



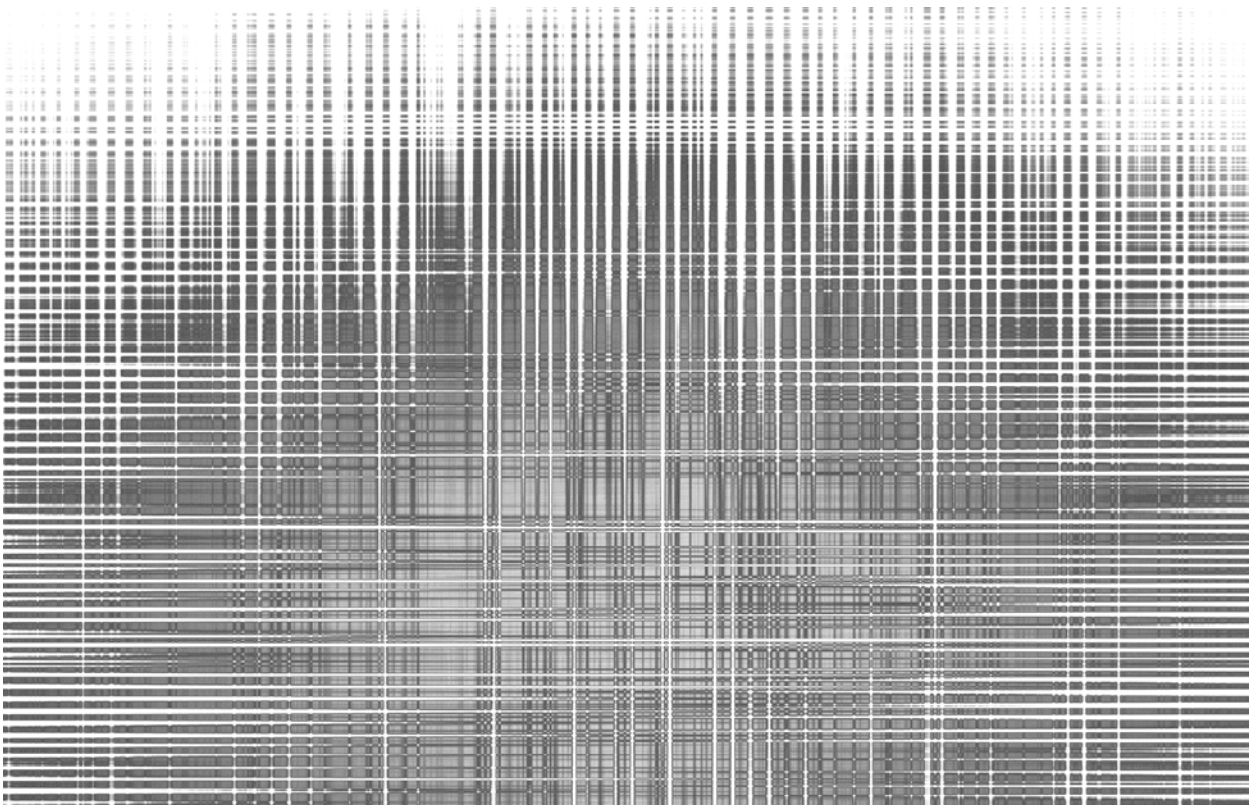
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Building a probability-based online panel: Life in Australia™

L Kaczmirek, B Phillips, DW Pennay, PJ Lavrakas and D Neiger

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ANU Centre for Social Research & Methods

Research School of Social Sciences
The Australian National University

Building a probability-based online panel: Life in Australia™

L Kaczmirek, B Phillips, DW Pennay, PJ Lavrakas and D Neiger

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Abstract

Life in Australia™ was created to provide Australian researchers, policy makers, academics and businesses with access to a scientifically sampled cross-section of Australian resident adults at a lower cost than telephone surveys. Panellists were recruited using dual-frame landline and mobile random digit dialling. The majority of panellists choose to complete questionnaires online. Representation of the offline population is ensured by interviewing by telephone those panellists who cannot or will not complete questionnaires online. Surveys are conducted about once a month, covering a variety of topics, most with a public opinion or health focus. Full panel waves yield 2000 or more completed surveys. Panellists are offered a small incentive for completing surveys, which they can choose to donate to a charity instead.

This paper describes how Life in Australia™ was built and maintained before the first panel refreshment in June 2018. We document the qualitative pretesting used to inform the development of recruitment and enrolment communications materials, and the pilot tests used to assess alternative recruitment approaches and the comparative effectiveness of these approaches. The methods used for the main recruitment effort are detailed, together with various outcome rates. The operation of the panel after recruitment is also described. We assess the performance of the panel compared with other probability surveys and nonprobability online access panels, and against benchmarks from high-quality sources. Finally, we assess Life in Australia™ from a total survey error perspective.

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We are also grateful to Emma Farrell of the Australian Bureau of Statistics for her helpful comments.

Methodological results from this study were presented at various conferences (Challice et al. 2017a,b; Kellard 2017; Pennay et al. 2017).

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Acronyms

ANU	Australian National University
CATI	computer-assisted telephone interviewing
COMR	completion rate
CSRM	ANU Centre for Social Research & Methods
CUMRR	cumulative response rate
DFRDD	dual-frame random digit dialling
ELIPSS	Enhancing Learning by Improving Process Skills in STEM
LISS	Longitudinal Internet Studies for the Social Sciences
OPBS	Online Panels Benchmarking Study
PROR	profile rate
RECR	recruitment rate
RETR	retention rate
SMS	short message service (i.e. text message)
SRC	Social Research Centre

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1 Introduction

1.1 Background

Probability-based online panels emerged in the United States in 1999 with KnowledgePanel and in Europe in 2007 with the Longitudinal Internet Studies for the Social Sciences panel in the Netherlands (Blom et al. 2016, Knowledge Networks n.d.). Other countries soon followed, such as Germany (the German Internet Panel and the GESIS Panel) and France (ELIPSS) (Blom et al. 2016). In Australia, the first probability-based online panel did not appear until 2016. This was despite high internet penetration – 86.1% of the population was estimated to have internet access in 2016–17 (ABS 2018) – and the rapid take-up of online research by the market and social research industry. In 2016, expenditure on online research was more than \$370 million and accounted for an estimated 44% of total revenue generated by the market and social research industry (RICA 2016, ESOMAR 2017).

