



Nonresponse and Bias

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Why a Problem?



- Image Problem
 - Survey organisation
 - Survey data
- Increase Costs
 - Completed questionnaire/interview
- Increased Variance
 - Smaller N, larger standard errors
- **Potential for Bias**



A Problem or Not?



- Non systematic: No problem
- Nonresponse **not** related to **any** variable:
MCAR
- Missing Completely at Random
 - Increased variance due to smaller realized sample
 - Influences Power, Standard Error
 - Solutions
 - Larger initial sample
 - Double sampling
 - Costly!



A Problem or Not?



- *Non systematic*: No big problem
- Nonresponse **not** related to **key** variables
MAR
- Missing At Random
 - Simple solutions (weighting)
 - Better point estimates
 - Increased variance
 - Standard software estimates standard error incorrect (too small)
 - Special software needed



A Problem !



- **Systematic**: Problem
- Missing Not At Random is **related to key variables**
 - Results may be biased!
 - Bad image
 - Costly
- Not Missing At Random **NMAR**
 - Complicated solutions



Nonresponse Error



- More than low response rate
- Nonresponse error is a function of
 - Nonresponse rate
 - **Difference** between respondents and nonrespondents
- In other words:

Nonresponse error occurs when some of the sampled units do not respond *AND* are **different** from those who do respond

Different in a way that is **relevant** to the study:
NMAR



Non Response Trends



“We all *believe* strongly that response rates are declining and have been declining for some time. Part of the problem is *LOCATING* respondents, and part of the problem is getting *COOPERATION*” (Bradburn, 1992)

- International Comparisons (De Leeuw & De Heer, 2001)
 - Nonresponse is increasing over time
 - Depends on country, topic, method



