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Designing inclusive transport surveys: Sampling disadvantaged people

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Abstract

This paper explores how travel surveys perform in covering socially disadvantaged people from a review of previous research and a description of sampling difficulties and how they were addressed in a study of transport disadvantage in Victoria.

The research literature shows that household travel surveys have been the major means of providing travel data for planning over the last half century. Sampling design aims to provide a representative picture of the whole population rather than a focus on specialist groups. Cost, quality and quantity trade-offs are necessary for good sampling which can make providing additional resources to cover hard-to-reach disadvantaged groups problematic. There are numerous challenges in targeting disadvantaged people and a range of methods for targeting them including 'snowballing' and 'location sampling' of specialist service providers and clubs. All are resource intensive and require special consideration of the needs and concerns of those being targeted.

As part of a major research program examining links between transport disadvantage, social exclusion and well-being in Victoria a long (60-90 min) home interview questionnaire survey was required. A follow on survey using an existing household travel survey sample frame was adopted to reduce interview time and to better target specific social groups. Responses over-sampled older age and higher income groups due to the low 'opt-in' rates from other groups and the low sample of low income groups in the sample frame.

A separate special survey was devised using 'snowballing' and 'location sampling' of service providers to better target disadvantaged groups including the unemployed, single mothers, young people, disabled people and the homeless. This was resource intensive but achieved a much higher sample of these groups than identified in previous approaches.

The paper discusses the implications of the findings for researchers and practitioners in the field. Amongst these a need to develop new methods for representative sampling of disadvantaged group is identified.

1. Introduction

Transport and its links to social exclusion has become a major research field over the last decade (Social Exclusion Unit 2003; Lucas 2004). Primary surveys of disadvantaged groups and areas have been a major focus of research in the field (e.g. Hine and Mitchell 2003; Social Exclusion Unit 2003). Indeed research in the field has tended to rely on specialist bespoke data collection since most available travel survey data is necessarily limited in the range of questions covered.

Household travel surveys (HTS) have been the main means of providing data in transport planning and modelling for the developed world for over half a century (Stopher 1995b). The main aims of HTS are to cover two major elements; the study of travel behaviour including trends and secondly to act as inputs to travel demand models for planning and forecasting travel behaviour (Stopher 1995a). HTS data is often used in research associated with social exclusion primarily as a means of contrasting trip rates and travel behaviour between different social groups. However, more in-depth surveys are needed to explore wider issues of disadvantage.

This paper explores how HTS perform in covering socially disadvantaged groups. It arises from sampling problems which emerged in a study using a HTS sample frame to target socially disadvantaged respondents. The paper describes the background to the study, how sampling issues emerged and how they were addressed in a special survey developed specifically to target disadvantaged groups. Implications for research, policy and practice are identified.

The paper commences by reviewing the relevant previous research literature and practices associated with travel surveys and the targeting of socially disadvantaged groups in surveys. This is followed by a brief outline of the research program of which this paper is a part. The field survey methods incorporating HTS samples and their findings in terms of sample coverage of disadvantaged groups are then outlined and discussed. The 'special survey' approach adopted to target specific social groups is then presented and the outcomes of the sampling described. The paper concludes with a summary and discussion of the major findings of the paper including suggestions for future research in the field.

2. Survey Sampling and Equity – Previous Research

In general the major aim of HTS is to provide a good representative general picture of travel throughout society rather than a targeted coverage of specific social groups. Ensuring good coverage is commonly achieved through stratified sampling in HTS (Stopher et al. 1996) based on population, household and other demographic variables.

Sampling outcomes from HTS depend much on the difficult trade-offs made when designing surveys. Quantity of surveys, quality of surveys and cost are the main elements to be traded off (Richardson et al. 1995a; Richardson et al. 1995b). If sampling specific groups becomes difficult then allocating resources to achieve samples in this group involves a trade-off against other sub-samples; this affects the cost effectiveness of the survey as a whole.

Selecting a sampling frame is a difficult process. Ideally the sampling frame is the base list that identifies every person in the sampling population, however not every person is so readily accessible through conventional sources. Typical sources include electoral rolls, telephone directories, mailing lists or motor vehicle registrations. However, all of these sources suffer from one or more limitations. They may be incomplete, out-of-date,

or not contain the specific information needed to discriminate the desired sample (Richardson et al. 1995a).

It is a simple fact of all survey planning, including HTS, that some social groups of interest are particularly hard to reach using conventional sampling methods. Five attributes have been identified that contribute to making a population hard to reach (Riandey and Quaglia 2009):

1. People missing from official records and sampling frames
2. People away from home during data collection
3. People who refuse contact
4. People who refuse to answer the questionnaire
5. People who cannot answer the interviewer.

