

THE CHALLENGE OF SURVEYING ‘HARD TO REACH’ GROUPS

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1. INTRODUCTION

The basic premise of a probability sample is that the sample will represent the universe or target population. To achieve that goal, pertinent information about each sample unit should be obtained. When some groups are not included, representation of the universe within the sample is brought into question. So, one goal of survey research is to maximise the probability of obtaining information about each sample unit.

In every survey there are groups that may be underrepresented because they are difficult to include. This chapter discusses challenges facing the inclusion of so-called ‘hard to reach’ groups in travel surveys, and explores methods that might be applied by travel survey practitioners to ensure representation of these groups. The content of the chapter is based upon deliberations within a workshop session on this topic,¹ at the 8th International Conference on Survey Methods in Transport.

The chapter is divided into five sections. The following section identifies examples of ‘hard to reach’ groups, and speculates on how the relative extent and composition of these groups could change with time. The third section defines the problem, by identifying the bias that can result from inadequate ‘hard to reach’ group participation in surveys. The fourth section discusses measures that can be taken to ensure adequate participation of these groups, with particular reference to improving the coverage of samples, reducing non-response, and

¹ The participants of this workshop session included: Kay Axhausen (Switzerland); Roger Behrens (South Africa); Heather Contrino (United States of America); Virginie Dejoux (France); Mark Freedman (United States of America); Mattias Gripsrud (Norway); Nancy McGuckin (United States of America); Sharon O’Connor (United States of America); Martine Quaglia (France); Benoît Riandey (France); Karl Sieber (United States of America); Anu Siren (Denmark); Juliane Stark (Austria); and Coralie Triadou (United Kingdom).

improving survey instrument cognition. The final section concludes with a discussion on the transferability of solutions to non-coverage and non-response problems, and an identification of key research gaps.

2. 'HARD TO REACH' GROUPS

Who then are the 'hard to reach' groups in travel surveys? Two, at times overlapping, categories can be identified. The first category includes groups who are hard to reach because of their frequent omission from sampling frames. Such non-coverage 'hard to reach' groups include:

- residents of informal housing that is not connected to utility servicing networks, and who are not easily identified because of the absence of a numbered and named address;
- people who have recently changed residence, changed type of telephone service or lost telephone service and are not currently associated with a common sample frame;
- sub-letters of sections of formal dwellings, or backyard shacks, who are indirectly connected to utility servicing networks, and do not have separate street addresses;
- residents of group quarters (e.g. army barracks, student residences, migrant worker hostels, hospices, etc.);
- illegal immigrants who typically avoid or resist involvement in activities that they perceive might lead to their identification by government agencies;
- transients who remain in a place only for a relatively brief period of time (e.g. the occupants of mobile homes, casual seasonal workers, workers resident on construction sites, etc.); and
- homeless people who, without a fixed abode, cannot be easily identified or contacted.

The second category includes groups that are hard to reach because they are disproportionately persistent non-responders in surveys. Such non-response 'hard to reach' groups include:

- people unable to speak the language, or languages, in which the survey is conducted, and are therefore unable to respond;
- (in the case of self-completion questionnaires) people who are functionally illiterate;
- people who are, to varying degrees, disengaged from broader society and do not wish to be contacted (e.g. residents of 'gated communities', or religious retreats, etc.);
- members of very high and very low income households, and adolescents, who are often unwilling, for a variety of reasons, so make their time available;
- (in societies experiencing high levels of crime) people who are afraid of allowing strangers into their homes, or of divulging information about their lives that they perceive would make them more vulnerable to criminals;
- 'gate-kept' individuals who are difficult to access without the permission of a third party (e.g. women within strictly patriarchal households, farm workers residing on commercial farms, etc.); and

- people with various forms of physical or cognitive disabilities (e.g. aurally impaired people in the case of telephone surveys, visually impaired people in the case of mail-back questionnaires, etc.).

Current events and trends in many parts of the world suggest that the proportion of these ‘hard to reach’ groups within target populations is likely to grow. The key drivers of this expected increase include changing population demographics, socio-economies, technologies, and geo-political stability.² Clearly exposure to, and the impact of, these drivers of change will be different and uneven in various parts of the world. Consequently trends with respect to the growth or decline in the relative extent and composition of ‘hard to reach’ groups is likely to vary considerably across different contexts.