The viability of a probability-based online panel in Australia was first raised by Paul J Lavrakas in a series of discussions with Darren Pennay in 2013. These discussions led to Dr Lavrakas being commissioned by the Social Research Centre (SRC) to write an internal white paper exploring this issue: *Establishing and maintaining a probability-sample internet panel for the Australian general adult population*.

From this starting point, the desirability of Australia having a probability-based online panel was then demonstrated by the Australian Online Panels Benchmarking Study (OPBS; Pennay et al. 2018a). The OPBS comprised eight national surveys: three probability surveys and five surveys conducted via nonprobability online panels. It replicated earlier international findings (Yeager et al. 2011) in showing that surveys fielded on nonprobability online panels were less accurate, on average, than probability sample surveys. The nonprobability surveys also produced results

that were more variable from each other than the results from probability surveys. Also in line with Yeager et al. (2011), weighting improved the accuracy of nonprobability survey estimates for some variables and reduced accuracy for others. In a study comparing three online opt-in panels totalling more than 30 000 interviews, Mercer et al. (2018:3) reported among their key findings that ‘even the most effective adjustment procedures [for the nonprobability panels] were unable to remove most of the bias’.

This research and the prevailing conditions in Australia led the SRC to establish Life in Australia™, a probability-based panel recruited using dual-frame (landline and mobile phone) random digit dialling (DFRDD).

Life in Australia™ was created as a commercial panel with the intent of providing Australian researchers, policy makers, academics and business leaders ready access to a scientifically sampled cross-section of the Australian community at lower cost than a standalone telephone survey. It was also created to empower Australia with this research method, which is widely available in Europe and the United States.

1.2 Key characteristics of Life in Australia™

Life in Australia™ panellists were recruited via their landline or mobile phone to take part in monthly surveys. Panel members receive a small incentive for joining the panel and additional small incentives for each questionnaire or interview they complete.

Life in Australia™ is recruited and maintained by researchers at the SRC using probability-based sampling methods – specifically, DFRDD. This means that the results from surveys undertaken on Life in Australia™ are generalisable to the Australian adult population, not including

Australian external territories, and that sampling errors and confidence intervals can be calculated. Nonprobability opt-in online panels do not have these properties (for a review of these issues, see Baker et al. [2013]).

Unlike other research panels in Australia, Life in Australia™ includes both the online population and the offline population (i.e. people who do not have access to the internet or are not comfortable completing surveys via the internet). The offline population is included via telephone interviews. In summary, Life in Australia™ includes the population of all Australian adults aged 18 and above who are resident in Australia and are contactable via either a landline or a mobile phone, not including Australian external territories. Life in Australia™ is recruited in English only, and questionnaires are fielded in English only.

See Box 1 for further details.

1.3 Aims of this paper

This paper reports on the methodology used to build Life in Australia™, including a series of tests and experiments that were conducted to inform various methodological and operational decisions as part of the overall establishment of the panel. The effectiveness of these approaches and of the final recruitment method used to build the panel is described.

Section 2 describes the exploratory research that informed the design of Life in Australia™, including research on other probability-based panels, qualitative pretesting and a small-scale randomised trial pilot study. Section 3 details the main recruitment effort, including the sample design, fieldwork procedures, results and enrolment weights. Section 4 addresses the operation of Life in Australia™ with respect to fieldwork procedures, weighting and research topics. Section 5 assesses the performance of Life in Australia™ compared with high-quality benchmarks and other surveys. Section 6 contextualises the pilot study experiments and assesses Life in Australia™ from a total survey error perspective. Section 7 concludes this paper, summarising its contents.

Box 1 Key characteristics of Life in Australia™

Coverage

All Australian adults aged 18 and above who are resident in Australia, not including Australian external territories, and can be contacted via either a landline or a mobile phone.

Sampling frame for panel recruitment

Landline and mobile random digit dialling. The sample was supplied by SamplePages.

Mode of recruitment

Telephone interviewers reaching landline and mobile telephone numbers. The interviews are conducted in English.

Mode of data collection

Mixed-mode panel using online/mobile questionnaires, and telephone interviewer-administered questionnaires for the offline population.

Size of pilot study

2815 telephone numbers resulted in 360 recruitment interviews and 280 respondents who completed a profile questionnaire.

Size of main recruitment

27 852 telephone numbers resulted in 3914 recruitment interviews and 3042 respondents who completed a profile questionnaire.

Researcher access

Researchers worldwide can request survey time to ask questions of panel members.

Funding

Fees are charged for researchers to place questions on the panel.



2 Exploratory research

2.1 Research on other probability-based panels

To inform the methodological decisions regarding the establishment and ongoing operation of Life in Australia™, we present some information about the key characteristics of other probability-based online panels around the world. A variety of probability-based online panels in other countries are used to survey the general population on a range of topics. Overall, the number of these types of panels is quite limited. Some are commercial panels that are open to a broad array of clients, whereas others are open only to researchers or a specified group of people. The online panels we refer to in this paper are also referred to as probability-based online access panels.¹ (In a strict sense, the term ‘online’ is a misnomer because some of the panels include the offline population by collecting data in alternative modes.)

Probability online access panels around the world differ in their recruitment methods, how the offline population is included, the funding source and the number of panel members (Table 1).² Recruitment via face-to-face surveys is the mode that yields the highest response rates. In Australia, face-to-face recruitment was not a feasible option because of the size of the country and the associated expense of trying to reach a representative sample through this method. Since the SRC has extensive experience with computer-assisted telephone interviewing (CATI), a telephone survey using DFRDD was the best option for recruiting Life in Australia™ panellists.

Whether and how to include the offline population poses a serious dilemma for probability-based online panels, because it requires balancing different types of errors, as well as practical considerations such as time in the field and questionnaire design across different modes.