These five attributes contribute disproportionately toward making specific groups less likely to be surveyed. Living conditions are likely to exclude specific groups from official records and sampling frames, such as the homeless, transient workers, illegal immigrants, residents of group quarters (e.g. army barracks, shelters), sub-letters of dwellings and people who frequently change address or phone number (Behrens et al. 2009). Other groups are hard to reach because they are typically non-responders even if they are part of a sampling frame, such as people who are unable to speak the language of the survey, people who are illiterate, adolescents, people on very high and very low incomes or people with physical or cognitive disabilities (Behrens et al. 2009).

Although weighting of data can correct for some of these missing groups, weighting has its shortcomings. Weighting can correct for over- or under-sampling target groups but it can't correct for systematic survey bias. It requires very large samples to begin with and up-to-date census records to avoid sampling errors. Furthermore if the sample size of hard-to-reach groups is too small it is unlikely to represent the 'hard-to-reach population' (Behrens et al. 2009). In general data expansion represents the behaviour of those not sampled using the behaviour of those that have been sampled as a proxy but for some socially disadvantaged groups this may be inappropriate.

Much research has now demonstrated that specific social groups are particularly problematic in targeting for survey participation. Research is this area began to flourish in the nursing literature at the height of the AIDS crisis (Faugier and Sargeant 1997). Research into people with AIDS, intravenous drug users, and homosexual men found it impossible to contact these populations using traditional sampling frames. These were considered 'hidden populations' because no sampling frames existed and there were strong privacy concerns because members of these groups participated in illegal or stigmatised behaviours (Heckathorn 1997). From this early literature a range of sampling techniques have been explored.

Referral methods such as 'snowballing' (where group members refer other group members to the survey) are appropriate where members of a target group know each other well but the target sample is geographically dispersed (Heckathorn 2002). Referral methods are usually used to target sensitive 'hidden' populations such as intravenous drug users.

'Location sampling' or 'time-space sampling' is appropriate for populations that are known to gather in specific places at specific times (Muhib et al. 2001; Heckathorn 2002). The sampling frame shifts from lists of individuals to lists of possible sampling locations. For example a study of homosexual men created a sample frame of bars, clubs, events, restaurants and places that were gay-identified.

The targeted use of specialist community service providers or clubs as a means of sampling specific groups is also suggested in the research literature. For example a study of disabled populations was recruited by attending advocacy and support groups

(Hillier et al. 2007a). A study of homeless youth maintained contact through youth service providers (Hillier et al. 2007b).

So overall there are a range of challenges in targeting selected social groups in surveys. A range of innovative methods have been suggested to address participation for selected groups however many require resource intensive methods. This is problematic for sampling in major HTS. However it has been suggested that it is important to incorporate the needs and travel habits of these groups since their exclusion in surveys of this type can have unwanted negative consequences on society's most vulnerable (McCray 2009). So how good are Australian HTS at targeting socially disadvantaged groups? This question and approaches to address equity bias are the focus of the following sections.

3. Research Context and Design

This paper results from a research project studying links between social exclusion, transport disadvantage and well-being in Metropolitan Melbourne and regional areas of Victoria, Australia.[1] The major project focus was the use of a substantial field survey to collate primary data on a range of aspects of transport disadvantage and travel behaviour, to explore associated issues with social exclusion and to measure individual social and psychological well-being (the following sources provide a more comprehensive description of the project: Currie et al. 2009b; Currie et al. 2009a; Currie and Delbosc in press).

Since the focus of the project concerned social disadvantage, a major research design objective was the targeting of disadvantaged groups; however both 'advantaged' and 'disadvantaged' groups were recruited to contrast the two. A range of previous research suggests that specific groups are a major concern with regards to transport and social exclusion including the elderly, youth, the homeless, those on low income, unemployed people, single parents, disabled persons and people from racial minorities (Social Exclusion Unit 2003; Currie et al. 2007). Within the Australian context fringe urban and remote communities are also a major concern (Currie 2009).

Another major research design concern was the length of the questionnaire. To cover the full range of survey design elements required of the project a considerable survey interview task was required including 36 main questions (and numerous sub-questions). Interview lengths of between 60 and 90 minutes were required which are substantially longer than recommend in the HTS literature (a maximum of some 15-20 mins is recommended by Richardson et al. 1995a). To partly compensate for the time taken to complete the survey a financial reward was included in the survey ($30).

The Victorian Integrated Survey of Travel and Activity (VISTA) was used as a sampling frame (The Urban Transport Institute 2008). This method was selected for the following reasons:

- VISTA provided a large sample of over 17,000 households from across the state
- It enabled spatial and cohort targeting of the follow-on sample

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1 *Australian Research Council Industry Linkage Program Project LP0669046 'Investigating Transport Disadvantage, Social Exclusion and Well-being in Metropolitan, Regional and Rural Victoria' Managed by Monash University. The industry partners are Department of Transport, Victoria, the Bus Association of Victoria, the Brotherhood of St Laurence and the Interface Councils of Victoria. The Principal Chief Investigator is Prof G Currie the chief investigators are Prof T Richardson, Prof P Smyth and Dr D Vella-Brodrick. The partner investigators are Prof J Hine, Dr K Lucas, Mr J Stanley, Dr J Morris, Mr R Kinnear and Dr J Stanley. The study Research Fellow is Alexa Delbosc.*

- It enabled use of existing VISTA data (including household characteristics, transport context and travel diary data) without having to ask these questions in the follow-on survey.

