over 120 = (F)	You may not interview anyone above 120	F
HH2d	if HH2d = code 7 AND HH2b is less than 45 = (W)	Oh, you retired early.	W
HH2d	if HH2d = code 9 AND HH2b is more than 40 = (W)	Oh, at this age, still in education.	W
HH3a	Only one answer. Male=1, Female=2 No blank accepted		
HH3b2 to HH3b10 (rule is repeated until HH3b10)	No blank accepted. if HH3b2 is less than 14 = HH3d2 = 11 if HH3b2 is over 120 = (F)	Response to Question HH3b(2 to 10) must be under 120	F
HH3b2 to HH3b10 (rule is until HH3b10)	if HH3b = 0 = (F)	Zero is not allowed	F
HH3c2 to HH3c15 (rule is repeated until HH3c15)	If HH3c2 = 1, then HH3b2 must be at least 18 (W)	May I just check, you said partner?	W
HH3c2 to HH3c15 (rule is repeated until HH3c15)	If HH3c2 = 2, then HH2b must be at least 14 more than HH3b2 (W)	May I just check, you said child?	W

HH3c2 to HH3c15 (rule is repeated until HH3c15)	If HH3c2 = 5, then HH2b must be at least 30 more than HH3b2 (W)	May I just check, you said grandchild?	W
Q1	Filter: if HH2d = codes 3 to 10 ask Q1		
Q2	Filter: if codes 1-2 at HH2d ask Q2		
Q3	Filter: if codes 1-2 at HH2d ask Q3		
Q4	Filter: if codes 1-2 at HH2d ask Q4		
Q5	Filter: If code 1 at Q1 ask Q5		
Q6	Filter: if codes 1-2 at HH2d ask Q6		
Q7	Filter: if code 1 or 2 at HH2d ask Q7 If Q7 is more than 120 (and not 999) = (F)	Response to Question Q7 must be under 120	F
Q7	If Q7 is between 72 and 120 = (W)	Are you sure, that sounds high?	W
Q7	If Q7 is 0 or 00 or 000 = (F)	Zero is not allowed	F
Q7a	Filter: if code 1 or 2 at HH2d ask Q7a		
Q7b	Filter: if code 1 at Q7a ask Q7b If Q7b is more than 120 (and not 999) = (F)	Response to Question '%Q' must be under %1.	F
Q7b	If Q7b is between 72 and 120 = (W)	Are you sure, that sounds high?	W
Q7b	If Q7b is 0 or 00 or 000 = (F)	Zero is not allowed	F
Q7c	Filter: IF HH2d = codes 3 to 10 ask Q7c		
Q8	If Q8 is more than 120 (and not 998 or 999) = (F)	Response to Question Q8 must be under 120.	F
Q8	If Q8 is between 72 and 120 = (W)	Are you sure, that sounds high?	W
Q9	Filter: if HH3c=1 and HH3d =1 or 2 ask Q9 If Q9 is more than 120 (and not 998 or 999) = (F)	Response to Question Q9 must be under 120.	F
Q9	If Q9 is between 72 and 120 = (W)	Are you sure, that sounds high?	W

Q9	If Q9 is 0 or 00 or 000 = (F)	Zero is not allowed	F
Q10	Filter: if HH3c=1 ask Q10 If Q10 is more than 120 (and not 998 or 999) = (F)	Response to Question Q10 must be under 120	F
Q10	If Q10 is between 72 and 120 = (W)	Are you sure, that sounds high?	W
Q11	Filter: if code 1 or 2 at HH2d ask Q11		
Q12	Filter: if code 1 or 2 at HH2d ask Q12		
Q13	Filter: if code 1 or 2 at HH2d ask Q13		
Q13a	There is no 'Not Applicable' code (code 97) here.		
Q13c	No 'Not Applicable' code (code 97)		
Q14	Filter: if code 1 or 2 at HH2d ask Q14		
Q15	Filter: if code 1 or 2 at HH2d ask Q15		
Q16	Filter: if code 1 or 2 at HH2d ask Q16		
Q17	If Q17 is 0 or 00 = (F)	Zero is not allowed	F
Q17	If Q17 is above 15 (W)	Are you sure, that sounds high?	W
Q24	Scale from 1 to 10 If Q24 is 0 or 00 = (F) If Q24 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F
Q27	Scale from 1 to 10 If Q27 is 0 or 00 = (F) If Q27 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F
Q28	Scale from 1 to 10 If Q28 is 0 or 00 = (F) If Q28 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F
Q30	Scale from 1 to 10 If Q30 is 0 or 00 = (F) If Q30 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F

