Online Appendix

Sample Design and Weighting Methodology of the 2024 OPC Survey on Climate Change and Climate Action in Luxembourg

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1. Introduction

LISER has been mandated by Ministère de l'Environnement, du Climat et de la Biodiversité (MEV) to carry out a survey of individuals aged 15 and over (age defined using 31.12.2023 as the reference date) who were resident in Luxembourg in private households during December 2023. The aim of this survey project is to conduct a study into the attitudes of the population of Luxembourg towards climate change. The information has been collected by means of a self-administered internet questionnaire (CAWI), which will be made available online to the people selected. In total, the MEV has contacted 35 000 people by post, precisely 15 000 individuals between 15 and 21 years old (youth) and 20 000 for the individuals of 22 years old and older (adults) to take part in the survey by logging onto a website. At the end of the survey, the response rate among all the population contacted by post was 18.47%. Precisely, for the people between 15-21 years old 16.67% and for the people of 22 years and older 19.83%.

The purpose of weighting the sample of respondents is to limit the undesirable effects of non-response. The principle is to increase the weights of respondents to compensate for the presence of possible biases (lack of coverage and selection bias) introduced by non-respondents. However, effective correction of non-response requires prior analysis of response behavior. The purpose of this document is to describe the weighting method used and the weighting system defined for the different age groups (youth and adult) targeted by the survey. We have considered the group of youth and adult as independent, therefore the whole weighting system is done accordingly. LISER provides two files with the results of the weighting system, one that contains the final weights for the respondents and another one that includes the replicate bootstrap weights. The variable adult (0 for youth and 1 for adult) is the variable that partition the files for youth and adults. The file of bootstrap replicate weights is needed to compute the variance estimator of the estimators calculated when analyzing the survey results.

The rest of the document is organized as follows. The constitution of a sampling frame and sampling is briefly presented in the second section. The treatment of imperfections in the administrative data is discussed in the third section. The general approach used for the analysis and explicit correction of non-response is the subject of the fourth section. The fifth section is devoted to the final weighting procedure, which uses a margin calibration procedure. The statistical tools needed to make proper use of the weighting system are described in the sixth section. The final section concludes with a description of the contents of the files provided by LISER, which have to be matched with the sample of respondents.

2. DEFINITION OF THE SAMPLING FRAME

Three survey protocols (three lists of selected individuals) have been built so that the following two constrains are respected:

1) Two different versions of the questionnaire regarding the age group: a version is foreseen for the individuals of 15-21 years old; another version for the individuals aged 22 years old and older.

2) With regard to the participation of individuals under the age of 18, initial consent must be obtained from their legal responsible.

Protocol 1.
From a sample of individuals between 15-17 years old, an information letter is addressed to the person selected and to the attention of the legal responsible inviting them to answer the questionnaire for the 15-21 years old.

Protocol 2.
For the individuals between 18-21 years old included in a second sample, the letter is addressed directly to them inviting them to reply to a questionnaire for the 15-21 years old.

Protocol 3.
Lastly, for the individuals aged 22 years old and over, which are included in a third sample, the letter is addressed directly to them, inviting them to reply to a questionnaire for the individuals aged 22 years old and older.

The IGSS is the source of data for these three survey protocols. In particular, data from the Répertoire National des Personnes Physiques (RNPP) and/or the Centre Commun de la Sécurité Sociale (CCSS), data covering all persons (parents, children) residing in the territory of the Grand Duchy of Luxembourg during the month of December 2023. These data were used, on the one hand, to create three independent sampling bases made up of young people aged 15-17, 18-21 and 22 and over respectively, and on the other hand, to define three probability sampling plans which are summarized in table 1 below, in the form of a general stratified sampling plan.

Table 1. Distribution of the population and sample size associated to each survey protocol.