Issues such as the following arise and are not easily resolved:

- Excluding the offline population, estimated in Australia to be 14% of households (ABS 2016a), will lead to coverage error when measuring a great many survey topics. Coverage error is the systematic underrepresentation of different sections of the population – for example, offline respondents are typically older and less educated.
- Including the offline population by providing internet access risks introducing nonresponse error and, potentially, measurement error, and has cost implications. Nonresponse error takes place because substantial numbers of offline households are likely to refuse to participate in the panel if their only option is to go online; the Pew Research Center was able to convert less than half (41%) of offline panellists on the American Trends Panel from mail to internet-connected tablet mode (Perrin & Bertoni 2017a). Measurement error potentially takes place because the offline population is no longer truly offline. Perrin and Bertoni (2017b) reported that the devices provided by the Pew Research Center were used for activities other than completing surveys, including getting news, using an app, playing games, and taking pictures or videos. The costs of providing internet access are considerable, including purchasing devices, providing internet access, providing helpdesk support for technical issues experienced by panellists, and replacing lost or damaged devices.
- Including offline panellists by CATI risks introducing measurement error due to mode effects associated with using an interviewer-administered mode to gather data, rather than a self-administered data collection mode. Mode effects are systematic variations in responses to questions by mode of data collection (see, for example, Keeter et al. [2015]).

- Including offline panellists by mail (which is also a self-administered mode) minimises mode-related data collection errors, but has important practical limitations. The Pew Research Center, for example, switched from surveying offline panellists by mail to offering

a tablet and internet access because of the long field periods required for mail survey administration, and because mail surveys severely restricted questionnaire design, with extensive skips, fills and randomisation being impractical (Perrin & Bertoni 2017a).

Table 1 Key characteristics of probability-based online panels worldwide

Country	Panel name (sponsor)	Sampling frame (recruitment method)	Method used to include offline population	Funding source	Approximate number of panellists
Australia	Life in Australia™ (SRC)	DFRDD (CATI, standalone)	CATI, mail	Self	3 300
Canada	Probit Panel (Probit)	DFRDD (CATI, standalone)	CATI, mail	Self	90 000
France	ELIPSS (academic consortium led by Sciences Po)	A-BS (letter; with mail, CATI and face-to-face follow-ups)	Provided with tablet and internet	Academic/ research infrastructure	3 500
Germany	German Internet Panel (Collaborative Research Center 'Political Economy of Reforms' [SFB 884] at the University of Mannheim)	Area probability sample (face to face)	Provided with computer and internet	Academic/ research infrastructure	1 600
Germany	GESIS Panel (GESIS – Leibniz Institute for the Social Sciences)	Population registry (face to face, with CATI follow-up)	Hard copy	Academic/ research infrastructure	4 800
Iceland	Social Science Research Institute	Population registry (CATI, after completion of survey)	None	Self	7 000
Iran	IranPoll (People Analytics)	Area probability (face to face); landline RDD (CATI)	None	Self	51 000
Korea	Korean Academic Multimode Open Survey (Chungnam National University)	Area probability (face to face, after completion of survey)	CATI, face to face	Academic/ research infrastructure	2 000
Netherlands	Longitudinal Internet Studies for the Social Sciences (LISS) (CentERdata at Tilburg University)	Population registry (face to face, with CATI follow-up)	Provided with computer and internet	Academic/ research infrastructure	8 000
Norway	Norwegian Citizen Panel (University of Bergen)	Population registry (mail)	None	Academic/ research infrastructure	6 000
Singapore	Singapore Life Panel (Singapore Management University)	Population registry (mail, with CATI and face-to-face follow-up, standalone)	None	Academic/ research infrastructure	11 000 (ages 50–70)

Table 1 *continued*

Country	Panel name (sponsor)	Sampling frame (recruitment method)	Method used to include offline population	Funding source	Approximate number of panellists
Sweden	Novus Sverigepanel (Novus)	Population registry (CATI, mail where no phone number available)	None	Self	50 000
United Kingdom	NatCen Panel (NatCen Social Research)	A-BS (face to face, after completion of survey)	CATI	Academic/ research infrastructure	1 800
United States	AARP Panel (AARP)	A-BS (mail, with CATI follow-up, standalone)	CATI	Self	9 500 (age 50+)
United States	American Life Panel (RAND Corporation)	Probability frames: A-BS, area probability and DFRDD. Nonprobability frames: respondent driven and snowball sampling (mail, CATI)	Provided with internet	Self	6 000
United States	American Trends Panel (Pew Research Center)	A-BS (mail, standalone), previously DFRDD (CATI, after completion of survey)	Originally mail, now provided with internet	Self	5 000
United States	AmeriSpeak (NORC at the University of Chicago)	Area probability sample (face to face, with CATI follow-up)	CATI	Self	15 000
United States	Gallup Panel (Gallup)	DFRDD and AB-S (mail and CATI)	CATI, mail	Self	100 000
United States	KnowledgePanel (Knowledge Networks, subsequently acquired by GfK and then Ipsos)	Formerly landline-only RDD, then DFRDD; currently A-BS with targeted use of DFRDD (mail and CATI)	Provided with internet	Self	60 000
United States	SSRS Opinion Panel (SSRS)	DFRDD (CATI, part of omnibus survey)	Phone	Self	10 000
United States	Understanding America Study (University of Southern California)	A-BS (mail, after completion of survey)	Provided with internet	Academic/ research infrastructure	7 000

A-BS = address-based sample; CATI = computer-assisted telephone interviewing; DFRDD = dual-frame random digit dialling; RDD = random digit dialling

