

Nonresponse Adjustments in the European Social Survey: The Added Value of Process Weights

Annelies Blom (GESIS)

NCRM Paradata Seminars
“The Application of Paradata in Social Surveys”
London, 25th August 2009

Motivation

- Countries differ in nonresponse
(de Heer & de Leeuw 2002; Billiet et al. 2007)
 - Differences in nonresponse can bias cross-national comparisons
 - Nonresponse weighting in cross-national surveys relies on limited comparative data
 - The collection of comparative data about the nonresponse process is possible
- ⇒ Availability of a comparative data source to model nonresponse processes in the ESS
(Kreuter & Kohler 2007; Beulens, Billiet & Loosveldt 2008; Blom 2008)

Motivation

- Standard nonresponse weights (e.g. post-stratifications) adjust for demographics only.
 - Weights based on process data might be able to adjust for characteristics that are independent of standard demographics.
 - Process weights might be well-suited for nonresponse adjustment in multi-purpose surveys.
- ⇒ Can nonresponse weights based on the ESS contact data contribute to nonresponse weighting?

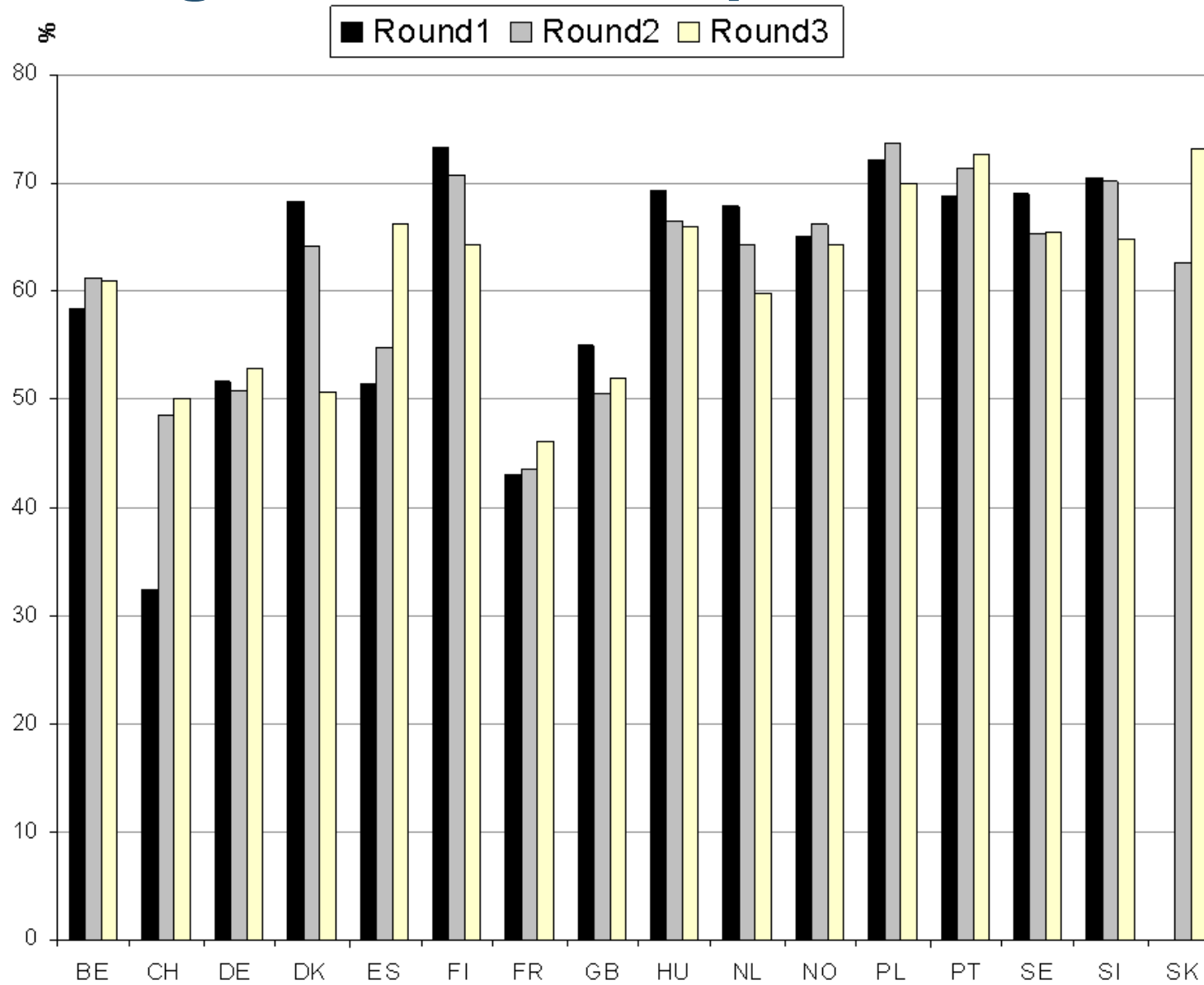
Background: the European Social Survey

- Cross-national survey of social and political attitudes in Europe
 - Repeated cross-sections (bi-annual)
 - First round in 2002
 - 20+ countries
 - Methodological requirements (e.g. face-to-face data collection, probability sampling, translation and fieldwork procedures)
- ⇒ In addition to the main interview data, the ESS collects *contact data* for all sample units (respondents and non-respondents)

