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**An Exploration of the Role of
Interviewers on Survey Nonresponse
Using a Multilevel Modelling Approach**

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ESRC Research Project

- “Hierarchical Analysis of Unit Nonresponse in Sample Surveys”
- Team from the University of Southampton and University of Bristol
- Collaborators: Netherlands, US, UK

Outline

- Introduction
- Data
- Methodology
- Modelling Strategy
- Results - Interviewer Effects
- Summary
- Further Research

Introduction

- **Concern:** falling response rates
reduction in data quality
potential effects on nonresponse bias

- **We need to:**
 - understand mechanisms underlying response behaviour and their links to survey measures and bias
 - understand nature and causes of non-response (also independent of a specific survey)
 - understand factors influencing the nonresponse process

Role of Interviewers

→ **Aim:**

Better understanding of the **role of interviewers** in face-to-face surveys

→ Role for establishing contact

→ Role for gaining cooperation

Role of Interviewers

- Influence of interviewer characteristics such as:
 - Socio-demographic characteristics
 - Experience
 - Workload planning and organisation
 - Attitude
 - Interviewing strategies
 - Behaviour

- Interaction between household and interviewer
- Tailoring towards households?
- Allocation of interviewers to households?
- Between and within survey effects
- Interplay with area effects

Implications for Survey Practice

- A better understanding of interviewer effects is important for the improvement of
 - interviewer training and recruitment
 - survey design
 - informing strategies to maximise response
 - data quality

The Data

- Information from 6 household surveys if household responded to survey or not (distinguishing noncontact and refusal)

Linked to:

- Rich information on responding and nonresponding households (census and interviewer observation data)
- Rich information on interviewers
- Area information

The Data

→ ONS Survey Nonresponse Census Link Data

→ The 6 surveys are:

→ General Household Survey (GHS)

→ Expenditure and Food Survey (EFS)

→ Family Resources Survey (FRS)

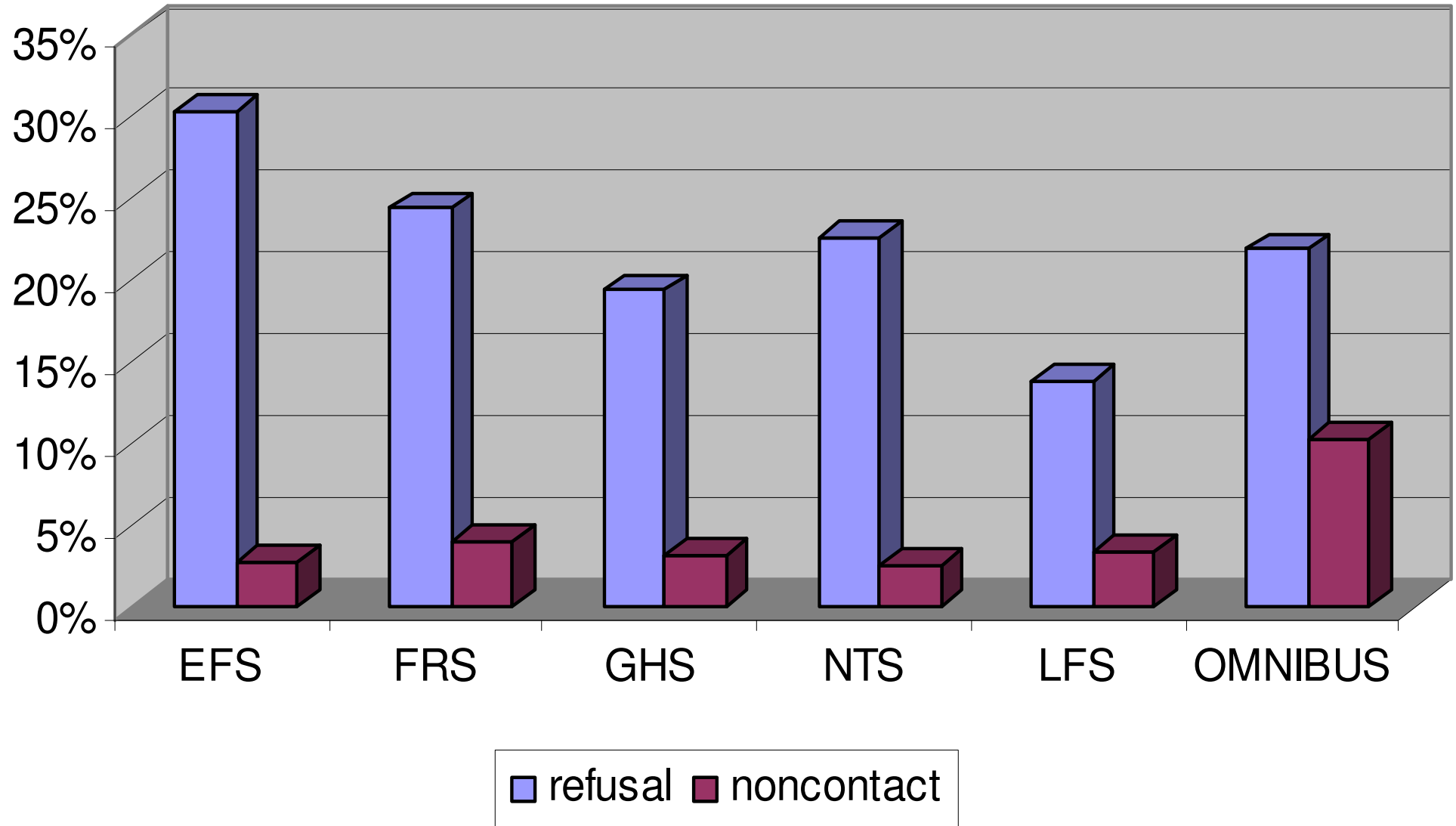
→ Omnibus Survey (OMN)