Survey protocol	Age class	Nationality	Affiliation to the Lux. Soc. Sec. System	Below median income*	STRATUM	Pop size	Sample size
1	15-17	Lux.			1	12 337	2 920
		Non-Lux.			2	8 785	2 080
2	18-21	Lux.			3	20 197	7 123
		Non-Lux.			4	8 159	2 877
3	22- and older	Lux.	Blue collar, Full time parental leave (in Dec. 2023)		5	22 917	883
			White collar, Civil servant	yes	6	51 069	1 969
				no	7	50 730	1 956
			Retired, pre-retired		8	66 079	2 547
			Self-employed, unemployed, invalid, widow, voluntary insured, non-affiliated		9	46 692	1 800
			Co-insured		10	27 846	1 073

			Blue collar, Full time parental leave (in Dec. 2023)		11	49 908	1 924
			White collar, Civil servant	yes	12	38 625	1 489
				no	13	38 458	1 482
		Non-Lux.	Retired, pre-retired		14	21 661	835
			Self-employed, unemployed, invalid, widow, voluntary insured, non-affiliated		15	85 541	3 297
			Co-insured		16	19 318	745
					Total	**568 322**	**35 000**

*The median income is computed within each group (Stratum 6 and 7 and Stratum 12 and 13 respectively)

3. Treatment of the individuals out-of-scope

On the basis of the sampling plan explained in Section 2, the reference population for the weighting system is made up of 568 322 individuals (49 478 individuals between 15-21 years old –youth- and 518 844 individuals of 22 years old and older -adults). When the survey was launched into the field, CTIE, which was responsible for collecting contact details, could only send out 34 006 letters (14 670 to the youth and 19 336 to the adults). The reasons provided by CTIE for mailing fewer than the 35 000 letters selected are:

- Foreign addresses;
- Incorrect addresses;
- Individual personnel number (matricule) not found in the RNPP;
- Dead individuals;

In terms of the sample, the 994 individuals (330 youth and 664 adults) who were not contacted are considered to be out-of-scope. However, in order to obtain an estimate of the number of out-of-scope individuals (youth and adult) in the reference population, out-of-scope are taken into account in the final weighting procedure.

We the previous information, we provide an estimation of the eligible population and the out-of-scope population. That is, the study population in December 2023 still present in September 2024 (reference period for the mailing) and the study population in December 2023 that is no longer present in September 2024 respectively. The Horvitz-Thompson (1952) -HT- estimator is an unbiased estimator for the sampling design used in this study. For each stratum, the estimator of the total of a variable of interest y_{hi} , Y_h, for each strata $h = 1 \dots H$ is given by

$$\hat{Y}_h = \sum_{i=1}^{n_{sh}} \pi_{hi}^{-1} y_{hi}$$

where n_{sh} is the sample size in each strata $h = 1 \dots H$ and π_{hi} is the inclusion probability of the sample for each strata, in the case of a stratified random sampling without replacement is given by $\pi_{hi} = n_{sh}/N_h$, where N_h is the population size by strata. The estimated variance for an estimator of the total is

$$\hat{V}(\hat{Y}_h) = \sum_h N_h^2 \left(1 - \frac{n_{sh}}{N_h}\right) \frac{s_{y_h}^2}{n_h},$$

where $s_{y_h}^2 = \frac{1}{n_{sh}-1} \sum_{i \in s_h} (y_{hi} - \bar{Y}_h)^2$ and $\bar{y}_h = \sum_{i \in s_h} y_{hi}/n_{sh}$.

Assuming that the sample size is sufficient, the confidence intervals are calculated based on the assumption that the distribution of the data is normal.

Tables 2a, 2b and 2c show the main statistics used to estimate the eligible and out-of-scope individuals, compared with the reference population: the weighted estimator of the total, the standard deviation and the bounds of the associated confidence interval. Precisely, Table 2a refers to the whole population (youth and adult), Table 2b to the population of youth and Table 2c to the population of adult.

Table 2a. Estimated total, standard deviation (sd), lower bound (LB) and upper bound (UB) of the associated confidence interval for the whole population.

POPULATION	**Total**(*)	**sd**	**LB**	**UB**
Eligible	550 074	638.37	548 823	531 325
Out-of-scope	18 248	638.37	16 997	19 499
All	568 322	0,00	568 322	568 322

(*) HT estimator

Table 2b. Estimated total, standard deviation (sd), lower bound (LB) and upper bound (UB) of the associated confidence interval for the population of adults.

POPULATION	**Total**(*)	**Sd**	**LB**	**UB**
Eligible	501 618	46.40	48 365	48 547
Out-of-scope	17 226	46.40	931	1 113
All	518 844	0,00	518 844	518 844

(*) HT estimator

Table 2c. Estimated total, standard deviation (sd), lower bound (LB) and upper bound (UB) of the associated confidence interval for the population of youth.

