



Title: The impact of adopting extended call routines on sample representativeness

Stream: Survey Research

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This paper is a continuation of our earlier paper which compared the profiles of persons with listed and unlisted telephone numbers and discussed the implications of these differences in the context of using Electronic White Pages or Random Digit Dial sample frames.

Continuing with the theme of improving the representativeness of samples obtained via telephone survey research, this paper looks at the impact extended call regimes have on sample representativeness. We also briefly raise the issue of the over representation of higher socioeconomic status groups in social and health research surveys and discuss what impact this has on the representativeness of survey estimates.

The observations in this paper are based on our experiences in providing survey research services to a range of government departments and agencies and academic researchers.

The surveys used in this analysis include:

- The 2006 Community Attitudes to Violence Against Women Survey (VAWS) – VicHealth. A multi-faceted survey relating to violence against women, including full qualitative development phase, 2,000 general community surveys and 800 surveys with persons of selected culturally and linguistically diverse backgrounds.
- The 2005 Victorian Population Health Surveys (VPHS) – Victorian Department of Human Services. A high quality annual survey of Victorian of 7,500 Victorians aged 18 years and over. The purpose of the survey is to inform and support planning, implementation and evaluation of adult health services and programs throughout Victoria.
- The 2004 International Crime Victimization Survey (IVCS) – Australian Institute of Criminology / United Nations Organisation. 6,000 general community surveys on crime victimization issues. Australian component of a large-scale international survey, and
- Community Attitudes Survey (CAS) - Australian Transport Safety Bureau, 2003 onwards. An annual community attitudes research survey of 1,500 persons aged 15 years and over regarding attitudes to road safety issues.

### ***The Impact of Adopting Extended Call Routines***

The number of calls made to establish contact with a household and obtain an interview varies considerably from survey to survey. For many social research projects a 6-call routine is used. For many commercial market research projects as few as 2 or 3 calls are made to a household to try and establish contact and obtain an interview.

Given the extra time and effort involved in adopting more rigorous call routines it is important to establish whether or not the profile of persons interviewed later in the call cycle differs to any great extent from those interviewed earlier in the call cycle.

Table 1, shows the proportion of interviews obtained with 18-44 year olds from call attempts 1 to 3, 4 to 6 and 7 onwards across three high profile surveys (VPHS, VAWS and ICVS). The reason for concentrating this analysis on 18 to 44 year olds is because interviews with older respondents are generally obtained much earlier in the call cycle.

For example, just looking at the VPHS, we see that persons aged 18 to 44 years comprise 32% of those interviewed between call attempts 1 and 3, 43% of those interviewed between calls 4 and 6 and 48% of those interviewed after 7 or more calls into the call cycle<sup>1</sup>. To put these results into context, approximately 55% of persons aged 18 years and over are aged between 18 and 44 years.

Whilst the representation of younger persons is substantially improved by using a 6-call routine rather than a 3-call routine, there are incremental improvements to the overall representation of this group by further extending the call cycle.

**Table 1: Proportion of interviews obtained by call attempt for persons aged 18 to 44 years.**

<b>Project</b>	<b>VPHS 2005</b>	<b>VAWS 2006</b>	<b>ICVS 2004<sup>(a)</sup></b>
Coverage .....	Victoria	Victoria	National
Respondent selection .....	Next birthday	Next birthday / Matched Gender	Disproportionate
Base within age range .....	(n=2,788) %	(n=807) %	(n=3,197) %
1-3 calls .....	32	34	45
4-6 calls .....	43	44	59
7 or more calls .....	48	48	64
% of all completed interviews from 7 or more calls.....	13	26	29

a) The base for the ICVS is persons aged 16 to 44 years

<sup>1</sup> Table 1 also shows that, across the surveys, the proportion of all interviews obtained from call attempts 7 and beyond ranged from 13% to 29%. These differences are largely explained by the different respondent selection routines used for each survey. The VPHS uses a standard "next birthday" respondent selection routine. For the Community Attitudes to Violence Against Women Survey there was a requirement for matched gender interviews. For the ICVS a disproportionate selection routine was used to increase the chance of selecting males and younger persons.

The observed differences in the ages of those interviewed late in the call cycle and those interviewed early in the call cycle is not a function of age, as such, but one of 'contactability'. That is, younger persons are relatively more difficult to establish contact with than older persons. As this is the case, one would expect other differences to exist between respondents interviewed early in the call cycle and those interviewed later in the call cycle.

Some examples of these differences are presented at Table 2.