Background: ESS contact data

- A record of the contacting and cooperation process allowing to derive the following variables
 - # contact attempts
 - timing of contact attempts
 - state of the building
 - urbanicity
 - interviewer cooperation rate
 - interviewer contact rate
 - interviewer calling strategies
 - mode of first contact
 - time of first contact
 - refusal
 - change of interviewer

Background: ESS response rates



Nonresponse bias

$$B(\bar{y}_r) \approx \frac{\sigma_{y\rho}}{\bar{\rho}}$$

Nonresponse bias in the mean of a survey variable (y) is a function of the correlation (σ) of y with response propensity (ρ) (Bethlehem 2000).

One can adjust y for nonresponse bias, if adjusting for the sample units' response propensities $\rho(x)$ with respect to auxiliary variables x renders the relationship between y and response independent (Göksel et al. 1992).

⇒ Auxiliary data needed to model sample units' response propensities

Nonresponse bias

Nonresponse weights based on process data appeal because:

1. Based on process characteristics and thus by their very nature related to the nonresponse process (especially relevant in multi-purpose surveys like the ESS)
2. Possibly proxy sample unit characteristics related to different types of survey outcomes
3. The data needed to model these weights can be collected comparatively across countries

Study description

Examining the effect of different types of nonresponse weights on selected ESS estimates (in the areas of political activism, trust, happiness and values).

Due to the limited availability of auxiliary data from countries' sampling frames this study was conducted in a few countries and rounds only:

Finland (rounds 1-3)

Poland (rounds 1-3)

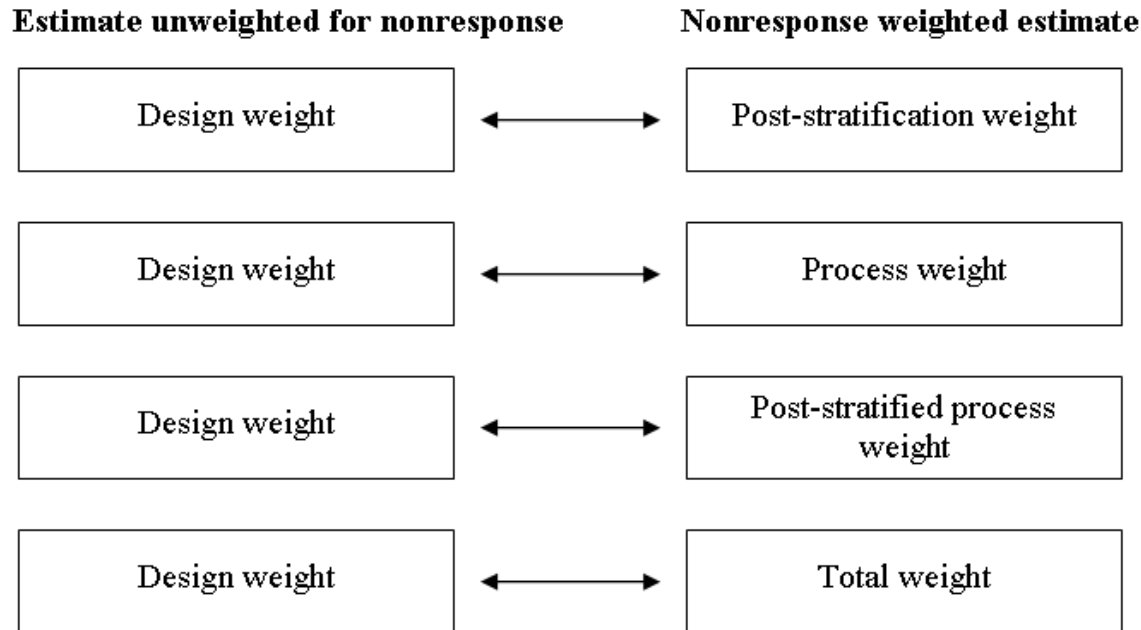
Slovakia (round 2)