Note: Information in this table was compiled from the panel providers – Australia, SRC (www.srcentre.com.au/our-research/life-in-australia-study); Canada (<http://probit.ca/what-we-do/probability-based-panels>); France, SciencePo (www.elipss.fr); Germany, University of Mannheim (https://reforms.uni-mannheim.de/internet_panel/Internet_Panel); Germany, GESIS – Leibniz Institute for the Social Sciences (www.gesis.org/gesis-panel/gesis-panel-home); Iceland, University of Iceland (http://fel.hi.is/online_panel); Iran, IranPoll (www.iranpoll.com/panel); Korea, Chungnam National University (<http://cnukamos.com/eng/main/>); Netherlands, CentERData (www.lisdata.nl); Norway, University of Bergen (www.uib.no/en/citizen); Singapore, National Management University (<https://crea.smu.edu.sg/singapore-monthly-panel>); Sweden, Novus (<https://novus.se/vara-tjanster/sverigepanel>); UK, NatCen (www.natcen.ac.uk/our-expertise/methods-expertise/surveys/probability-panel); USA, RAND (<https://alpdata.rand.org>); USA, Pew Research Center (www.pewresearch.org/american-trends-panel-datasets); USA, NORC at University of Chicago (<https://amerispeak.norc.org/Pages/default.aspx>); USA, Gallup (www.gallup.com/174158/gallup-panel-methodology.aspx); USA, Ipsos (www.ipsos.com/en-us/solution/knowledgepanel); USA, SSRS (<https://ssrs.com/opinion-panel>); USA, University of Southern California (<https://uasdata.usc.edu/index.php>).

2.2 Studies that informed our approach to recruitment

Having settled the main characteristics, we conducted pretests and a randomised trial pilot study to develop our approach to recruiting panellists.

2.2.1 Pretesting with in-depth interviews and focus groups

To inform the design, tone and content of our approach to recruitment and our communications materials, nine in-depth interviews and one focus group were conducted by the SRC Qualitative Research Unit with members of the general population aged 18 years and over. The goal was to test different positioning statements and communications materials to find the most effective approach. The materials tested were variations of pre-notification text messages, the advance letter and the introductory script to be used by the telephone interviewers who would recruit panel members.

Text message

We knew from previous Australian research (Pennay et al. 2016) that advance text messages (SMS) increase response rates. The goal was to determine the best wording to use to recruit and enrol panel members – for example, ‘chosen’ versus ‘selected’ and ‘interviewer’ versus ‘researcher’. In addition, we wanted to learn whether the term ‘study’ should be included in the SMS text. The following versions were tested:

- *You’ve been chosen to be part of the Life in Australia study: <http://src.is/LinA>. An interviewer will call to provide more info. To unsubscribe call 1800023040.*
- *You’ve been selected to be part of Life in Australia: <http://src.is/LinA>. A researcher will call to provide further info. To unsubscribe call 1800023040.*

The results indicated a preference for the terms ‘researcher’ and ‘selected’. There were some indications that inclusion of the term ‘study’ would be well received. In addition, participants noted that the term ‘unsubscribe’ was not appropriate because participants had not subscribed to anything at this point. Participants also liked

seeing a caller’s number or a name and thought that the SRC’s association with the Australian National University (ANU) added credibility, given that the SRC is a subsidiary of the ANU. The importance of mentioning the ANU is in keeping with authority as a principle of compliance with survey requests (Groves et al. 1992).

The final SMS text took these considerations into account:

The Social Research Centre at Australian National University has selected you for the Life in Australia study. We will call soon. To opt out call 1800023040.

Advance letter

In Australia, commercial list vendors can append address information to some randomly generated phone numbers (landlines and mobiles) to support the sending of presurvey letters. Based on the SRC’s experience, generally speaking, about 40–50% of randomly generated numbers can be appended with an address, and this appended address is accurate in the vast majority of cases (around 80–90%).

For this trial recruitment phase, advance letters were sent to those records for which a landline number could be matched with an address (see de Leeuw et al. [2007] on the effectiveness of advance letters in telephone surveys). The SRC followed up on the letter with a phone call. The results from our qualitative presurvey communications testing yielded several insights:

- An incentive scheme, comprising contingent incentives, should be clearly explained.
- The letter should not start by introducing the sender because participants indicated they did not really care who wrote the letter. Instead, they preferred that the letter got to the point quickly.
- It was important to say how the results would be used. This is in keeping with reciprocity as a principle of compliance (Groves et al. 1992).
- The letter should emphasise the importance of selection and the unique opportunity to participate in the study. This is in keeping with scarcity as a principle of compliance (Groves et al. 1992).
- The letter should refer to the purpose of the study.

- The inclusion of a ‘nudge message’ to appeal to potential participants seemed helpful (e.g. ‘with your help’, ‘join the many others’). The reference to joining with others is in keeping with social validation as a principle of compliance (Groves et al. 1992).

The final advance letter used is provided in Appendix A.

CATI introduction script

After a potential respondent picks up the phone, the interviewer engages them in conversation by following an introduction script. It was expected that a conversational approach would help in building trust and gaining cooperation. The initial draft wording was:

Good (morning/afternoon/evening). My name is (...) calling from the Social Research Centre, part of the Australian National University. Thanks for taking my call. How are you this (morning/afternoon/evening)?

Feedback from the participants revealed that the conversational aspect was not well received. Participants preferred an unknown caller to get to the point of the call immediately and explain how long it would take. In general, participants preferred a direct approach rather than a conversational or indirect approach to the call. On the positive side, people liked to hear the interviewer’s name and the mention of the ANU. The research indicated that ‘panel’ could be easily misunderstood; ‘study’ should be used instead.

The final wording was:

Good (morning/afternoon/evening). My name is (...) from the Social Research Centre, part of the Australian National University. This is just a quick call about an important national study called Life in Australia™.

Summary

The nine in-depth interviews and the focus group provided important insights that informed design decisions at various steps of the recruitment process. Most importantly, this presurvey qualitative communications testing helped with decisions about what aspects to include in the initial approach and how to phrase specific aspects of the approach. The results of the

communications pretesting also made it very clear that the term ‘panel’ should not be used in communication with the general public and should be replaced with ‘study’.

2.2.2 Randomised trial pilot study

As is typical for web panel recruitment, efforts can be divided into two phases (Callegaro & DiSogra 2008, DiSogra & Callegaro 2016). The first is to gain agreement from potential panellists to join the panel. The second is for these recruits to complete a panel profile questionnaire. The SRC uses the term ‘recruitment’ to refer to the initial consent stage and ‘enrolment’ to refer to the panel profiling phase. The recruitment method used a telephone interviewer to ask the respondent to join Life in Australia™.