The above design elements were thought to be good ways of reducing the length of the questionnaire whilst also achieving sampling goals. The approach and outcomes of the metropolitan elements of this survey (the 'Main Metropolitan Survey' or MMS) are now discussed.

4. The Main Metropolitan Survey

4.1. Survey method

VISTA acted as the sample frame for the MMS. VISTA was conducted in 2007 by the Urban Transport Institute on behalf of the Victorian Department of Transport (The Urban Transport Institute 2008). The MMS selected households for sampling using the following criteria;

- Both advantaged and disadvantaged households were to be selected
- Disadvantage in this context was concerned primarily with income. Household incomes below average were considered 'disadvantaged' in this context.
- In addition to income, priority was given to surveying young people. Special dispensation from ethical constraints for surveying people aged between 16-18 years of age was sought and granted by university ethics authorities. Adjustment of some psychological questions in the questionnaire was also needed. Parental consent for participation by young people was a requirement of ethics protocols.
- Sampling was to focus on all areas of Melbourne with over-sampling to be undertaken in fringe parts of the city due to expected higher issues with transport in these contexts.
- Individuals within the household identified from this framework were randomly selected using a Kish grid random sampling method (Kish 1965). This approach reduced self-selection bias within the household.

A range of households were identified for the survey using this method however in each case participation was requested via an 'opt-in' process for ethics reasons. This involved writing to selected households and asking them to return an agreement letter.

The MMS was contracted to a private market research group called I-View. I-View had been involved in implementing VISTA and were experienced in surveys of this type. They developed a computer assisted survey method to conduct the survey and trained interview staff on methods to keep respondents involved in the lengthy interview period. Interviewing in the MMS took place between September and December 2008.

4.2. Sample demographics

A total of 535 surveys were collected across the Melbourne Metropolitan Area in the MMS. Figure 1 compares the gross household income of the MMS with the un-weighted sample from VISTA and the overall income distribution for all Melbournian households (Australian Bureau of Statistics 2006)[2]. The unweighted VISTA data were chosen for this comparison in order to highlight the differences in raw sampling demographics between surveys.

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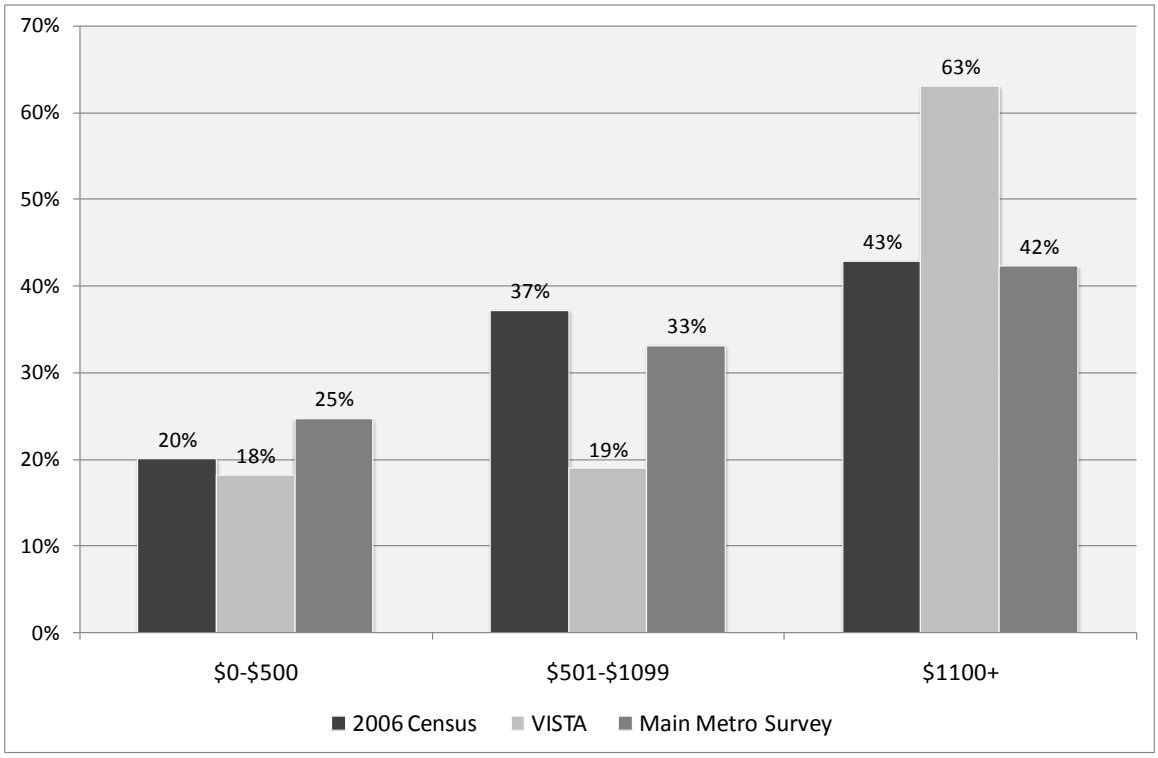
[2] *Household incomes increased approximately 3% between 2005/06 and 2007/08 when changes in measurement methodology are taken into account, Australian Bureau of Statistics (2009). Household income and income distribution, 2007-08. Report No. 6523.0.*