POPULATION	**Total**(*)	**sd**	**LB**	**UB**
Eligible	48 456	46.40	48 365	48 547
Out-of-scope	1 022	46.40	931	1 113
All	49 478	0,00	49 478	49 478

(*) HT estimator

At the level of the population, and with reference to the HT estimator, the estimated number of out-of-scope individuals is set (to the nearest round) at 18 248 (precisely 1 022 youth and 17 226 adults). **However, the final weighting system is built by taking into account both eligible and non-eligible (out-of-scope) individuals.**

4. Non-response correction.

Usually, the non-response correction is seen as an additional sampling phase. The estimation of the response probabilities is usually done by fitting a model of non-response. The validity of the correction made depends on the level of understanding of the phenomenon of non-response. In practice, the analysis (or modelling) of the non-response mechanism requires access to auxiliary information at the level of both respondents and non-respondents. The auxiliary variables used for this analysis are defined at the level of the individuals. The results of this analysis will be used to partition the survey sample into several homogeneous response groups (MGH- in French).

The homogeneous response group (MGH- in French) method consists on dividing the sample into disjoint groups such that, within these groups, all the units in the sample have independent response behaviors and identical response probabilities. The procedure used to create these groups is a two-stage process. First, the auxiliary variables available for respondents and non-respondents that are correlated with response behavior are identified. These variables are identified by modelling response behavior using a logistic regression model. We indicate here that the most discriminating sources of auxiliary information from the point of view of non-response. We highlight that the non-response correction has been analyzed independently for the youth and the adults.
The variables that explain the non-response in youth are:

1) Personaly affiliated to the Luxembourgish social security;
2) Number of parents;
3) Gender;
4) Residence canton.

The non-response in adults is explained with the following variables:
1) Affiliation status to Luxembourgish social security;
2) Nationality;
3) Gender;
4) Income.

Second, The MGHs are then constructed using an iterative procedure. First, we divide the sample according to the auxiliary variable most significantly correlated with the fact of being a respondent; then dividing the remaining sample in groups according to the next variable(s) with respect the largest correlation with the fact of being a respondent. We repeat this procedure until everyone is assigned to a group. At the end of this procedure, each homogeneous group is composed of sample units with in which it is no longer possible to demonstrate a correlation between the fact of being a respondent and the auxiliary variables available for the analysis of non-response. In each group, the response probability is estimated as the number of responding units divided by the total number of sample units (respondents and non-respondents) belonging to the same group (empirical response rate). The homogeneous response groups retained for the entire sample are described in table 3 below.

Table 3: Partition of the sample in 16 homogeneous response groups (6 for the youth and 10 for adults)

Response homogeneous groups (MGH)		Description	Response rate (in %)	Respondents size
1	YOUTH	Personally affiliated to the Luxembourgish social security.	10.52	277
2		-Non-affiliated or affiliated on the name of another person to the Luxembourgish social security (coinsured), -0 or 1 parent.	11.89	258
3		-Non-affiliated or affiliated on the name of another person to the Luxembourgish social security (coinsured), -2 parents,	16.24	504

		-Male, -Residence Canton Diekirch, Esch/Alzette, Grevenmacher, Luxembourg Ville, Redange, Remich, Vianden, Wiltz.		
4		-Non-affiliated or affiliated on the name of another person to the Luxembourgish social security (coinsured), -2 parents, -Male, -Residence Canton Capellen, Clervaux Echternach, Luxembourg Campagne, Mersch.	19.86	374
5		-Non-affiliated or affiliated on the name of another person to the Luxembourgish social security (coinsured), -2 parents, -Female, -Residence 1 2 3 4 6 9 10 11 12 Canton Capellen, Clervaux, Dierkirch, Echternach, Grevenmacher, Mersch, Redange, Remich, Vianden, Wiltz.	19.63	567
6		-Non-affiliated or affiliated on the name of another person to the Luxembourgish social security (coinsured), -2 parents, -Female, -Residence Canton 5 7 8 13 Esch/Alzette, Luxembourg Campagne, Luxembourg Ville, Wiltz.	22.67	466
7	ADULT	Blue collar, Parental leave (full time), Voluntary insured.	13.17	236
8		Non Affiliated to the Luxembourgish social security.	17.67	315
9		-Unemployed, Pre-retired, Retired, Invalid, Widow, -Male.	20.53	447
10		-Unemployed, Pre-retired, Retired, Invalid, Widow, -Female.	14.87	336
11		Affiliated on the name of another person to the Luxembourgish social security (coinsured).	19.71	351
12		Independent worker.	24.18	207
13		Civil servant.	29.23	394
14		-White collar	20.08	550