Looking at efforts to build probability-based panels in Europe and the United States, we knew that the question about joining the panel could be positioned at the end of a recruitment interview or even at the end of a substantive survey. These approaches allow interviewers to build rapport with a respondent before asking for something that will require a continued commitment. As well, costs may be saved by piggy-backing recruitment activity with another survey. Respondents may be more likely to agree to ongoing surveys if their confidence has been gained by a good experience with an initial survey.

Cultural differences might warrant a different approach in Australia, and so an experiment was needed. In the Australian context, it seemed counterintuitive not to mention up front, at the beginning of the interview, the panel structure (i.e. multiple surveys per year) and the main reason for the call. From a practical point of view, we also needed to think about whether respondents should be asked to complete the panel profile questionnaire at the time of recruitment (i.e. at the end of the recruitment interview) or be sent further information and instructions on how to complete the profile questionnaire later.

Research questions

This experiment addressed two research questions:

- Was it better to introduce the concept of joining a panel ('study') very early in the telephone call (*ask-first*) or to build rapport first by asking questions for several minutes before introducing the concept of joining a panel (*ask-last*)?
- Was it better to ask the recruitment and profiling questions within the same telephone interview or to only ask recruitment questions over the phone and then send out material for the prospective panellists to review, so that they completed the profile questionnaire later? The first is a direct approach, which we called *immediate enrolment*, whereas the second is a less direct approach, which we called *delayed enrolment*.

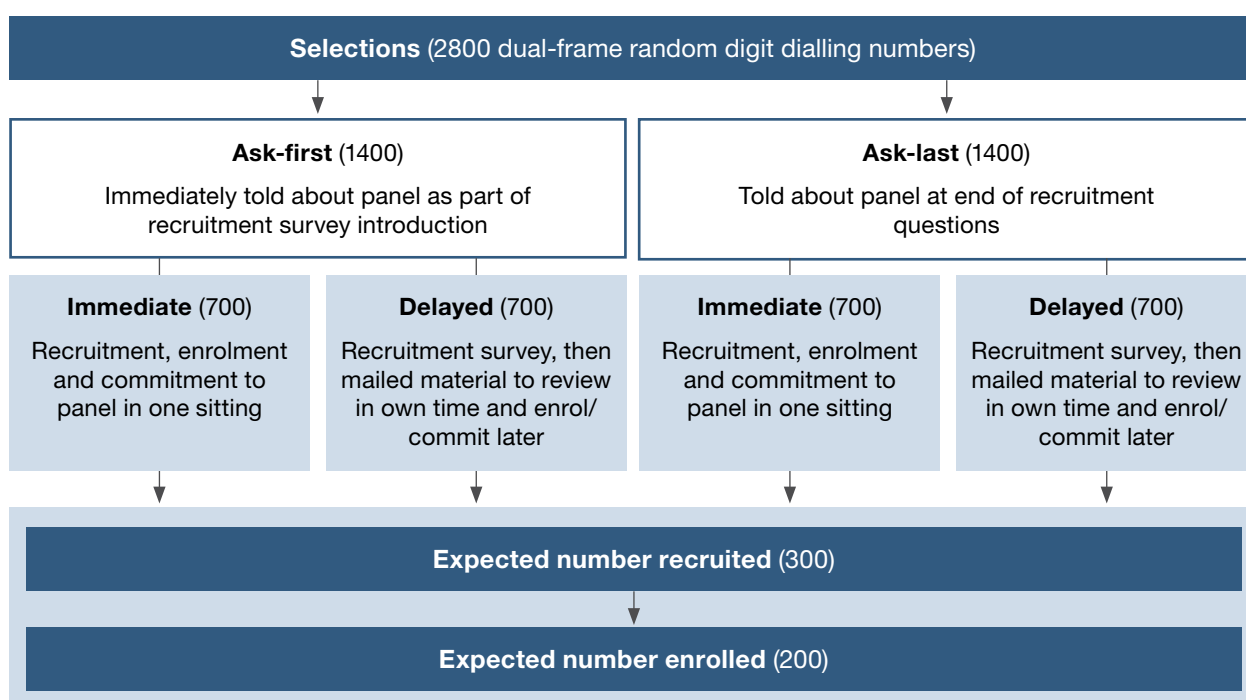
The main survey modes in which enrolment was completed were CATI for immediate enrolment and online for delayed enrolment. In the delayed enrolment condition, potential panellists completed the profile questionnaire either online or as part of a telephone follow-up. Postal reminders to addresses that could be matched to phone numbers were also used to encourage cooperation.

Experimental design

The experiment employed two factors derived from the two research questions with two conditions each, resulting in a 2 × 2 design. Figure 1 shows the random assignment of the respondents to the four conditions. We planned to initiate 2800 interviews. Half of the sampled respondents were immediately informed about the panel (*ask-first*), and the other half were informed at the end of the interview (*ask-last*). In both conditions, half the respondents were asked to enrol immediately (*immediate enrolment*) after having agreed to join the panel while still on the phone, and the other half were asked to enrol after receiving additional material in the mail (*delayed enrolment*). We expected that the study would result in about 200 people completing a profile questionnaire, thereby making them members of the panel.

Sampled phone numbers were randomly assigned to either the *ask-first* or *ask-last* condition at the time of sample preparation, as this condition affected the wording of the presurvey approach materials – that is, the *ask-last* condition sample could not be told about the ongoing nature of Life in Australia™ before their interview. The CATI script was programmed to randomly allocate sample members to one of the two enrolment conditions at the time of calling.

Figure 1 Design of the recruitment experiment



The study used a DFRDD approach with a 60% mobile – 40% landline blend. Within a household, the next/last birthday method was used. For the mobile phone sample, the person reached on the phone was considered the target person, provided they were aged 18 years or over. The mobile phone sample received a pre-notification text message (see Appendix B).

We used a commercial list vendor to match landline numbers with postal addresses. Matched addresses were mailed an advance letter (see Appendix A).