In general the VISTA sample tends to include a higher share of participants from higher income groups than exists in the general population (63% of households with an income above $1,100/week compared to 43% in the census). The secondary sampling approach used in the MMS enabled adjustment for this but not as much as had been hoped. It was hoped to 'over sample' households with incomes below $1,100/week when in practice the coverage was closer to the actual population distribution. This resulted because of low levels of opt-in to the survey from lower income groups.

Figure 1: Gross weekly household income of MMS/VISTA samples and census population



Note: About 11% of households in the 2006 census did not state their income or only stated partial incomes (Australian Bureau of Statistics 2006); they are excluded from this graph

The age profile of the MMS and VISTA sample is compared to the census in Figure 2. In general VISTA achieves a very good coverage of the age profile with slight under-sampling of younger age groups.

The MMS sample significantly over sampled older age groups; MMS included a 56% sample of those aged above 54 years while the population share of this group is 30%. It also contained fewer full-time workers and more retirees. Table 1 shows the employment profile of the MMS compared to the census (both sources only include people aged 15 years and older). The sample contained fewer full-time workers and more part-time workers and people not in the labour force. In the MMS sample most of those not in the labour force were retired (28% of the sample, or 57% of those not in the labour force).

The sample showed a distinct bias towards those with time on their hands to undertake a very long household survey. Busy working couples and families were more likely to decline the offer of participating in the survey. Older, retired households, on the other hand, were much more likely to agree to participate. Furthermore, the proportion of single parents, disabled people and carers of the disabled was lower than that of the Melbourne population and far lower than desired for the survey sample. It should be noted that these demographics were not measured directly in the MMS. Instead, someone was classified as a single parent if their household contained children but only one adult. The other two indicators were based on whether someone in the MMS stated

that they received a disability or a carer's pension. It should be noted that these may be under-estimates for the MMS sample.