Available auxiliary data

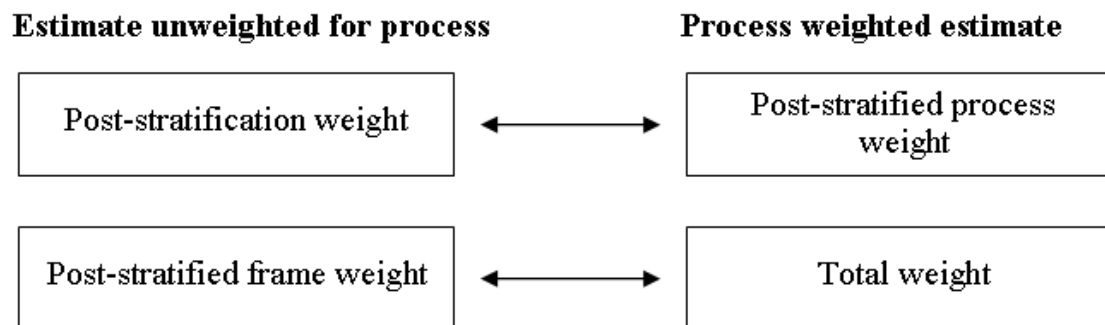
- Population level data on age, gender & education distributions (*post-stratification weights*)
- Sample unit level data on age, gender, region, urbanicity (& language) from the sampling frames (*frame weights*)
- Sample unit level contact data (*process weights*)
- Design weights for Poland; simple random samples in Slovakia and Finland

Method: comparing weighted estimates

Basic comparisons



Added-valued comparisons



Note: Total weight = Post-stratified frame- and-process weight

Findings

- Post-stratified process weight and total weight successful at removing relative nonresponse bias
- Some limited added value effects
- Different effects across variables, countries and rounds, but some types of variables (and countries/rounds) more affected than others

Findings: political activism

Country and round	Design weight	Post-stratification weight sign.	Process weight sign.	Post-stratified process weight sign.	sig. (ps	Total weight	sig. (ps frame
Proportion 'yes'	%	% (dweight)	% (dweight)	% (dweight)	dweight)	% (dweight)	dweight)
Voted							
Finland round 2	79	78	78	77	*	77	*
Finland round 3	84	83	82	82	*	81	*
Contacted politician							
Demonstration							
Finland round 2	2.0	2.2	2.4	2.6	*	2.6	*
Party member							
Finland round 2	7.2	7.0	6.6	6.3	*	6.3	*

Only significant results presented

Findings: happiness

Country and round	Design weight	Post-stratification weight sign. (dweight)	Process weight sign. (dweight)	Post-stratified process weight		Total weight	
				sign. (dweight)	sig. (ps dweight)	sig. (dweight)	sig. (ps frame dweight)
Happiness Finland round 3 Depression	mean 8.00	mean 7.99	mean 7.95 *	mean 7.94 *		mean 7.95	

Only significant results presented

Findings: Schwartz's human values

Country and round	Design weight	Post-stratification weight		Process weight	Post-stratified process weight		Total weight	
	mean	mean	sig. (dweight)	mean (dweight)	mean (dweight)	sig. (ps dweight)	mean (dweight)	sig. (ps frame dweight)
Security								
Finland round 3	-0.42	-0.40		-0.41	-0.38	*	-0.40	
Conformity								
Finland round 3	-0.06	-0.03		-0.05	-0.02		-0.02	*
Tradition								
Slovakia round 2	-0.30	-0.36	*	-0.30	-0.35	*	-0.36	*
Benevolence								
Slovakia round 2	-0.41	-0.44		-0.42	-0.44		-0.45	*
Universalism								
Finland round 3	-0.79	-0.78		-0.78	-0.77		-0.76	*
Poland round 3	-0.55	-0.54		-0.57	-0.57	*	-0.57	*
Slovakia round 2	-0.46	-0.47		-0.49	-0.49	*	-0.50	*
Self-direction								
Slovakia round 2	-0.25	-0.21	*	-0.28	-0.23		-0.23	
Stimulation								
Finland round 2	0.50	0.48		0.48	0.46	*	0.47	*
Finland round 3	0.52	0.48	*	0.49	0.45	**	0.46	*
Hedonism								
Finland round 2	0.29	0.27		0.27	0.29	*	0.25	*
Finland round 3	0.29	0.25		0.26	0.92	*	0.22	*
Achievement								
Slovakia round 2	0.29	0.32		0.32	0.35	*	0.36	**
Power								
Poland round 3	0.65	0.65		0.69	0.69	*	0.69	*
Slovakia round 2	0.67	0.70		0.69	0.72	*	0.73	*

Only significant results presented

Conclusions

- Weighting effects were of expected direction
- Effects found in variables not previously examined for NR bias
- Analyses emphasised estimate-specificity of NR bias (across variables, countries & rounds)
- Combining contact data with frame data and population distributions benefited the NR weights
- In the absence of frame data NR weights based on contact data and population distributions successful

Conclusions

- ⇒ Process data adjust for characteristics partially independent of standard demographics
- ⇒ Process weights might be well-suited for NR adjustments in cross-national multi-purpose surveys like the ESS
- ⇒ Process-based weighting possible for most ESS countries

Caveats

- Availability and quality of contact data across ESS countries
- Costs of collecting comparative contact data

Thank you!

Full working paper available from
<http://www.iser.essex.ac.uk/publications/working-papers/iser/2009-21>