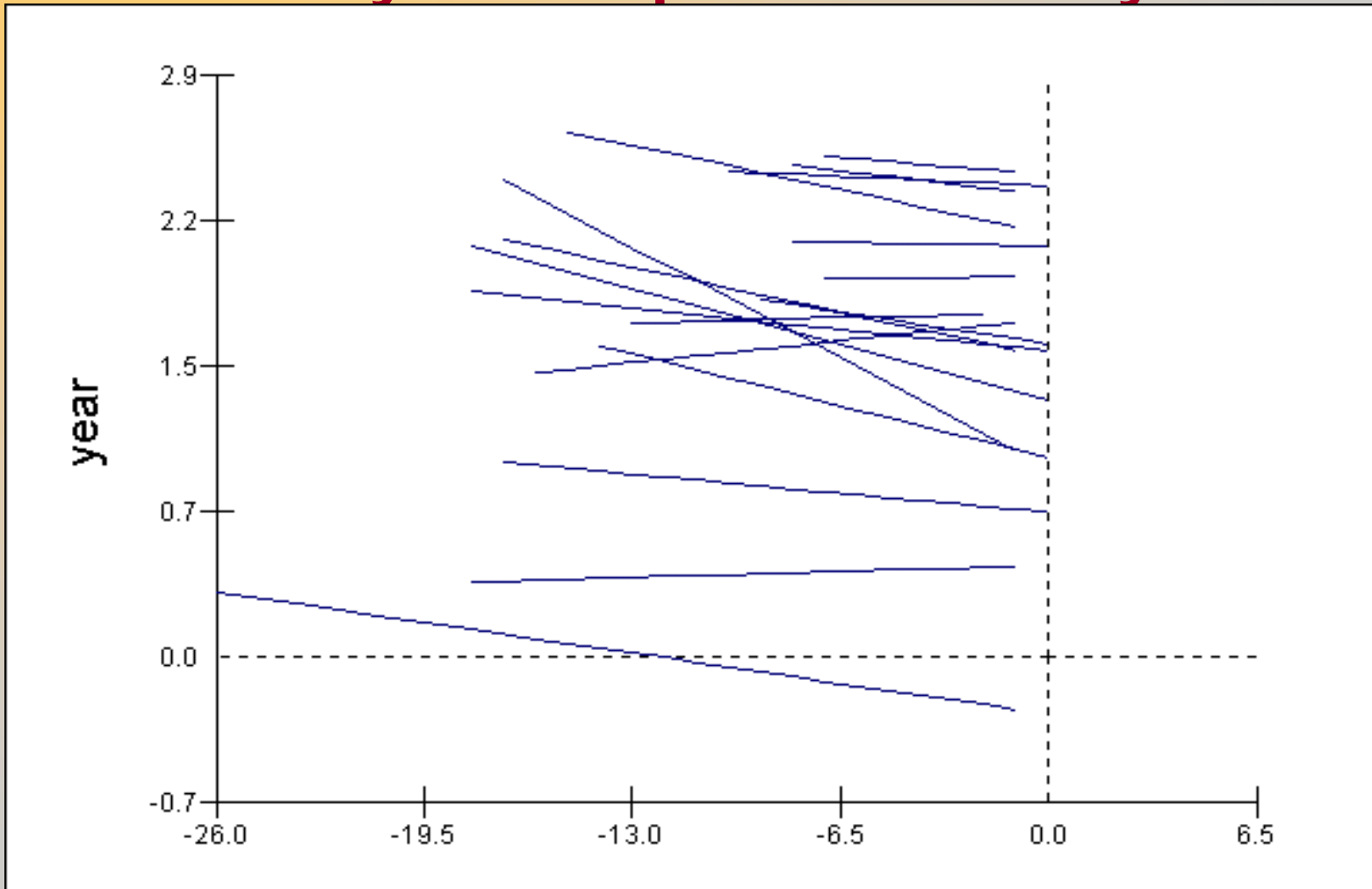
Unit Non-Response: Household Surveys



- International Comparison Official Statistics
 - Negative trend over time:
 - Example of Increase in Nonresponse
 - Holland LFS: from 20%-40% last 20 years
 - USA LFS: from 4%-8% last 20 years
 - **Countries** differ in overall response rate
 - Surveys differ in overall response rate
 - Speed of increasing nonresponse differ from country to country
- (Source: De Leeuw & De Heer, 2001)



International Response over years per country





International Comparison Response Trend



- In Sum
 - 16 countries (USA, Canada, Europe)
 - Period 1980-1998
- Non contacts
 - Increase on average 0.2% each year
- Refusals
 - Increase on average 0.3% each year



International Comparison



Non contacts

- Non Response: Two Major Problems
 - ***Locating: non-contacts***
 - Cooperating: refusals
- Countries differ!
 - Non-contacts LFS 1990's: Holland (10%), Denmark (15%), Belgium (12%), UK (5%), Sweden, (7%), USA (3%), Rest (2-5%)

(Source: De Heer, 1999, De Leeuw & De Heer, 2001)



International Comparison Refusals



- Non Response: Two Major Problems
 - Locating: non-contacts
 - ***Cooperating: refusals***
- Countries differ!
 - Refusals LFS 1990's: Holland (26%), UK (14%), Denmark (8%), Slovenia (7%), Hungary (6%), Sweden (5%), USA (4%), Rest (1-4%)
- Some countries remain stable in *overall response* over time by increasing effort
(Source: De Heer, 1999, De Leeuw & De Heer, 2002)

Table 10.1 Response overview European Social Survey 2002/2003

country	eligible sample units	response rate	non-contact rate	refusal rate		incapacity rate ^a		unknown ^c	net sample
				total	by proxy ^b	total	language		
Austria	3736	60.41	12.04	25.67	3.27	1.87	0.00	0.00	2257
Belgium	3207	59.21	8.11	24.70	5.61	7.98	1.87	0.00	1899
Czech Republic	3139	43.33	11.63	20.01	4.81	5.32	0.13	19.72	1360
Denmark	2229	67.56	3.77	23.60	0.18	5.07	0.00	0.00	1506
Finland	2732	73.21	3.88	19.03	1.76	3.88	0.62	0.00	2000
France	3488	43.09	14.68	38.53	33.03	3.70	0.86	0.00	1503
Germany	5242	57.13	8.34	26.12	1.87	8.28	1.11	0.13	2919
Greece	3208	79.99	2.74	16.08	10.35	1.18	0.22	0.00	2566
Hungary	2412	69.86	6.84	13.93	0.00	9.37	0.00	0.00	1685
Ireland	3174	64.46	9.80	20.26	8.13	5.48	0.00	0.00	2046
Israel	3520	70.99	5.77	21.76	8.38	1.48	0.51	0.00	2499
Italy	2761	43.72	4.13	43.86	37.02	8.29	0.04	0.00	1207
Luxemburg	3535	43.93	11.46	44.61	0.00	0.00	0.00	0.00	1552
Netherlands	3484	67.85	2.70	24.37	0.00	3.16	1.32	1.92	2364
Norway	3132	65.01	2.65	24.87	0.51	7.47	1.05	0.00	2036
Poland	2881	73.24	2.08	19.75	4.82	4.93	0.00	0.00	2110
Portugal	2196	68.81	2.82	25.82	22.22	1.23	0.09	1.32	1511
Slovenia	2154	70.52	5.06	17.27	4.22	4.97	0.00	2.18	1519
Spain	3249	53.22	11.05	32.10	11.45	3.32	0.49	0.31	1729
Sweden	2878	69.46	4.07	20.95	0.00	5.52	1.84	0.00	1999
Switzerland	6097	33.48	2.80	54.81	24.95	8.91	5.04	0.00	2040
UK	3696	55.52	4.92	33.17	11.39	5.09	1.33	1.30	2052