**Table 2: Interviews obtained by call attempt for selected demographic characteristics**

Characteristic	1-3 calls	4-6 calls	7 or more calls
<i>VPHS 2005</i>	(n=4,740) %	(n=1,858) %	(n=962) %
Male.....	38	40	42 <sup>#</sup>
Capital city resident .....	40	44 <sup>#</sup>	46 <sup>#</sup>
Australian born.....	79	79	80
Employed.....	48	61 <sup>#</sup>	67 <sup>#</sup>
Retired .....	34	21 <sup>#</sup>	17 <sup>#</sup>
Blue collar occupation.....	23	23	26 <sup>#</sup>
Household income < \$40k pa .....	45	38 <sup>#</sup>	32 <sup>#</sup>
Household with dependent children.....	25	33 <sup>#</sup>	38 <sup>#</sup>

#Denotes significant difference between estimates obtained from calls 1 to 3 at the 95% confidence interval.

As can be seen, the representation of employed persons, in particular, is improved through interviews achieved late in the call cycle (serving to help correct the skew towards retirees who are well represented amongst those interviewed early in the call cycle). There is a corresponding decrease in the proportion of households with an income under \$40,000 later in the call cycle.

Other groups whose representation is improved by the extended call cycle include males, capital city residents and households with dependent children.

Whilst these statistics are taken from the VPHS, the pattern of responses is very consistent across a range of similar surveys undertaken by the Social Research Centre.

Given the strong evidence showing that the socioeconomic and demographic profiles of respondents differ quite markedly depending upon the call cycle used, it is important to understand whether these differences impact on key attitudinal or behavioural measures. This is briefly examined at Table 3, using a health survey (VPHS), a crime victimisation survey (ICVS) and a road safety survey (CAS) for comparative purposes

As can be seen, there are some important differences in selected measures of health, social connectedness, crime victimization and driver attitudes / behaviours depending upon when in the call cycle an interview was achieved.

**Table 3: Selected findings by call attempt**

Characteristic	1-3 calls	4-6 calls	7 or more calls
	(n=4,740) %	(n=1,858) %	(n=962) %
<i>VPHS 2005 (n=7,560)</i>			
General health "fair" or "poor" .....	20	17 <sup>#</sup>	15 <sup>#</sup>
Covered by private health insurance .....	50	51	52
Could not raise \$2,000 in an emergency .....	14	13	11 <sup>#</sup>
Feels safe walking down street alone after dark - "Yes definitely" .....	56	60 <sup>#</sup>	62 <sup>#</sup>
Multiculturalism makes life in your area better - "Yes definitely" .....	60	62	62
Feels valued by society - "Yes definitely" .....	50	52	55 <sup>#</sup>
Spoke to 10 or more people yesterday .....	44	52 <sup>#</sup>	59 <sup>#</sup>
	(n=2,968) %	(n=1,304) %	(n=1,728) %
<i>ICVS 2004 (n=6,000)</i>			
Net victim of crime .....	51	54	56 <sup>#</sup>
Had access to home computer with internet in last 5 years .....	66	74 <sup>#</sup>	76 <sup>#</sup>
	(n=1,153) %		(n=205) %
<i>CAS 2005 (n=1,358)</i>			
Drive every day of the week .....	71		81 <sup>#</sup>
Been directly involved in a road accident in the last 3 years .....	16		11 <sup>#</sup>
Approve of lowering speed limit in residential streets to 50 km/hr .....	66		56 <sup>#</sup>
Agree that fines for speeding are mainly intended to raise revenue .....	23		32 <sup>#</sup>
Agree that people should be allowed to travel at 110 km/hr in 100km/hr zones in rural areas, without being booked for speeding .....	32		41 <sup>#</sup>

#Denotes significant difference between estimates obtained from calls 1 to 3 at the 95% confidence interval.

While the data presented to date show broad attitudinal, behavioural and demographic differences based on how far into the call cycle an interview is obtained, it is of interest to establish whether or not there are also differences within selected population subgroups.

An example of the sorts of differences that can be found is provided in Table 4. For example:

- smoking prevalence amongst persons aged 41-69 years and 70 year and over decreases with a longer call cycle
- the proportion of employed 41-69 year olds increases later in the call cycle, and
- the proportion of 41 to 69 year olds with a household income of less than \$40,000 per annum decreases later in the call cycle (i.e. household income rises).

**Table 4: Selected findings by call attempt within age group**

Source: VPHS 2005, Base 7,560	Age Group								
	18 to 40 years			41 to 69 years			70 years and over		
	1-3	4-6	7+	1-3	4-6	7+	1-3	4-6	7+
Characteristics									
Number of calls									
Base (n= )	1,208	628	369	2,529	988	490	1,003	242	103
Daily smoker	24	20 <sup>#</sup>	23 <sup>#</sup>	18	17	13 <sup>#</sup>	9	5 <sup>#</sup>	2 <sup>#</sup>
Employed	68	72	72	56	72 <sup>#</sup>	75 <sup>#</sup>	4	4	6
Household income <\$40k	35	32	30 <sup>#</sup>	50	42 <sup>#</sup>	35 <sup>#</sup>	86	88	90

#Denotes significant difference between estimates obtained from calls 1 to 3 at the 95% confidence interval.