An extended call routine was used to minimise nonresponse due to noncontacts: interviewers would leave a prerecorded message when they encountered an answering machine/voicemail, and a second SMS was sent after five consecutive noncontacts.

Respondents were told they would receive an incentive of \$10 on completion of the telephone interview (\$20 for immediate enrolment) and an additional \$10 for completing the profile questionnaire. In the delayed enrolment condition, respondents received several reminders via email, telephone calls and mail.

The duration of the recruitment interview was quite short, with a median interview duration of 7.8 minutes (excluding the profiling questionnaire).

Fieldwork and interviewing

The task of recruiting (and enrolling) panellists relied heavily on the persuasive powers of our interviewers. It was quite challenging for that reason and because of the need to administer the different trial conditions (ask-first/ask-last and immediate/delayed enrolment).

For most of the recruitment period in the pilot study, interviewers were allocated to either the immediate or delayed enrolment condition, so they did not have to swap conditions from one call to another. Towards the end of the recruitment period, interviewers began calling in both conditions because there were only a small number of calls to be made and only a small number of interviewers allocated to the project.

Although splitting the interviewing team into immediate and delayed enrolment was helpful, the ask-first/ask-last condition was the harder

of the conditions to implement when talking to respondents, because interviewers were restricted in what they could tell respondents at the beginning of the ask-last trial condition. As a result, avoiding refusals was difficult, particularly at the start of fieldwork before interviewers were familiar with the questionnaire.

Results

The target for the randomised trial pilot study was to achieve 300 recruited respondents and finish with 200 enrolled panellists. At the conclusion of the experiment, 280 panellists had been successfully enrolled, representing 10% of the initiated sample. (These panellists are part of Life in Australia™.)

The most important criterion for assessing the outcome of the experimental conditions was whether a respondent had enrolled and thus became a panel member. Nevertheless, there were earlier selection steps in the process.

The first step was an in-principle agreement to participate in Life in Australia™, measured by the recruitment rate. The ask-last – delayed enrolment condition had the highest recruitment rate, at 20.3%, while the ask-first – immediate enrolment condition had the lowest recruitment rate, at 14.7% (see Table 2 for outcome rates and Box 2 for definitions of the metrics).

However, we see a different picture when looking at the net result of whether respondents enrolled, measured by the profile rate. Profile rates were highest for the ask-first – immediate enrolment condition, at 87.5%, and lowest for the ask-last – delayed enrolment condition, at 66.3%.

The yield across recruitment and enrolment phases (i.e. recruitment rate × profile rate) did not differ significantly across conditions.

We see that the ask-last – delayed enrolment condition performed best in terms of recruitment rate but had a poorer conversion of recruits into enrolled panel members than the ask-first – delayed enrolment condition. A possible explanation is that people might have agreed to accept the materials as the path of least resistance when they were asked to join Life in Australia™ at the end of the recruitment interview. The ask-first – immediate enrolment condition

Table 2 Outcomes of the experiment

Outcome	Ask-first – immediate enrolment (A)	Ask-first – delayed enrolment (B)	Ask-last – immediate enrolment (C)	Ask-last – delayed enrolment (D)	Total trial
Sample size	701	705	704	705	2817
Number recruited	80	97	79	104	360
Number enrolled	70	78	63	69	280
RECR (%) ^a	14.8 ^D	17.5	15.6 ^D	20.3 ^{AC}	17.0
PROR (%)	87.5 ^D	80.4 ^{CD}	79.7 ^D	66.3 ^{AB}	77.8
RECR × PROR (%)	13.0	14.0	12.4	13.5	13.2
RETR (wave 16) (%)	88.6	92.3	93.7	92.8	91.8
COMR (wave 16) (%)	72.6	80.6	81.4	76.6	77.8
CUMRR2 (wave 16) (%)	8.3	10.4	9.5	9.6	9.5
Offline panellists (%) ^b	14.3	23.1	20.6	23.2	20.4
Cost per enrolled panellist (\$) ^c	54.65	54.35	61.15	62.37	57.93

a Superscripts A, B, C and D indicate a significant difference in outcome rates at the $P \leq 0.05$ level compared with the corresponding column. Tests of proportions are used. For RECR, RECR × PROR and CUMRR2, the sample size is treated as the amount of sample used.

b Offline panellist percentage is status at enrolment.

c Costs per enrolled panellist were calculated based on project costs divided by the number of respondents for each condition. The total costs include components that can be linked to each condition separately (e.g. interview time used to call respondents) and global costs that are either equal in each condition (e.g. costs to match landlines to addresses) or cannot be separated (e.g. printing of information material).

Note: See Box 2 for details of outcome rates.

had a strong conversion of recruits into enrolled panel members because most, but not all, respondents were happy to complete recruitment and enrolment in one sitting.

The best performing condition, taking into account both recruitment rate and profile rate (RECR × PROR), was ask-first – delayed enrolment. Here, the concept of the panel was introduced early in the call, and, to enrol, the recruit had to make a conscious, considered decision to join the panel, after reviewing the supporting materials mailed out to them. The ask-first conditions were also more cost-effective than the ask-last conditions, because less interview time was needed before a decision to join the panel was made.

Because the panel has been running since December 2016, we can evaluate the continued effect of the recruitment conditions up to the

time of the first panel replenishment. The results can be summed up by looking at wave 16, which was about 18 months after recruitment.³ At this stage, the ask-first – delayed enrolment condition continued to perform the best, with a cumulative response rate (CUMRR2; see Box 2 for details) of 10.4%. The worst performing condition in wave 16 was ask-first – immediate enrolment, with a CUMRR2 of 8.3%, a product of poor retention and completion rates. (However, these differences in CUMRR2 were not significant.) The ask-first – delayed enrolment condition had the highest cumulative response rate in all but one wave. The ask-last – delayed enrolment condition usually had the second highest cumulative response rate; the ask-last – immediate enrolment condition overall performed second worst, and the ask-first – immediate enrolment condition performed worst overall.