3. PROBLEMS RESULTING FROM INADEQUATE INCLUSION OF ‘HARD TO REACH’ GROUPS

The main problems of data unreliability and bias that are introduced by the absence or underrepresentation of certain groups in travel surveys are well documented. Decreasing participation in surveys, generally, leads to reduced data reliability because of reduced sample size, and, more specifically, may increase coverage errors and non-response bias in the likely event that the travel behaviour profile of non-contacts and refusals systematically differ from those of respondents. It is possible of course to address the problem of the underrepresentation of certain groups in sample respondents through weighting corrections and non-response adjustments. In some cases, however, these techniques can raise problems of their own (e.g. unreliable or outdated census data introduce weighting errors, reduced ‘hard to reach’ respondent sub-samples may not be representative of the whole ‘hard to reach’ group, etc.) and offer a partial solution as best.

The extent of the bias and error that emerge from non-coverage of, and non-response by, ‘hard to reach’ groups will clearly vary, depending on context, method and purpose.

The relative size of the ‘hard to reach’ group population, relative to the whole population, will vary from country to country and from city to city. In some cases the errors resulting from non-coverage and non-response might be slight and of relatively minor consequence for data reliability, while in other cases they may be significant.

Different ‘hard to reach’ groups are impacted differently by alternative survey methods, and depending on the relative composition of the ‘hard to reach’ population, the extent of bias and error will be determined by the choice of method. For instance, in populations with high

² Examples of population demographic changes include: an increase in the number of child-headed households in countries with high rates of HIV infection; and aging societies in wealthier countries. Examples of socio-economic changes include: in stagnant or ‘jobless growth’ economies, increasing levels of poverty and associated increases in informal and sublet housing and homelessness; the casualisation of labour forces; and increased disengagement amongst wealthier households in response to perceptions of greater security risks. Examples of technological changes include: increases in the proportion of cell phone-only households, and of households with unlisted landline telephone numbers. Examples of geo-political changes include: increased immigration and emigration in response to political conflicts; natural disasters; and the projected impacts of climate change and resource depletion.

levels of no-phone, unlisted or cell phone-only households, coverage error would be compounded by the use of telephone interviews. Similarly, in populations with high rates of functional illiteracy and low internet penetration, self-completion questionnaires and web-based surveys, respectively, would compound non-response and coverage errors.

The purpose of the survey is also important. For instance, in the case of surveys to calibrate a city-wide travel demand forecasting model for the purposes of long-term transport infrastructure planning, the omission of relatively small sections of the population, with typically lower trip generation rates, is of relatively less significance. By comparison, in the case of surveys intended to inform the development of public policies relating to social equity issues (e.g. public transport subsidy policies, social inclusion policies, etc.), the omission or underrepresentation of even relatively small ‘hard to reach’ groups is of critical concern because these are the very groups the policy is wishing to target.

4. POTENTIAL MEASURES TO ENSURE THE PARTICIPATION OF ‘HARD TO REACH’ GROUPS

Having established that ‘hard to reach’ groups are heterogeneous and therefore require different approaches, what then are some of the measures that have the best chance of reducing the barriers to participation in travel surveys? These measures are discussed in terms of improving the coverage of samples, reducing non-response, and improving survey instrument cognition.

4.1 Measures to improve coverage

Measures that can be taken to ensure that ‘hard to reach’ groups are included in sample frames are discussed in terms of general population surveys, and specific population surveys.

With respect to general population surveys, the problem of non-coverage in the main sampling frame can be addressed by multi-frame sampling (see Kalton and Anderson 1986). For instance, taking care to eliminate or compensate for overlap, address frames might be combined with telephone number lists, and in developing world countries with extensive informal settlements without street addresses and landline telephone connections, supplemented by a frame of dwelling units identified in recent areal photography. Where applicable and available, further supplementary frames could take the form of registers or membership lists obtained from organisations representing the interests of particular ‘hard to reach’ groups (e.g. non-governmental organisations representing the disabled, refugees, etc.). A limitation in the use of multi-frame sampling, however, is that it tends to increase variance.