a Respondent mentally or physically unable to cooperate throughout the fieldwork period; language barrier; respondent unavailable throughout the fieldwork period for other reasons.

b Refusal to cooperate by other person within the household or at the address, possibly within knowing whether the refuser is the target sample person.

c Percentage of sample units not accounted for.



Why Worry?



- Seriousness Nonresponse Bias depends
 - Nonresponse rate
 - Difference between respondents and nonrespondents on key variables

- If difference large, large bias even with high response rate!



Fictional Example

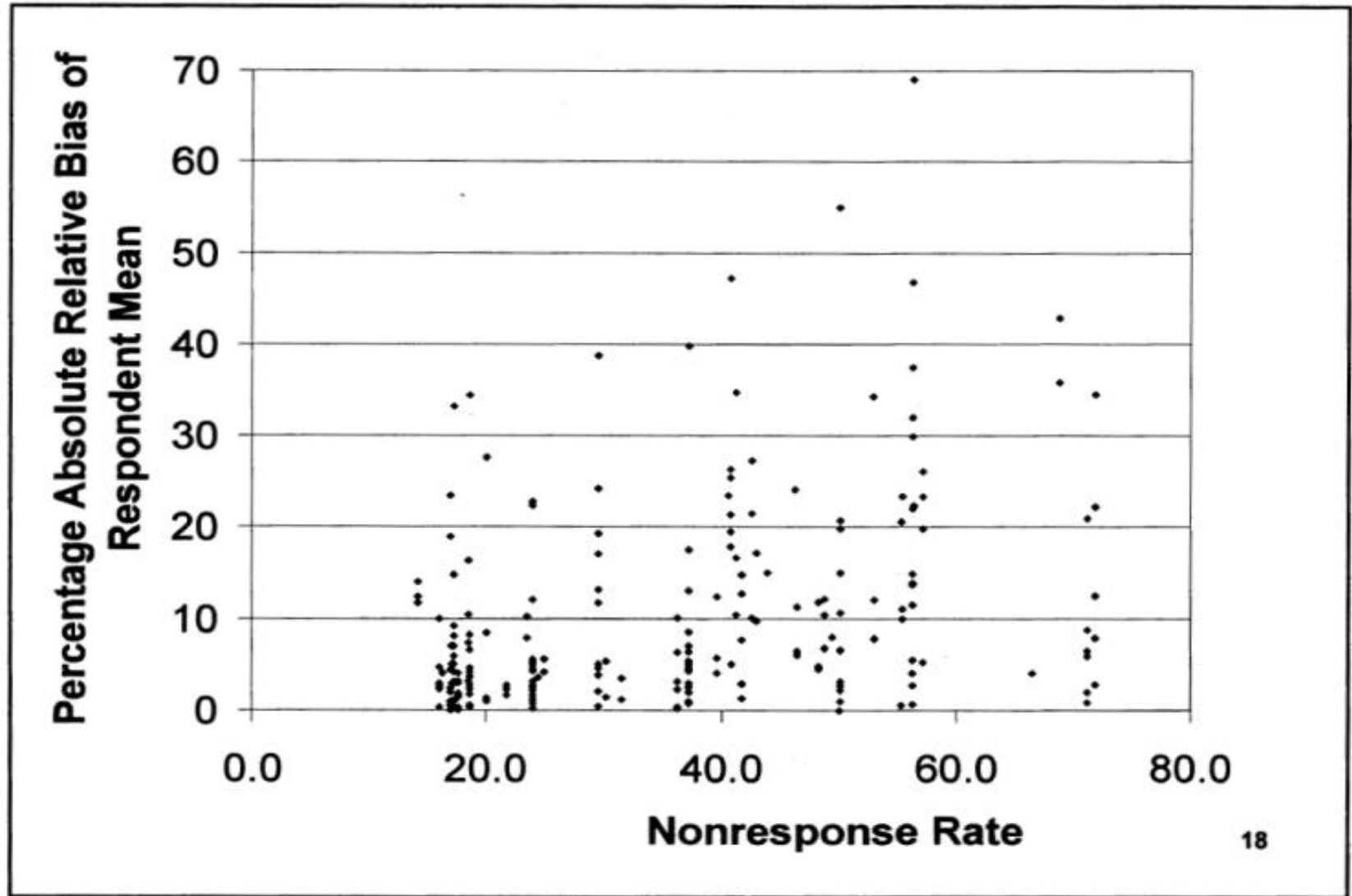


- If difference large, large bias possible even with high response rates
- Poll on becoming member of European Community
 - 80% response in country X
 - 50 % in favour
 - True value could range (extreme cases) 40-60%



Nonresponse Rate vs Bias **MA**

Slide Groves 2005





Why Worry II



- Seriousness Nonresponse Bias depends
 - Nonresponse rate
 - Difference between respondents and nonrespondents on key variables
- If difference large, large bias even with high response rate!
- Countries may have different groups nonrespondents
- Cultural groups may have different groups of nonrespondents



Illustration IALS



Response Rates IALS (face-to-face)

Country	Age range	Number of respondents	Response rate (%)
Canada	16+	5,660	69
France	16-65	2,996	55
Germany	16-65	2,062	69
Netherlands	16-74	3,090	45
Poland	16-65	3,000	75
Sweden	16+	3,038	60
Switzerland	16+	3,000	55
United States	16-65	3,053	60

Source; Couper & De Leeuw, 2003



IALS Nonresponse



Different countries=different sources

- Inventory De Heer (1998) of IALS fieldwork
 - Non-contact rates related to
 - Effort, contact strategies
 - Societal changes
 - Refusal related to
 - Fieldwork (e.g., interviewer payment, training)
 - Refusal Conversion
 - Substitution
 - Mandatory nature
 - Culture (e.g., civic duty, honour)
 - Risk different bias in different countries



IN SUM



(Couper and De Leeuw, 2003, p.168)

- If difference between respondents and nonrespondents is large, bias may be large even with high nonresponse rates