Box 2 Response metrics for online panels

Callegaro and DiSogra (2008) provide standard definitions of outcome rates for online panels:

- The recruitment rate (RECR) is the rate at which people invited to join the panel initially agree to participate.
- The profile rate (PROR) is the rate at which people initially invited to join the panel complete the panellist profile. Completing the profile is an essential part of joining online panels. Those who complete the panellist profile make up the panel membership.
- The retention rate (RETR) is the proportion of the original panellists who remain on the panel at the time the sample for a specific wave of data collection is drawn.
- The completion rate (COMR) is the proportion of panellists invited to participate in a specific wave who complete that wave's questionnaire.
- The cumulative response rate (CUMRR) is the overall response rate as the product of the various stages at which nonresponse occurs. There are two versions of CUMRR
 - Cumulative response rate 1 (CUMRR1) does not include the retention rate.
$$\text{CUMRR1} = \text{RECR} \times \text{PROR} \times \text{COMR}$$
 - Cumulative response rate 2 (CUMRR2) takes panel retention into account.
$$\text{CUMRR2} = \text{RECR} \times \text{PROR} \times \text{RETR} \times \text{COMR}$$

Summary

One of the benefits of the randomised trial is that we can compare data quality indicators with costs. The best performing approach in panel recruitment seems to be to communicate clearly to the respondents about the reason for the call at the beginning of the interview, ask the recruitment question and allow enrolment later on. This approach also has the benefit of having the lowest cost for implementation.

An additional benefit of this study is that we can look at panel retention after 16 waves of survey invitations. Here, ask-first – delayed enrolment is still the superior condition. The benefit associated with asking the recruitment question at the beginning is a surprising result in that it contrasts with the approach used in some other countries of starting with a single interview and then asking respondents at the end to join a panel for more surveys.

3 Main recruitment

The exploratory research described in Section 2 informed several design decisions for the main recruitment effort.

As of May 2018, Life in Australia™ had completed 16 waves of data collection (at approximately monthly intervals). It reached 2107 completes among 2886 invited for the wave 16 questionnaire. As the first panel replenishment took place after wave 16, we only report on waves fielded on the original panel.

In this section, we describe the methodology of recruitment for the main study, and give some details about ongoing data collection and outcome rates of the study. Additional experiments and activities to improve the quality of the panel are not described here.⁴

3.1 Sample design

Life in Australia™ is designed to represent adults aged 18 and above who are resident in Australia, not including Australian external territories. Interviews are conducted in English. For the main phase of recruitment, we used a DFRDD approach with a blend of 30% landline and 70% mobile numbers to recruit participants. The company that provided the frame, SamplePages, uses both automatic number checks without dialling as part of telephony signalling protocols (Signalling System No. 7 for landline numbers and Home Location Register for mobile numbers) and checks that make use of dialling phone numbers (Korbel 2012). SamplePages estimates an error of about 1% for working phone numbers misclassified as nonworking (false negatives) and 5% for nonworking phone numbers misclassified as working (false positives). In addition, we matched the landline sample only with the address information provided by Sensis's Macromatch service to provide addresses for the advance letters. The match rate of landline records to an address was 29.4% (2530/8595). In total, approximately 9% of sampled phone numbers (landline and mobile) were sent an advance letter.

Undercoverage consists of the part of the population that cannot be reached by telephone. About 2.0% of Australian adults aged 18 and over do not have access to a telephone (ABS 2019). Taking account of the 1% false negative rate and 2.0% of adults without access to a telephone, undercoverage is estimated to be 3.0%.

Whether to classify the fact that Life in Australia™ does not include non-English speakers as nonresponse or out of scope is not clear cut. Language problems – where no-one in the household at the time the interviewer makes contact or the selected respondent does not speak a language in which the interview is to be conducted – are counted as eligible non-interviews by the American Association for Public Opinion Research (AAPOR 2016:16) for the purpose of calculating outcome rates. However, the same source notes that language problem cases can be counted as not eligible if the survey is defined as only covering those who speak certain languages (AAPOR 2016:17). For some research questions, the target population can be defined as English speaking, in which case non-English speakers would be classified as out of scope and thus not contribute to nonresponse. However, because Life in Australia™ does not have a predefined limitation on possible research questions, the SRC treats language barriers as nonresponse. It also could be argued that coverage refers to the properties of sampling frames, and non-English speakers are, indeed, covered in DFRDD. In any case, what is essential is transparency regarding language of interview and its implications for survey error.

The 2016 Census put the proportion of adults who self-reported that they do not speak English at least 'well' at 3.7% (ABS 2016b). If one considers the exclusion of non-English speakers to be coverage error, undercoverage is estimated to be 8.9%.

3.2 Fieldwork procedures

Life in Australia™ includes respondents from the trial pilot study and the main recruitment effort. Recruitment took place from 25 August to 21 September 2016 for the pilot study and from 11 October to 6 December 2016 for the main study. Because of the special nature of the study, an extended interviewer briefing was held to fully explain the project and the various aspects of the recruitment method. Interviewers were reminded of the importance of collecting reliable contact information, which was vital for recontacting respondents for the reminder cycle and for future surveys.

An advance letter was sent to all address-matched landline numbers (see Appendix A). The letter contained the SRC and ANU logos, introduced the Life in Australia™ study, encouraged participation, and provided sample members with phone numbers, email addresses and website details to help them resolve queries. In the main recruitment phase, 29% of the sample were sent the advance letter. Similarly, an advance SMS was sent to all mobile numbers informing recipients that they were going to be contacted for the research and offering them a way to opt out. The content of the message was:

The Social Research Centre at Australian National University has selected you for the Life in Australia study. We will call soon. To opt out call 1800 023 040.

To try to establish contact with sample members, mobile phone numbers were called up to four times and landlines up to six times. If contact with a person was made, an additional two call attempts were made to secure the interview, when necessary. Calls were made 7 days a week, and call times took into account the different time zones across Australia. A message was left on answering machines if no previous interviewer contact had been made with a household. A maximum of two messages were left at landline numbers and one on mobile numbers. The messages were prerecorded and activated by interviewers when required.

The within-household selection procedure used when dialling landline numbers was the next/last birthday method, with an equal probability for each method. Mobile numbers did not use a

selection procedure because the devices were treated as personal use devices, meaning that the person who answered the call was selected, provided that they were aged 18 years or over.