With respect to specific population surveys, in instances where an appropriate sample frame does not exist, a variety of rare population sampling techniques can be applied (see Kalton and Anderson 1986). One technique is to screen a sample in order to find certain types of respondents, but this can be an expensive exercise, particularly if the rare population sought represents a small proportion of the sampled population. Another technique is non-random multiplicity sampling (or ‘snowballing’) in which a respondent who qualifies for the rare population sample is asked to provide the names of others from their network of

acquaintances who also qualify (see Cowham *et al* 2008 for an application of this method in a stated preference survey of persons with disabilities). Advertisements in a range of appropriate media can be targeted at specific groups to recruit the first set of qualifying respondents in this process. A further technique is to draw qualifying respondents from an extant access panel of recruited and managed individuals (see Stoop 2005). A limitation of both multiplicity sampling and access panels is bias introduced by self selection. It is difficult to check whether the respondent sample is representative of the whole rare population being studied.

4.2 Measures to reduce non-response

Measures that can be taken to reduce non-response among ‘hard to reach’ groups are discussed in terms of data collection protocols, recruitment techniques, and non-response follow-up.

With regard to data collection protocols, response rates can be increased by expanding the period over which data is collected in the case of cross-sectional surveys (continuous surveys have an obvious advantage here). Increasing the number of attempts to make contact increases the chance of contacting respondents who are frequently away from home (e.g. students, holiday makers, business travellers, seasonal workers, etc.). Notwithstanding the need for surveys to be conducted in the languages of all population groups of key interest whenever possible, a further measure to reduce the need for substitution is to permit proxy reporting as a way of overcoming communication barriers in the case of respondents within households who do not speak the language, or languages, in which the survey is conducted. This can also be helpful to include people with disabilities. Although, as Stopher *et al* (2006) argue, data collected by proxy should be coded as such in datasets so that any tendency towards greater underreporting can be identified in data analysis.

With regard to recruitment techniques, a variety of measures can be taken to provide advance warning of scheduled contacts, and incentivise response. Advance warning of scheduled contacts has been found in some surveys to result in increased response rates (see Contrino *et al* 2008, Zmud 2003). This can be achieved through media campaigns or letters which are customised to the ‘hard to reach’ groups in question. Endorsement of the survey by well-known local leaders or celebrities within the particular ‘hard to reach’ group could also encourage participation and allay fears around legitimacy.

Incentives are becoming more common in all kinds of surveys, and range from small pre-incentives to large lotteries. The incentive should be carefully designed, however, so that the impact helps response rates of the targeted ‘hard to reach’ groups. Careful testing of the impacts of incentives is required as amongst some groups they have sometimes proven to have the opposite effect. (see Singer *et al* 1999)

With regard to non-response follow-up, analysis of non-response should occur early in the survey process, so that patterns of, and reasons for, non-response can be identified with sufficient time to make any necessary changes to the survey protocol which are aimed at increasing ‘hard to reach’ group participation. This might involve follow-up contact to obtain further demographic information on the profile on non-responders, and their reasons for non-response. The common practice of analysing non-response at the end of the data collection

period does not facilitate amendment to survey protocols. In some surveys a subset of specially trained interviewers, or non-response ‘converters’, are employed who follow up with the ‘hard to reach’ non-responders encountered and attempt to induce a response (see Zmud 2003). If the full survey cannot be completed, the follow-up contact may resort to capturing just essential demographic and travel-related information.

4.3 Measures to improve instrument cognition

To address the variation among ‘hard to reach’ groups, multi-modal survey methods can be used. Different survey modes have different problems and strengths (e.g. telephone and internet surveys have non-coverage problems, post surveys impose greater respondent burden and are easy to ignore, home interviews have contact refusal problems, etc.) (see Morris and Adler 2003).

Multi-modal surveying enables the most suitable survey instrument to be matched to different categories of ‘hard to reach’ respondents. It enables customised language and protocols to be targeted at particular groups to increase the likelihood of cognition and response. It also enables the allocation of greater resources per respondent to ensuring that ‘hard to reach’ groups are included. Caution and pre-testing are required, however, for even if the sequence and phrasing of questions is the same, the data collected using one survey mode may not be completely comparable with the data collected using another (see Bonnel 2003). The mode effects should be analysed carefully so that final estimates can be made with confidence.