Figure 2: Age profile of MMS/VISTA sample and census population

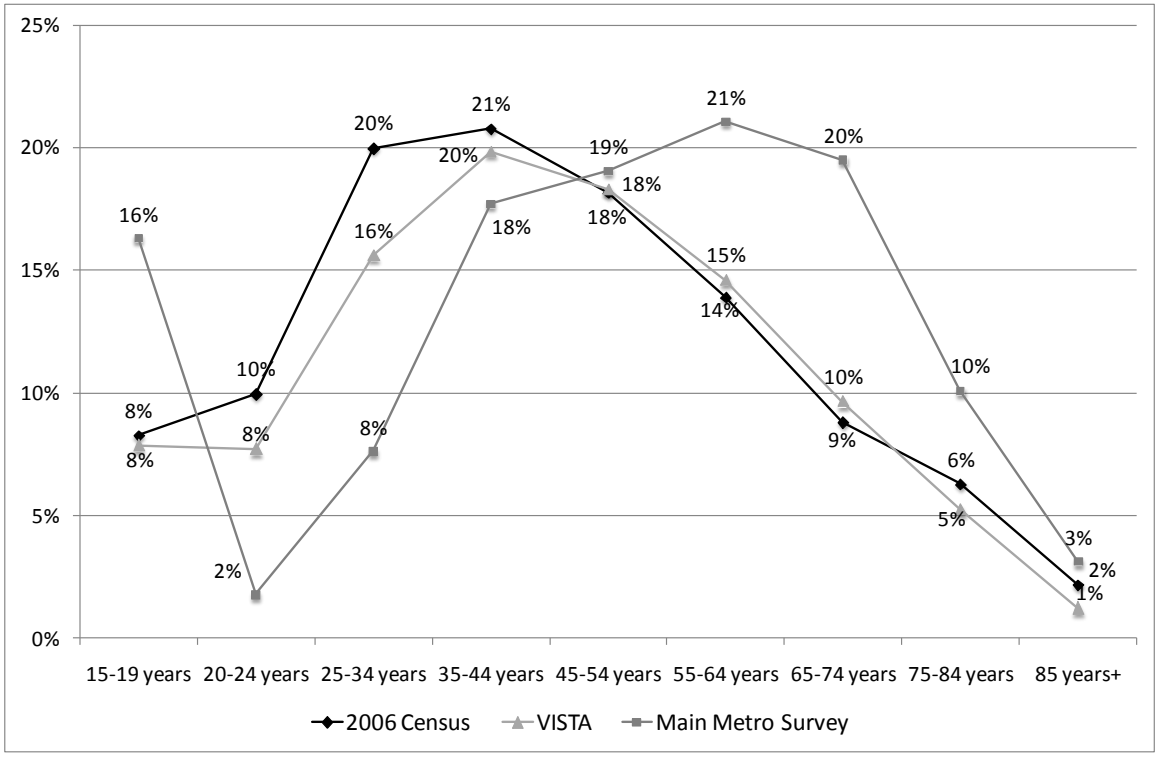


Table 1: Demographic profile of MMS And VISTA sample and census population

	Main Metro Sample	VISTA 2007	2006 Census
EMPLOYMENT			
Employed full-time	24%	44%	37%
Employed part-time	24%	17%	17%
Unemployed, looking for work	2%	3%[a]	3%
Not in the labour force (total)	49%	36%	32%
Those not in labour force:			
Retired	28%	17%	10%[b]
Study	13%	12%	6%[b]
Home duties	4%	6%	9%[b]
Unemployed due to illness / disability	3%	[a]	4%[b]
Other	1%	1%	3%[b]
DEMOGRAPHICS			
Single parents	5%[c]	8%	10%
Physical or intellectual disability	6%[c]	n/a	4%[d]
Carer of a disabled person	2%[c]	n/a	10%

[a] *Does not distinguish between those looking for work and those unable to work*

[b] *Data comes from the 2007 "Persons not in labour force" data for Melbourne, (Australian Bureau of Statistics 2010)*

[c] *Measured indirectly and may be underestimated*

[d] *The census uses the stringent criteria "needs assistance to perform core activities"*

Although older people are an important demographic in transport research and can face significant transport disadvantage, a wider sample of disadvantaged people was desired

for the research. It was clear that the combined research design elements of using the VISTA sample as a sampling frame, the long survey interview requirement and opt-in process was acting to restrict participation from a range of disadvantaged people including the unemployed, single parents, homeless and disabled. A different methodology was needed in order to contact and survey these people. This was developed for what became the 'Special Survey'.

5. The Special Survey

5.1. Survey Method

The recruitment and interview process decided upon was time- and resource-intensive but ultimately rewarding.

It was decided that this sample would be directly contacted through government and non-government service providers known to work with a range of disadvantaged individuals. They included drop-in centres, work skills centres, child and family resource centres and centres where people pick up pension and support payments.[3]

Agencies were first approached and permission was sought to recruit on their premises (a few agencies originally contacted refused at this stage). Promotional materials such as brochures and posters (including contact telephone 'tear off' strips) were distributed on site to advertise the survey. Contact information was provided (including telephone, email and mail) so that interested parties could arrange an interview in their own home. Specific days were organised for interviews to take place on-site. It was emphasised to on-site partners that although the survey could be promoted, people should in no way be coerced into participating. This was a particularly sensitive issue as many of these agencies provided essential services to their clients. It was also a major requirement of university research ethics processes.

Liaising with service agencies insured that there was a semi-private location where people could be interviewed without their responses being overheard. However, interview location should not be so isolated as to make the respondent feel uncomfortable being alone with the interviewer.

In addition, a special effort was made to ease ethical requirements for the parental consent of some young people aged 16-17 who participated in the survey. The removal of parental consent requirements was granted by the research ethics committee only for those respondents whose relationship with their parents was so poor that contacting them could be detrimental to the well-being of the young person. In this regard it was hoped that the young people surveyed might include homeless young people as this group would be more likely to have dysfunctional relationships with parents.

The MMS questionnaire did not require significant modification for the Special Survey. Because respondents were not recruited from VISTA, a simplified travel diary was added. In addition three new demographic questions were needed to specifically measure whether participants were single parents, whether they had a physical or intellectual disability and whether they were a carer for the disabled.

Experience during the piloting of the Special Survey was illustrative of both the benefits and drawbacks of this approach. Agency contacts on-site 'got behind' the project and

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3 *Service providers who granted permission included the non-government organisations The Brotherhood of St. Laurence, Anglicare, Headspace and the GETT Centre as well as the government organisations Centrelink and Interface Councils of Whittlesea, Mornington Peninsula, Wyndham, Melton and Cardinia. Surveying took place at 17 agencies.*

enthusiastically promoted it. After two weeks of promotion quite a number of 'tear-off' strips had been removed from the posters but only one person called to book an interview.