→ Labour Force Survey (LFS)

→ National Travel Survey (NTS)

→ Allows for comparisons of surveys with different designs and subject matters

Response Rate per Survey



Information on Households

- Census information from 2001: information on individual and household characteristics
- Interviewer observation data
- Area information

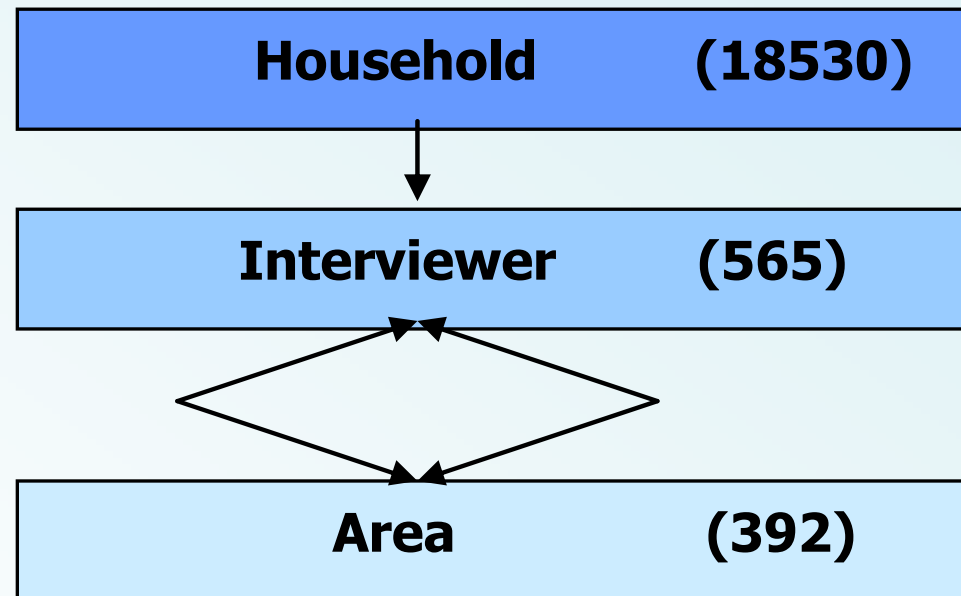
Information on Interviewers

- Interviewer Attitude Survey
- Carried out by ONS in 2001
- Interviewers and field managers working on ONS face-to-face surveys
- No re-issues included in the dataset