Q31	If Q31 is code 1 and HH3c (..HH3c2, 3c3 etc) is NOT code 1 = (W) If Q31 is code 2 and HH3c (..HH3c2, 3c3 etc) is code 1 = (W) If Q31 is code 3 and HH3c (..HH3c2, 3c3 etc) is code 1 = (W) If Q31 is code 4 and HH3c (..HH3c2, 3c3 etc) is code 1 = (W)	This does not match what you told me in the household grid, are you sure?	W
Q32	If Q32 is greater than 15 (and not 99) = (W)	May I just check that the number of children is correct?	W
Q33a	Skip if code 00 at Q32		
Q33d	No "code 6"		
Q34a	Skip if code 00 at Q32 Skip if code 6 at Q33a		
Q34b	Skip if code 6 at Q33b		
Q34c	Skip if code 6 at Q33c		
Q37a, Q37b, Q37c	Filter: If codes 1, 2 or 3 at Q36a, ask Q37a If code 1,2 at Q36b, ask Q37b If code 1,2 at Q36c, ask Q37c // If Q36a is code 1 and Q37a is more than 168 (but not 998 or 999) = (F) If Q36a is code 2 and Q37a is more than 96 (but not 998 or 999) = (F) If Q36a is code 3 and Q37a is more than 48 (but not 998 or 999) = (F) if (Q37a = 0) = (F)	Response to Question Q37 must be under 168/96/48. Response to Question Q37 cannot be decimal	F
Q37a, Q37b, Q37c	If Q36a is code 1 and Q37a is more than 50 (but not 998 or 999) = (W) If Q36a is code 2 and Q37a is more than 30 (but not 998 or 999) = (W) If Q36a is code 3 and Q37a is more than 20 (but not 998 or 999) = (W)	Are you sure, that sounds high?	W

Q38	Filter: If at least 2 people aged 18 or over in the household (at least code '2' in HH1 and at least one more time code >='18' in HH2b or HH3b2 to HH3b10 OR at least two times code >='18' in HH2b or HH3b2 to HH3b10.		
Q39b	No Not Applicable code (code 4).		
Q39c	No Not Applicable code (code 4).		
Q39d	No Not Applicable code (code 4).		
Q40	Scale from 1 to 10 If Q40 is 0 or 00 = (F) If Q40 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F
Q40b	Filter: Q40b is asked only if codes 1 or 2 at HH2d		
Q41	Scale from 1 to 10 If Q41 is 0 or 00 = (F) If Q41 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F
Q44	Filter: if code 1 at Q43 ask Q44		
Q48	If ISCED 6 or ISCED 7 and less than 20 at HH2b = (W)	Have you already graduated?	W
Q52	If codes 1-2 at HH2d or code 9 at HH2d If Q52 is more than 720 (and not 998 or 999) = (F)	Response to Question Q52 must be under 120.	F
Q52	If Q52 is between 301 and 719 = (W)	Are you sure, that sounds high?	W
Q53	Scale from 1 to 10 If Q53 is 0 or 00 = (F) If Q53 is > 10 (and not 98 or 99) = (F)	You must give a number from 1 to 10	F
Q54	IF Q54_1 and/or Q54_2 = 1 then Q54_3 & Q54_4 & Q54_5 should be 0 IF Q54_1 and Q54_2 = 0 then Q54_3 or Q54_4 or Q54_5 should be 1		

Q55	IF Q54a_1 and/or Q54a_2 = 1 then ask Q55 SKIP IF Q54a_3 or Q54a_4 or Q55a_5 = 1		
Q56	IF Q54a2_1 and/or Q54a2_2 = 1 then ask Q56 SKIP IF Q54a2_3 or Q54a2_4 or Q55a2_5 = 1		
Q61	IF HH2d = 1 or 2 then Q61 = 1		
Q63	Filter: if code 1 "yes" at Q62 ask Q63		
Q64	Filter: If code 2 "no" or code 99 "refusal" at Q62 OR if code DK or Refusal at Q63 ASK Q64		
Q67	cannot be left blank		
END	24:00 hr clock. No blanks accepted If end is before 08:00 = (F)	You may not interview before 8:00 am	F
END	24:00 hr clock. No blanks accepted If end is after 22:30 = (F)	You may not interview after 10:30 pm	F