- Differential nonresponse may affect validity of subgroup comparisons, because answers of differently composed groups are compared
- Even same response rate in countries or in subgroups does not guarantee comparability!



What to Do



- Prevent Unnecessary Variation
 - Minimum standards for fieldwork
 - Battery for nonresponse reduction
 - Optimal response given the possibilities
- Collect auxiliary data / Nonresponse studies
- Investigate potential for nonresponse bias
- Adjust



Needed In Comparative Research



- Thorough Methodological Reports
 - Document the battery of nonresponse reduction measures used
 - Report nonresponse clearly (AAPOR)
 - Specify different components of nonresponse
 - Specify specific fieldwork conditions (e.g., substitution)
- Implement and Document Nonresponse Studies:
 - Who, where, why



Based On



- Mick P. Couper and Edith D. de Leeuw
Nonresponse in Cross-Cultural and Cross-National Surveys: In Harkness et al (2003) *Cross-Cultural Survey Methods*. New York: Wiley
- Edith D. de Leeuw and Wim de Heer
Trends in Household Survey Nonresponse: A Longitudinal and International Comparison. In Groves et al (2001). *Survey Nonresponse*. New York: Wiley



Some Useful References



- Special Issue of Journal of Official Statistics (1999)
 - www.jos.nu (free access)
- Website of the American Association of Public Opinion Research (AAPOR)
 - www.aapor.org (free access)
 - Response rate definitions
 - Response rate calculator



Some Useful References 2MA

- Robert M. Groves and J. Michael Brick
Joint Program in Survey Methodology
(JPSM) Universities of Michigan and
Maryland, 2005

*Practical Tools for Nonresponse Bias
Studies.*



Major Indices Used in Reporting: Conceptual Definition



- Response Rate:
 - Number of **Completed** Interviews or Questionnaires divided by **Eligible** Units.
- Cooperation Rate:
 - All cases 'Interviewed' (cooperated) divided by all **Eligible** Numbers **Contacted**
- Refusal rate:
 - All cases Refused divided by all Eligible cases
- Contact rate:
 - All contacted cases divided by all Eligible cases