As can be seen, investment in a longer call cycle, together with carefully controlled sample release and an adequate fieldwork period to fully enumerate the sample<sup>2</sup>, is important when attempting to improve overall sample representativeness or improve the representativeness of specific subgroups of interest.

<sup>2</sup> See Rogers (2006.)

### ***The over representation of tertiary qualified persons in survey research***

The Social Research Centre has observed a tendency for persons of higher socio-economic status (as indicated by educational attainment) to be over-represented in many of the social and health surveys. This occurs despite the application of rigorous call procedures and standard approaches to weighting.<sup>3</sup>

The final aspect of this paper looks briefly at the impact that this over-representation has on survey estimates and examines the impact of applying an appropriate weighting correction factor.

Australian Bureau of Statistics data indicates that 19.6% of the population aged 15 to 64 years has a Bachelors Degree or higher level of educational attainment<sup>4</sup>. Broadly comparable figures from a range of surveys undertaken by the Social Research Centre, based on weighted survey estimates, are shown below:

- The Community Attitudes to Violence Against Women Survey – 32% tertiary qualified
- The Victorian Population Health Survey – 30% tertiary qualified
- The International Crime Victimization Survey – 29% (est.) tertiary qualified, and
- Community Attitudes to working age income support customers – 25% tertiary qualified.

As can be seen, across these surveys there is a tendency, even after traditional weighting methods have been applied, for the survey estimates to over-represent persons with tertiary qualifications.

Given that educational attainment is associated with some differences in attitudes (see Table 6) the question is does this matter and, if so, what can be done about it?

**Table 6: Impact of educational attainment on selected attitudes and behaviours.**

	Tertiary Quals.	
	Yes %	No %
<b>Selected attitudes and behaviours</b>		
More needs to be done to help the unemployed ..	85	77
Daily smoker.....	10	20
Could raise \$2,000 within 2 days, if needed .....	92	80
High gender equality rating.....	46	36

All results in this table are statistically significant at the 95% confidence interval.

<sup>3</sup> We suspect that part of the reason for this is because interviewers (supported by primary approach letters) attempt to appeal to the social conscience of sample members when attempting to encourage survey participation. O'Neil (1979) notes "highly significant occupational differences in interview amenability ... with persons in white collar occupations less likely to refuse an interview attempt and those in blue collar occupations more likely to refuse."

<sup>4</sup> ABS, 2005.

A simple post weighting adjustment factor to correct for educational attainment has been applied to these estimates.

The impact is shown below (Table 7).

**Table 7: Original weighted estimates and estimates post weighted by educational attainment.**

<b>Population Estimates</b>	<b>Original Est %</b>	<b>Adjusted Est %</b>
<b>Selected attitudes and behaviours</b>		
More needs to be done to help the unemployed ..	79.2	78.8
Daily smoker.....	16.9	17.9
Could raise \$2,000 within 2 days, if needed.....	83.7	82.5
Victim of crime in the last 12 months.....	52.3	51.7
High gender equality rating.....	39.2	38.1

The above indicates that, depending on the level of precision required and depending on whether or not the measures of interest are likely to be affected by an over representation of tertiary qualified persons, it is worth considering some sort of education (or socio-economic status) weighting adjustment factor.

The solution is more complicated than simply applying a post weighting adjustment as we have done for this paper. The reason for this is the potential effect on sub group results (weighting up the educational attainment of those aged 60 years and over and weighting down the educational attainment of those aged less 18 to 30 years). The likely answer lies in the adoption of a more sophisticated raking weighting or raking procedure.

Our scan of the literature does not reveal a lot of work being done in this area. One paper we did find was based on the Behavioural Risk Factor Surveillance System (BRFSS) conducted by the Centers for Disease Control and Prevention (CDC). The BRFSS currently uses a design weight followed by post stratification by age by gender by race/ethnicity. The Battaglia paper looked at adding variables to the BRFSS weighting methodology to add stability to / improve the accuracy of the estimates. The authors concluded that "education is an important variable to add" to the weighting adjustment<sup>5</sup> and that many of the adjustments they made led to increased risk factor estimates.

Further work is required in this area but on face value it appears that the issue of whether or not to post weight survey results to better account for educational attainment warrants further consideration. In our experience this sort of adjustment is not typically undertaken and may be of interest to those wishing to improve the representativeness of the population estimates generated from telephone research.

<sup>5</sup> Battaglia, Michael P, Frankel, Martin R and Link, Michael, Weighting Survey Data: How to Identify Important Poststratification Variables."

## References

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