		-Income below the median (within the white collar).		
15		-White collar, -Income above the median (within the white collar) -Male.	29.60	420
16		-White collar -Income above the median (within the white collar), -Female.	25.67	327

5. Calibration adjustment after non-response correction.

Margin calibration is generally applied after correction for non-response. This procedure is described in Särndal and Lundström (2005). At the level of the sub-sample containing both respondents and out-of-scope individuals, the homogeneous response groups are included in the set of calibration variables. We also consider additional auxiliary information the combination between age group, gender and nationality. A final constraint takes into account the estimation of the out-of-scope population shown in table 2a, 2b and 2c. The calibration weights were calculated using the raking ratio method. The weighting procedure was carried out using a version of the macro CALMAR, compiled on a SAS 9.4 Windows version. We describe in Table 4 the variables used in the calibration procedure.

Table 4: Calibration variables and associated margin totals.

Calibration variables		Category	Description	Population totals
MGH	YOUTH	1	See Table 3	7 829
		2	See Table 3	7 542
		3	See Table 3	10 739
		4	See Table 3	6 501
		5	See Table 3	6 976
		6	See Table 3	9 891
	ADULT	7	See Table 3	99 386
		8	See Table 3	53 190
		9	See Table 3	59 956
		10	See Table 3	57 854
		11	See Table 3	47 164
		12	See Table 3	22 412
		13	See Table 3	34 783
		14	See Table 3	72 049
		15	See Table 3	37 986
		16	See Table 3	34 064
Age group, gender and Nationality	YOUTH	1	15-17 years old, male, Luxembourgish	6 262
		2	15-17 years old, male, non-Luxembourgish	4 549
		3	15-17 years old, female, Luxembourgish	6 075
		4	15-17 years old, female, non-Luxembourgish	4 236
		5	18-21 years old, male, Luxembourgish	10 576
		6	18-21 years old, male, non-Luxembourgish	4 336

		7	18-21 years old, female, Luxembourgish	9621
		8	18-21 years old, female, non-Luxembourgish	3 823
	ADULT	9	22-34 years old, male, Luxembourgish	33 191
		10	22-34 years old, male, non-Luxembourgish	34191
		11	22-34 years old, female, Luxembourgish	31 639
		12	22-34 years old, female, non-Luxembourgish	32 215
		13	35-44 years old, male, Luxembourgish	21 001
		14	35-44 years old, male, non-Luxembourgish	31 890
		15	35-44 years old, female, Luxembourgish	21 197
		16	35-44 years old, female, non-Luxembourgish	30 753
		17	45-54 years old, male, Luxembourgish	20 085
		18	45-54 years old, male, non-Luxembourgish	28 533
		19	45-54 years old, female, Luxembourgish	20 917
		20	45-54 years old, female, non-Luxembourgish	25 900
		21	55 years old and older, male, Luxembourgish	54 730
		22	55 years old and older, male, non-Luxembourgish	35 904
		23	55 years old and older, female, Luxembourgish	62 573
		24	55 years old and older, female, non-Luxembourgish	34 125
ELEGIBLE	YOUTH	1	Eligible	48 465*
		2	Out-of-scope	1 022*
	ADULT	3	Eligible	501 618*
		4	Out-of-scope	17 226*

(Sources IGSS/CTIE.
** Calculus done with the HT estimator, see tables 2a, 2b and 2c.)*

6. **Example of using the weighting system to estimate a total or a proportion.**

In order to compute the measurement error of an estimator, either as a confidence interval or as coefficient of variation, and therefore, the variance associated to an estimator, we propose to use resampling methods. Precisely, the bootstrap method by Rao & Wu, (1988) and Rao, You and Wu (1992) for the case of a stratified simple random sampling with replacement. Both methods take into account only the variance attached to the sampling (the sampling variance). However, they do not take into account the variance due to non-response and calibration. Recently, Bessonneau et al (2021) proposed a SAS macro including the methodological procedure described. This method consist basically on replicating the weighting procedure explained in sections 2 to 5 a number B (big) of times *(b=1,…,B).* For this survey, we consider B=1 000. The idea is to approximate the variability (variance) due to the sampling, the eligibility, the non-response correction and the final calibration. Note that this procedure has been done independently for the youth and the adult. The susinlux_replicateweights SAS file provides 1 000 replicate weights for the youth and the adult. In the rest of the section, we explain how to use this file to compute three different confidence intervals for the whole population (youth and adult together), for the population of youth and for the population of adults.