On-site recruitment on the day of the interview was far more successful. Once the first respondents had been interviewed and reported to others that the process was interesting and not too difficult, further requests to participate began to 'snowball'. After the first day another 7 people called to arrange appointments and an extra interviewing day was scheduled to cater to all interested people. Interviewers reported that although the $30 incentive was well received, they did not believe respondents were only participating for the money. They considered them to be very interested in the survey and provided well thought-through answers.

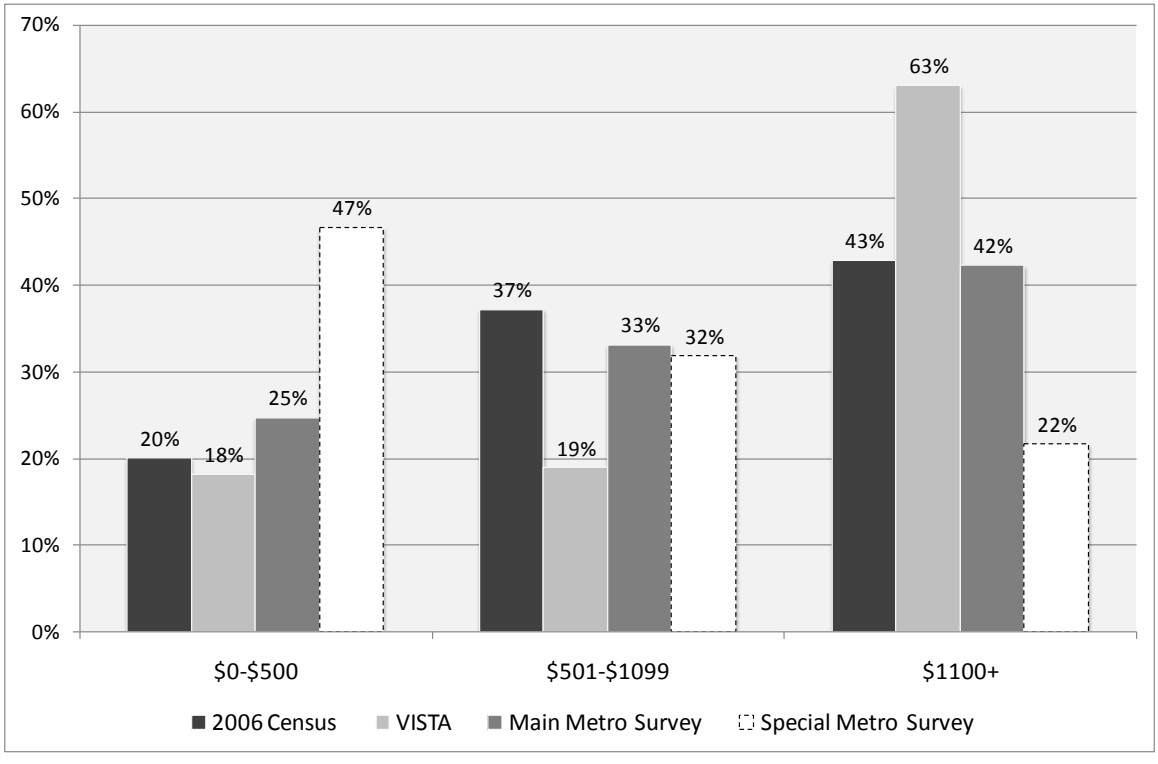
Not all interview sites were as successful as the pilot site during the full roll-out of the Special Survey. In some locations on-site staff did not have the time or inclination to promote and support the survey which resulted in an extremely low interest on the day. At other sites foot traffic was uncharacteristically low due to outside influences such as poor weather. One site only attracted 2 interviews and another only 1, compared to a high of 53 interviews at one Centrelink office.

5.2. Sample demographics

The Special Survey took place between July and December 2009 and was managed again by I-View. A total of 249 interviews were conducted in the metropolitan sample of the Special Survey. Once recruitment locations were chosen, people interested in the survey were not turned away if they were not in the target sample (e.g. the unemployed, the single parents, the young, the homeless, the disabled and carers of the disabled).

Figure 3 shows the gross household income of the Special Survey (Metro) compared to the MMS, VISTA and the census population in Melbourne.

Figure 3: Gross weekly household income - MMS/VISTA/Special Survey samples & census



Nearly 40% of the sample had a household income in the lowest quartile which was as targeted. Figure 4 show the age profile of the samples. Young people (15-19) made up

an even larger proportion of the Special Survey due to the targeting of several youth centres for interviewing. However when this is taken into account it is clear the MMS sampled more working-age adults and fewer older people. Agencies that serve the elderly were specifically excluded from the sample frame to compensate for the oversampling in the MMS.