The Linked Data

Survey Respondents	R=1	Household Information from Census	Interviewer Observation	Interviewer Attitude Survey	Area Information
Survey Nonrespondents	R=0				

Multilevel Structure



- Take account of **multilevel structure**
- Interviewer allocation
- Area clustering

Advantages of the Study

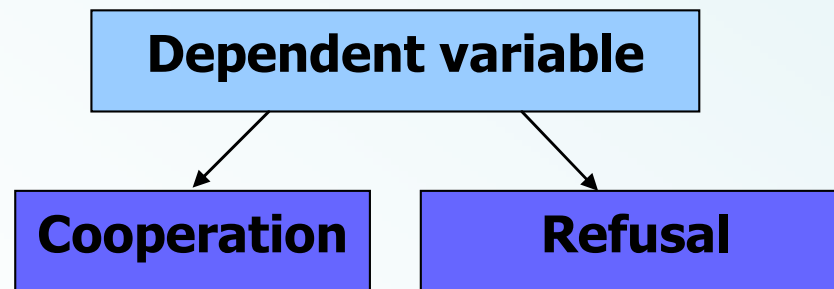
- Rich information on interviewers available
- Linked to household information
- Several surveys

Limitations of the Study

- Not an interpenetrated sampling design
- Confounding factors
- Information available on interviewing strategies and behaviours are general (not at contact level)
- Self-selection of interviewers

Definition of Nonresponse

- household (unit-) nonresponse
- we can distinguish different types of nonresponse: refusal, non-contact, ...
- focus on: (partial and full) household cooperation versus refusal
- conditioning on contact made



Methodology

Multilevel logistic cross-classified model:

$$\log \left(\frac{\pi_{i(jk)}}{1 - \pi_{i(jk)}} \right) = \bar{\beta}^T \bar{x}_{i(jk)} + u_j + v_k$$

i = households, j = interviewer, k = area

$$y_{i(jk)} = \begin{cases} 0 & \text{cooperation} \\ 1 & \text{refusal} \end{cases}$$

$$\pi_{i(jk)} = P(y_{i(jk)} = 1)$$

$$u_j \sim N(0, \sigma_u^2) \quad v_k \sim N(0, \sigma_v^2)$$

Modelling Strategy

- Exploration of multilevel structure: basic cross-classified model
- 2-level models (household and interviewers) to explore household and interviewer effects
- 2-level models (household and areas) to explore household and area effects
- Multilevel logistic cross-classified models (household, interviewer and area effects)

Specification of Models

- Guided by **theoretical framework** of survey participation and influence of interviewer
- Households effects
 - Discussed in separate paper (JRSSA)
 - Guided by sociological/psychological concepts: social exchange, civic duty, opportunity-cost, leverage-salience theory etc
 - Individual level characteristics defined based on HRP

Interviewer and Area Random Effects

	Interviewer variance	SE	Area variance	SE	DIC
Model 0 (variable survey; hh level only)	--	--	--	--	18863
Model 1a (Model 0 with interv var)	0.094 (0.064; 0.129)	(0.017)	--	--	18742
Model 1b (Model 0 with area var)	--	--	0.055 (0.032; 0.083)	(0.013)	18796
Model 2 (Model 1a with area var, cross-classified)	0.077 (0.047; 0.112)	(0.017)	0.026 (0.007; 0.052)	(0.011)	18735
Model 3 (Model 2 + household variables)	0.081 (0.049; 0.118)	(0.018)	0.013 (0.001; 0.037)	(0.010)	18338
Model 4 (Model 3 +interviewer variables)	0.040 (0.012; 0.070)	(0.015)	0.012 (0.001; 0.033)	(0.009)	18321
Model 5 (Model 4+area variables)	0.039 (0.015;0.069)	(0.014)	0.010 (0.001; 0.032)	(0.008)	18319