6.1 Confidence interval associated to the estimation of a ratio.

We consider the question: *How important are each of the following issues to you, personally?-climate change (…) or other environmental issues (…).*

1) *Not at all important*
2) *Not important*
3) *Indifferent*
4) *Important*
5) *Very important*
6) *Prefer not to say.*

Our aim is to estimate the distribution of the responses for the question, which can be also calculated as the proportion of people replying yes to each statement. The response modalities are exclusive, therefore, we transform it into five dummy variables. We define the variable of interest $y_{ji.}, j = 1, \dots, 6$ for the respondent individuals r ($i \in r$).

$$y_{ji} = \begin{cases} 1 & \text{if the individual } i \text{ replies yes to question } j, \\ 0 & \text{otherwise,} \end{cases}$$

Note that for this survey, we consider only the eligible units (the individuals present in December 2023 still present in September 2024). Then, the total of the eligible population is not known and therefore should be estimated (see tables 2a, 2b and 2c). Thus, the proportion cannot be assimilated to a mean. The true proportion of individuals replying yes to each question $j = 1, \dots, 6$ is computed as $P_j = \frac{Y_j}{N}$,

where $Y_j = \sum_{i \in U} y_{ji}$. The associated weighted estimator for the proportion is given by $\hat{P}_j^w = \frac{\hat{Y}_j^w}{\hat{N}}$, where $\hat{Y}_j^w = \sum_{i \in r} w_i y_{ji}$, where w_i is the final weight of the $i \in r$ and $\hat{N} = \sum_{i \in r} w_i$.

We can compute three confidence intervals associated to the weighted estimator of the proportion. Consider α=2.5% to obtain confidence intervals at 95%:

1) The bootstrap normality based confidence interval given by,

$$IC_{Norm}(P_j) = \left[\hat{P}_j^w \pm Z_{1-\alpha}\{\tilde{v}_b(\hat{P}^w)\}^{1/2}\right]$$

where $\tilde{v}_b(\hat{P}^w) = (B-1)^{-1} \sum_{b=1}^{B} \left\{\hat{P}_j^{w*(b)} - B^{-1} \sum_{c=1}^{B} \hat{P}_j^{w*(b)}\right\}^2$ and $\hat{P}_j^{w*(b)}$ is the bootstrap estimator of the proportion of the replicate *b*, (*b=1,…,B).*

2) The percentile confidence interval, which relies upon the assumption that the conditional distribution of the bootstrap calibrated estimators, $\hat{P}_j^{w*(b)}$ is a good approximation of the distribution of the calibrated (final) estimator of the proportion $\hat{P}_j^{w}$. Order $\hat{P}_j^{w*(b)}$, *b=1,…,B*

$$IC_{Perc}\left(P_j\right) = \left[\hat{P}_j^{w*(b),LB}, \hat{P}_j^{w*(b),UB}\right],$$

where $LB = \alpha B$ and $UB = (1-\alpha)B$

3) The reverse percentile confidence interval (a.k.a. basic confidence interval) uses of the conditional distribution of $\hat{P}_j^{w*(b)} - \hat{P}_j^{w}$ to approximate the distribution of $\hat{P}_j^{w} - P_j$. The confidence interval is

$$IC_{basic}\left(P_j\right) = \left[2\hat{P}_j^{w} - \hat{P}_j^{w*(1-\alpha)B}, 2\hat{P}_j^{w} - \hat{P}_j^{w*(\alpha)B}\right].$$

Table 5.1: Ratio estimates, standard deviation (sd), coefficient of variation (CV), normality based (norm), percentile (per) and reverse percentile confidence interval (basic) with their respective lower bound -LB- and upper bound -UB- for the question "importance of climate change" for the population of study (15- and older), all in %.