Figure 4: Age profile of MMS/VISTA/Special Survey sample and census

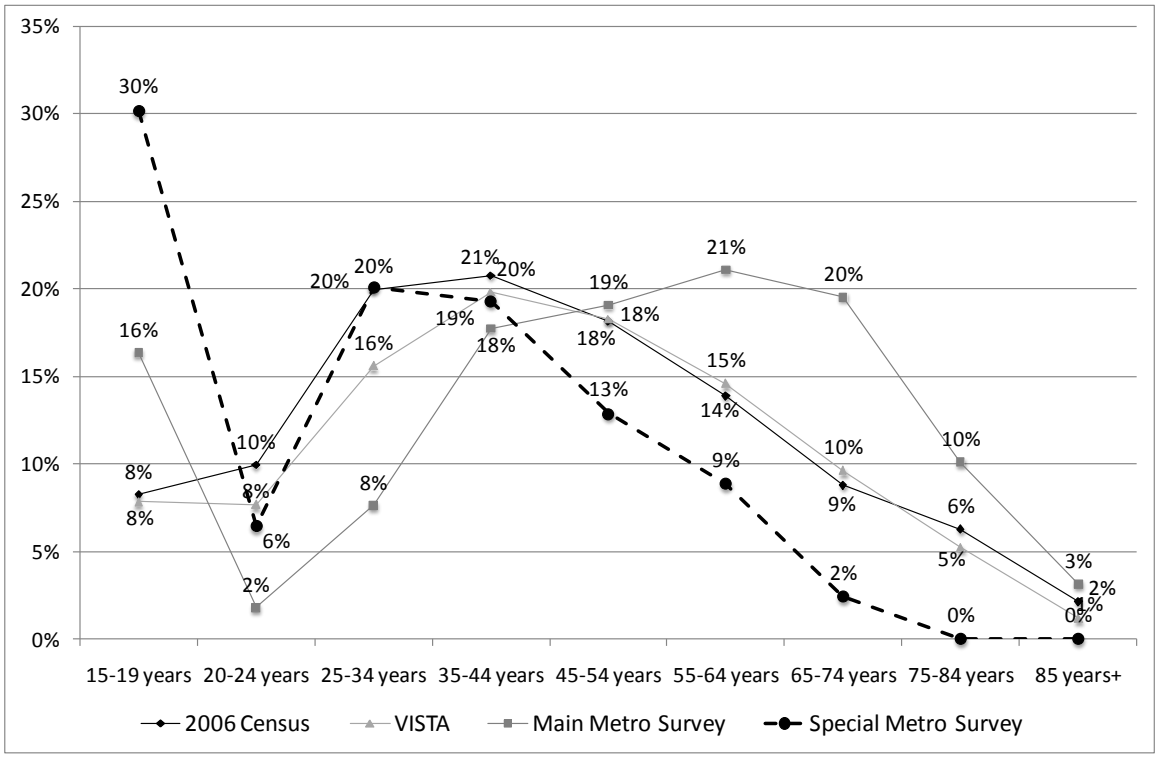


Table 2 shows the employment status of the Special Survey sample compared to the MMS and VISTA samples and census data. The Special Survey sample contained a much larger proportion of unemployed work-seekers (25%) and the unemployed due to illness or disability (13%). This table also shows some key demographic indicators of disadvantage. The proportion of single parents (24%), disabled persons (26%) and carers (14%) is quite considerable in the Special Survey sample.

Interestingly, no homeless people completed the survey. It was expected that some of the service providers would have had homeless clientele although none of the agencies were specifically targeted to the homeless. However 11 people in the Special Metro stated that they did not live with family, friends or on their own; most of these lived in temporary shelter accommodation.

Table 2: Demographic profile of MMS, Census and Special Metro sample

	Special Metro Sample	Main Metro Sample	VISTA 2007	2006 Census
EMPLOYMENT				
Employed full-time	5%	24%	44%	37%
Employed part-time	16%	24%	17%	17%
Unemployed, looking for work	25%	2%	3%[a]	3%
Not in the labour force (total)	54%	49%	36%	32%
Those not in labour force:				
Retired	3%	28%	17%	10%[b]
Study	25%	13%	12%	6%[b]
Home duties	9%	4%	6%	9%[b]
Unemployed due to illness / disability	13%	3%	[a]	4%[b]
Other	3%	1%	1%	3%[b]
DEMOGRAPHICS				
Single parents	24%	5%[c]	8%	10%
Physical or intellectual disability	26%	6%[c]	n/a	4%[d]
Carer of a disabled person	14%	2%[c]	n/a	10%

[a] *Does not distinguish between those looking for work and those unable to work*
[b] *Data comes from the 2007 "Persons not in labour force" data for Melbourne, (Australian Bureau of Statistics 2010)*
[c] *Measured indirectly and may be underestimated*
[d] *The census uses the stringent criteria "needs assistance to perform core activities" whereas the Special Metro counts anyone who self-identifies as disabled*

6. Discussion and conclusions

This paper explores how travel surveys perform in covering socially disadvantaged people from a review of previous research and a description of sampling difficulties and how they were addressed in a study of transport disadvantage in Victoria.