Estimated Multilevel Logistic Cross-Classified Model

Variable (0 = Reference category)	Categories	$\hat{\beta}$ (<i>ste</i> ($\hat{\beta}$))
Constant		0.06916 (0.180)
Household Level variables		
Survey indicator † (0 EFS)	1 FRS 2 GHS 3 OMN 4 NTS 5 LFS	-0.751 (0.203)** -1.053 (0.196)** -0.926 (0.192)** -1.031 (0.231)** -1.684 (0.230)**
Highest qualification (HRP) † (0 No academic qualification)	1 O/A levels, GCSEs 2 First/Higher degree 3 Other qualifications	-0.227 (0.070)** -0.554 (0.090)** -0.290 (0.126)**
Dependent children present (0 not present)	1 Present	-0.260 (0.048)**
...
Interviewer observations	...	...
Interviewer level variables	...	...
Survey Specific effects	...	...
Cross-Level Interactions	...	...
Area level variables	...	...

Estimated Multilevel Logistic Cross-Classified Model

Variable (0 = Reference category)	Categories	$\hat{\beta}$ (<i>ste</i> ($\hat{\beta}$))
Interviewer level variables		
Pay grade (0 Interviewer)	1 advanced interviewer and merit 1 and 2	-0.096 (0.069)
	2 merit 3 and field manager	-0.363 (0.095)**
Years of experience (0 Less than 1 year)	1 1 to 2 years	-0.032 (0.074)
	2 3 to 8 years	0.032 (0.091)
	3 9 years or more	0.246 (0.109)**
Daily hours previous year weekdays (0 0-4 hours)	1 5 and more hours	-0.108 (0.062)*
...		

Interviewer Characteristics

Main Effects:

→ Socio-demographic variables:

→ Age not sign

→ Gender

→ Qualification

→ Work experience:

→ Pay grade

→ Interviewer experience (in years)

→ Hours working (full-time vs part-time)

Estimated Multilevel Logistic Cross-Classified Model

Variable (0 = Reference category)	Categories	$\hat{\beta}$ (<i>ste</i> ($\hat{\beta}$))
Interviewer level variables		
Should respect privacy (0 strongly agree)	1 agree	-0.079 (0.048)*
	2 disagree	-0.157 (0.090)*
Should persuade reluctant respondent (0 strongly agree, agree)	1 neither agree nor disagree	-0.145 (0.084)*
	2 disagree, strongly disagree	0.111 (0.066)*
Can persuade when others can't (0 disagree, strongly disagree)	1 neither agree nor disagree	-0.116 (0.050)**
	2 strongly agree, agree	-0.280 (0.096)**
Can convince reluctant respondents † (0 Less confident)	1 more confident	-0.508 (0.183)**
Refusal affects how behave (0 Rarely, never)	1 always, frequently, sometimes	-0.115 (0.056)**
No matter what I do, some will never agree to participate (0 strongly agree, agree)	1 str disagree, disagree, neither nor	-0.195 (0.111)*
If respondent refused send different interviewer † (0 str disagree, disagree, neither nor)	1 strongly agree, agree	-0.369 (0.170)**
If same or different introduction † (0 Try to use same introduction)	1 I alter introduction to fit each household I visit	-0.232 (0.122)*

Interviewer Characteristics

Interviewer Attitudes

- Respect of privacy
- Persuasion of reluctant respondents (should persuade reluctant respondents)
- Indicators of confidence
 - can persuade when others can't
 - can convince reluctant respondents
 - disagreement with 'No matter what I do, some respondents will never agree'

Interviewer Characteristics

Interviewer behaviours and strategies

→ Indication of tailoring:

- Altering introduction to fit each household
- No matter what I do, some respondents will never agree to participate
- Refusal affects how behave (indication of being able to adapt?)
- Better to send a different interviewer if respondent refused
- Can deal with everybody in the same manner
- Persuasion skills

Interviewer Characteristics

Not significant in final model:

- Many doorstep approach variables (e.g. need unique approach, can modify approach, topic should interest etc)
- Many specific interviewing strategies (e.g. complement household; if likely to refuse withdraw) (maybe due to certain interviewer training?)
- Attitudes: happy to travel, happy to work weekends or evenings

Survey Specific Effects

- Two-way interactions between interviewer-variables and survey indicator
- Rationale: certain interviewer characteristics/strategies/behaviours may have different effects for different surveys
- Important:
 - Can convince reluctant respondent
 - Same or different introduction
 - Can deal with in same manner
 - Send different interviewer
 - Other paid employment

Survey Specific Interviewer Effects

Example:

- interaction of interviewer level variable and survey indicator: confidence in persuading reluctant respondents

Predicted probabilities for refusal (in %)

Can convince reluctant respondent	EFS	FRS	GHS	OMN	NTS	LFS
Less conf	42.2	25.8	20.5	22.0	20.9	12.1
More conf	30.7	22.0	16.4	19.3	19.6	11.7

Cross-Level Interactions

- Rationale: interaction of household and interviewer characteristics
- Potential implications:
 - Tailoring of interviewing strategies to type of respondent
 - Matching of interviewers to households
- Effects investigated:
 - Gender (at first contact; HRP)
 - Age (at first contact; HRP)
 - Qualification (HRP)
 - Confidence of interviewer and gender and age of hh at first contact
 - Years of experience/pay grade and gender and age of hh at first contact

Results: Cross-level interaction

- No effect found for: age, confidence, years of experience, pay grade
- Gender effect:
 - Gender at first contact marginally significant
 - Gender of HRP found significant

Gender of householder at first contact	Interviewer Gender	
	Male	Female
Male	23.9	23.0
Female	23.5	20.8

Results: Cross-level interaction

→ Qualification:

- If interviewer has low or no qualification and HRP of household has a degree/higher qualification then indication that refusal higher

		Interviewer qualification		
		Degree or postgraduate	Academic below degree	Other or no qualifications
Qualification of HRP	No academic qualification	26.8	25.7	17.9
	O/A levels, GCSEs	22.7	22.5	16.4
	First/Higher degree	17.5	18.1	20.4
	Other qualifications	21.6	21.5	36.2

Area Variables

- Population density
- Proportion of ethnic groups, religious groups, age groups, employed/unemployed, retired, student etc
- Proportion of people in good health, bad health
- Proportion of houses, flats

Importance of Area Effects

- Area characteristics highly significant if
 - No interviewer variance in model
 - No household characteristics in model
- When entering household characteristics only, all but two area variables not significant any more
- Once interviewer level variance entered area level variance is negligible
- In line with other research: area characteristics seem to be weak proxies for household characteristics

Summary

- Socio-demographic characteristics
- Some support found for tailoring
- Some support found for matching of interviewers to certain types of households (cross-level interactions)
- Attitude and confidence important
- We may not be able to identify specific interviewing strategies that work best
- Survey specific effects
- Area effects negligible (once controlled for household and interviewer effects)

Implications for Survey Practice

This work may inform:

- How best to approach certain subgroups in the population
- Tailoring of approaches (?)
- Allocation of interviewers to households (?)
- Interviewer training, recruitment and evaluation
- Analysis work in absence of interpenetrated design and use of interviewer data

Further Research

- Extension of current models to include noncontact
- Alternative approaches to nonresponse modelling
- Analysis of individual level nonresponse/ proxy response
- Hierarchical models using interviewer call and survey process data
- Use of models to improve adjustment (e.g. weighting)
- Recommendations for survey practice