j	Ratio	sd	CV	Norm		Perc		Basic	
				LB	UB	LB	UB	LB	UB
1	2.09	0.21	10.17	1.67	2.51	1.69	2.51	1.67	2.49
2	2.51	0.24	9.71	2.03	2.99	2.05	3.02	1.99	2.97
3	7.74	0.41	5.29	6.93	8.54	6.93	8.56	6.91	8.54
4	42.56	0.78	1.83	41.03	44.09	41.04	44.06	41.06	44.08
5	43.02	0.77	1.79	41.51	44.53	41.49	44.59	41.44	44.54
6	2.92	0.24	8.35	2.44	3.40	1.65	2.97	2.60	2.54

Table 5.2: Ratio estimates, standard deviation (sd), coefficient of variation (CV), normality based (norm), percentile (per) and reverse percentile confidence interval (basic) with their respective lower bound -LB- and upper bound -UB- for the question "importance of climate change" for adult (22 years old and older), all in %.

j	Ratio	sd	CV	Norm		Perc		Basic	
				LB	UB	LB	UB	LB	UB
1	2.04	0.23	11.28	1.59	2.49	1.59	2.49	1.58	2.48
2	2.35	0.27	11.36	1.83	2.87	1.88	2.92	1.78	2.86
3	7.17	0.43	6.02	6.32	8.02	6.30	8.02	6.31	8.02
4	42.51	0.84	1.99	40.85	44.17	40.81	44.17	40.87	44.21
5	43.83	0.85	1.91	42.19	45.47	42.22	45.51	42.16	45.45
6	2.12	0.26	12.55	1.59	2.64	1.62	2.68	1.55	2.61

Table 5.3: Ratio estimates, standard deviation (sd), coefficient of variation (CV), normality based (norm), percentile (per) and reverse percentile confidence interval (basic) with their respective lower bound -LB- and upper bound -UB- for the question "importance of climate change" for youth (15-21 years old), all in %.

j	Ratio	sd	CV	Norm		Perc		Basic	
				LB	UB	LB	UB	LB	UB
1	2.66	0.38	14.22	1.92	3.4	1.99	3.43	1.88	3.33
2	4.13	0.45	10.92	3.25	5.01	3.26	5.05	3.21	4.99
3	13.71	0.75	5.44	12.25	15.17	12.37	15.33	12.08	15.05

4	43.11	1.05	2.43	41.05	45.17	41.13	45.19	41.01	45.08
5	34.54	1.01	2.92	32.56	36.52	32.52	36.46	32.65	36.59
6	1.85	0.3	15.95	1.27	2.43	1.3	2.46	1.24	2.39

7. Conclusion

The weighting system (6 280 individual final weights) is stored in SAS file named susinlux_weights. It includes 3 variables.

1. Login,
2. Adult: 0 for the individuals between 15-21 years old and 1 for the individuals of 22 years old and older.
3. W_final: final weight.

The file of replicate weights susinlux_replicateweights contains 1 000 vectors of final weights. Precisely,

1. Login,
2. Adult: 0 for the individuals between 15-21 years old and 1 for the individuals of 22 years old and older.
3. R vector of 1 (respondents).
4. W_final0001—W_final1000, for each column (of 1 000) the bootstrap b set of final weights *b=1,…,B*.

Both files can be partitioned easily for youth and adult by using the variable adult in each file.

Bibliography

Bessonneau, P., Brilhaut, G., Chauvet, G. and Garcia, C. (2021). With-replacement bootstrap variance estimation for household surveys Principles, examples and implementation. *Survey Methodology*, Statistics Canada, **47**, No. 2.

Deville, J.-C. and Särndal, C.-E. (1992). Calibration estimators in survey sampling. *Journal of the American Statistical Association*, **87**: 376-382.

Horvitz, D. G. and Thompson, D. J. (1952). A generalization of sampling without replacement from a finite universe. *Journal of the American Statistical Association*, **47**: 663-685.

Rao, J. N., & Wu, C. F. J. (1988). Resampling inference with complex survey data. *Journal of the American statistical association*, **83**(401), 231-241.

Rao, J. N. K., Wu, C. F. J., & Yue, K. (1992). Some recent work on resampling methods for complex surveys. *Survey methodology*, **18**(2), 209-217.