The research literature shows that household travel surveys have been the major means of providing travel data for planning over the last half century. Sample design aims to provide a representative picture of the whole population rather than a focus on specific demographic groups. Cost, quality and quantity trade-offs are necessary for good sampling which can make providing additional resources to cover hard to reach groups problematic. There are numerous challenges in targeting disadvantaged groups and a range of methods for targeting them including 'snowballing' and 'location sampling'. All are resource intensive and require special consideration of the needs and concerns of those being targeted.

As part of a major research program examining links between transport disadvantage, social exclusion and well-being in Victoria a long (60-90 min) home interview questionnaire survey was required. A follow-on survey using an existing household travel survey sample frame was adopted to reduce interview time and to better target specific social groups. Responses over-sampled older age and higher income groups due to the low opt-in rates from other groups and the propensity for people with more time on their hands to opt-in to a long survey.

A Special Survey was devised using 'snowballing' and 'location sampling' of service providers to better target disadvantaged groups including the unemployed, single mothers, young people, disabled people and the homeless. This was resource intensive

but achieved a much higher sample of these groups than identified in previous approaches.

Ensuring the sampling of disadvantaged groups in transport surveys is clearly a major challenge for researchers and practitioners. The methods described are clearly effective in achieving participation, however major methodological questions will remain about the representativeness of the samples achieved. 'Location sampling' is not representative of those not attending specific service providers. 'Snowballing' implies participation from a selected group of individuals who know each other but tells us little of those in this group who don't know those contacted.

There is an important disconnect between the poor representativeness in the specialist sampling methods used to target disadvantaged groups and the major aim of providing a representative sample in household travel surveys. Some researchers have suggested that participation of disadvantaged groups in major travel surveys is essential for reasons of social inclusion (McCray 2009). To do this there will be important cost and survey design implications to maintain quality and sample size in household surveys. It may be that a way forward would be to undertake small specialist surveys of disadvantaged communities as a supplement to major household travel surveys. The specialist surveys might be used to better inform data expansion. For this to work methods to make specialist surveys representative of their cohort will be required. This remains a major research issue to be addressed to achieve social inclusion in this field.

A major conclusion of the research was that successful recruitment of disadvantaged individuals requires 'active' or 'face to face' promotion of the survey rather than 'passive' sampling through a mail out and 'opt-in' process. Higher sample returns were achieved in the Special Survey through direct on-site recruitment than through 'passive' methods like flyers and posters. There is some corroboration of this from the research literature. For example, during a study of people with disabilities the researchers got no response from fliers, newsletter advertisements or even from promotion on targeted radio programs. They were only able to recruit interested participants through attending advocacy and support groups and surveying respondents on the day of these events (Hillier et al. 2007a).

Cooperation from service providers was also an important key success factor in the Special Survey. Providers need to agree to commit resources and to actively promote on-site interviews. It is important to identify a specific individual within agencies who will make a commitment to the survey and take responsibility for the agencies' side of the event. Without this support, interviewers may arrive on the day to find that no-one has heard of the survey. Interestingly, obtaining commitment from agencies and individuals within them was not particularly problematic. The theme of the research (transport disadvantage and social exclusion) was a major concern of the agencies targeted and as a result many were willing to make commitments of time and resources. Researchers seeking cooperation of this type therefore need to make clear the value of the research being undertaken.

Special attention was made to target homeless people, particularly homeless young people, in the Special Survey. This included targeting specific day care centres which assist homeless people but no interviews with this group were actually achieved. Previous research on homeless young people has found that this group is particularly challenging to study and requires consistent contact to build and maintain trust. One study of 700 homeless young people required the full-time employment of a community liaison officer to establish and maintain contact with both service providers and young people (Hillier et al. 2007b). This was beyond the resources available to this project but should be kept in mind for future projects interested in understanding the travel needs of this group.

There was some initial concern with the motivation of respondents to the Special Survey. It was thought that they might be more interested in receiving the $30 incentive than in spending time providing a considered response to the questionnaire. The research clearly demonstrated these concerns were unfounded. Feedback from the experienced interviewers suggests that most respondents were genuinely interested in the survey and gave thoughtful, considered answers. In the open-ended comments provided at the end of the survey, several respondents expressed their appreciation for the survey:

> "[This] survey is very important" *19-year-old student*
>
> "Interesting questions, glad to be of help in [the] study." *15-year-old male*
>
> "I enjoyed the survey." *51-year-old unemployed single mother*
>
> "It's good that you are giving the community a chance to have a say about this and the spending money is much appreciated." *29-year-old male*

There appears to be a clear association with research aiming to address important issues being faced by disadvantaged communities and their willingness to engage their time and efforts in these projects.

Overall the research has identified significant challenges for researchers and professionals involved in transport survey planning and development regarding inclusive design for socially disadvantaged groups. As research in transport and social exclusion expands there is a need to develop new methods to ensure inclusive sampling including representative sampling of disadvantaged groups.

7. Acknowledgement

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