5. CONCLUSION

The foregoing discussion illustrates that the extent and nature of the problem of including ‘hard to reach’ groups in travel surveys varies considerably across contexts. Consequently the identification of appropriate measures to ensure ‘hard to reach’ group participation will also be context specific, and will require an understanding of the nature of ‘hard to reach’ groups and how these groups are likely to respond to different forms of participation stimuli.

No ‘one size fits all’ approach can ensure that ‘hard to reach’ groups participate in a survey, and certainly the assessment of the significance of each special population varies between countries and from one context to another. Local practitioners will need to develop tailor-made solutions for overcoming the problem, which reflect the nature of ‘hard to reach’ groups in the particular target population, and the coverage imperatives of the particular survey.

This raises the need for research that develops a better understanding of the extent and nature of ‘hard to reach’ groups in particular contexts, and of how this is likely to change over time. Such research could also usefully employ cognitive techniques to investigate the reasons for, and barriers to, non-response amongst different categories of ‘hard to reach’ groups. This improved understanding would enable better estimates of the extent of the problem in the survey design and budgeting phase, and better informed decisions with respect to the need for the inclusion of mitigating measures in sampling strategies and instruments. The latter, in essence, involves an assessment of the trade-offs between, on the one hand, the ability to address coverage and response biases through the use of measures like multi-modal surveys

and multi-frame and rare population sampling techniques, and, on the other, the potential for the introduction of additional bias in survey data that these measures bring. Thus further research is also required to investigate potential design or mode effects, especially with respect to comparative unit non-response rates, and variations in respondent cognition. Opportunities exist here for comparative research into alternative survey methods, utilising experiment and control groups within different categories of 'hard to reach' groups as a means of isolating and measuring effects. In pursuing the above, a further general research need is to look beyond the travel survey field, as Riandey and Quaglia (2008) do, to see what lessons can be learned and what techniques might be adapted from survey practices in other fields.

REFERENCES

- Bonnel P, 2003: *Postal, telephone, and face-to-face surveys: How comparable are they?*, in Stopher P and Jones P (eds), *Transport survey quality and innovation*, Pergamon, Amsterdam.
- Contrino H, McGuckin N, Nakamoto H and Santos A, 2008: *A re-examination of methods in the U.S. National Household Travel Survey*, 8th International Conference on Survey Methods in Transport: Harmonisation and Data Comparability, Annecy.
- Cowham M, Webb J, Dye J and Crowther B, 2008: *Prioritising street improvements for respondents with disabilities: qualitative and quantitative research*, 8th International Conference on Survey Methods in Transport: Harmonisation and Data Comparability, Annecy.
- Kalton G and Anderson D, 1986: Sampling rare populations, *Journal of the Royal Statistical Society A*, Vol 149, No 1, pp65-82
- Morris J and Adler T, 2003: *Mixed mode surveys*, in Stopher P and Jones P (eds), *Transport survey quality and innovation*, Pergamon, Amsterdam.
- Riandey and Quaglia (2008) *Resource paper: Surveying hard to reach groups*, 8th International Conference on Survey Methods in Transport: Harmonisation and Data Comparability, Annecy.
- Singer E, Groves R and Corning A, 1999: Differential incentives: Beliefs about practices, perceptions of equity, and effects on survey participation, *Public Opinion Quarterly*, Vol 63, No 2, pp251-260.
- Stoop I, 2005: *The hunt for the last respondent: Nonresponse in sample surveys*, Social and Cultural Planning Office of the Netherlands, The Hague.
- Stopher P, Wilmot C, Stecher C and Alsnih R, 2006: *Household travel surveys: Proposed standards and guidelines*, in *Travel survey methods: Quality and future directions*, Elsevier, Amsterdam.
- Zmud J, 2003: *Designing instruments to improve response*, in Stopher P and Jones P (eds), *Transport survey quality and innovation*, Pergamon, Amsterdam.