In contrast to the approach used in several panels in Europe and the United States, the recruitment request was made at the beginning of the first telephone interview, not the end. The ask-first approach to recruitment was strongly favoured by interviewers because it was more forthright and transparent than the ask-last approach and meant that interviewers could describe the virtues of panel membership when trying to gain cooperation from sample members. The use of the ask-first approach was also consistent with the findings from presurvey communications testing, which showed a preference among study participants to quickly get to the reason for the contact attempt.

Respondents were given the option of enrolling in the study during the interview (immediate enrolment) or completing enrolment after receiving further information about Life in Australia™ and contact details for the SRC should they require additional support (delayed enrolment). This flexible strategy appears to have worked well, given that yield from recruitment and enrolment (i.e. RECR × PROR – see Box 2 for explanations) was higher for the main recruitment effort than under any of the four trial conditions (see Table 3 for outcome rates for recruitment).

The median length of completed recruitment interviews was 4.9 minutes for respondents who opted to delay the decision to join the panel and 15.5 minutes for respondents who enrolled as part of the interview and completed the profile questions on the phone.

People who did not go on to complete the enrolment questionnaire after they were sent the invitation (43.3%) received a series of reminders. Recruitment was supported by a broad range of communications measures, such as a website, a toll-free support number for incoming calls to complete the enrolment procedure or to answer any questions, and an email address.

As part of the recruitment interview, respondents qualified to receive a \$10 incentive for completing the interview and an additional \$10 for enrolling in the main study. Incentives were available in the

Table 3 Outcomes of enrolment by sample frame

Outcome	Landline	Mobile	Total	Total (excluding trial)
Sample size	9 730	20 937	30 667	27 852
Number recruited	1 065	3 209	4 274	3 914
Number enrolled	911	2 411	3 322	3 042
RECR (%)	17.1	22.7	21.1	21.6
PROR (%)	85.5	75.1	77.7	77.7
RECR × PROR (%)	14.6	17.0	16.4	16.8
RETR (wave 16) (%)	87.3	86.5	86.7	86.3
COMR (wave 16) (%)	80.0	70.4	73.0	72.5
CUMRR2 (wave 16) (%)	10.2	10.4	10.4	10.5
Offline panellists (%) ^a	21.2	9.9	13.0	12.3

a Offline panellist percentage is status at enrolment.

Note: See Box 2 for details of outcome rates.

form of gift cards that could be either mailed or sent via email, as a PayPal payment.⁵ Respondents could choose to have their incentive payment donated to one of the following charities: UNHCR (United Nations High Commissioner for Refugees) Australia, CanTeen (focused on teens with cancer), the Australian Wildlife Conservancy or White Ribbon (focused on preventing domestic violence).

3.3 Results

In this section, we describe the response metrics for recruitment to the main study and the subsequent mixed-mode surveys. Altogether, 8.4% of Life in Australia™ panellists were recruited via the trial pilot study, and the remainder were recruited in the main recruitment effort.

The results of the main recruitment phase are shown in Table 3, together with outcome rates as of May 2018 (wave 16).

To put the numbers into context, Appendix C summarises the different outcome rates for various panels.

3.3.1 Recruitment

The total recruitment rate was 21.1% (21.6% excluding the trial). Since interviews were

conducted only in English, language problems contributed to nonresponse; see, however, the discussion in Section 3.1 of whether this is best treated as nonresponse or out of scope. The 2016 Census put the proportion of adults who self-reported that they only spoke English or spoke English ‘very well’ at 89.4%, while another 6.9% self-reported speaking English ‘well’ (ABS 2016b).

To include the offline population, respondents without internet access or unwilling to complete online questionnaires could complete surveys via telephone. The offline population stood at 12.0% after recruitment and at 13.4% of those invited to complete wave 16. The increasing offline proportion is a product of both lower attrition of panellists who started offline and the shifting of panellists from the online to the offline mode (CATI). Of panellists who started with the online mode, 79.8% were invited to complete wave 16, compared with 84.7% who started with the offline mode. With respect to shifting modes, 64 panellists (1.9% of all panellists) shifted from the online to the offline mode, compared with 25 (0.8% of all panellists) who shifted from the offline to the online mode. Most shifts from online to offline mode are thought to be due to panellist preference, rather than a change in their internet access.

3.3.2 Enrolment

Completing the recruitment interview does not mean that respondents agreed to join the panel. To join Life in Australia™, respondents had to complete a profile questionnaire. The profile rate was 77.7%.

3.3.3 Attrition

Attrition from the panel has been low; the retention rate was 86.7% at wave 16.

3.3.4 Completion rates

Completion rates have remained high across waves: 78.8% for wave 1 and 73.0% for wave 16.

3.3.5 Cumulative response rates

The CUMRR2 of Life in Australia™ of 10.4% puts it below European panels with face-to-face recruitment (GESIS – 19.5%, German Internet Panel – 14.3%, NatGen Panel – 14.0%), roughly equal to the only United States panel recruited face to face (AmeriSpeak – 10.9%) and above other United States panels (American Trends Panel – 3.7%, KnowledgePanel – 1.1%).

3.4 Enrolment weights

To ensure that Life in Australia™ is as representative as possible of the population of Australian adults, enrolment weights were calculated for each panellist. Weighting took place in two steps. First, a design weight was calculated, based on the chance of selection into Life in Australia™. Second, the base weights were calibrated so that the final sample as a whole matched demographic benchmarks. Every panel member has these weights, regardless of whether they complete the questionnaire in a specific wave; we discuss wave-specific weights in Section 4.

3.4.1 Design weights

The design weight accounts for the difference in probability of each respondent participating in the survey. Each respondent's weight is the inverse of their probability of selection.

For DFRDD samples, the chance of selection (p_i) is calculated using the following formula for the i th respondent (where where $i = 1, 2, \dots, n$):

$$p_i = \frac{S_{LL} LL}{U_{LL} AD_{LL}} + \frac{S_{MP} MP}{U_{MP}}$$

where

S_{LL} is the number of survey respondents contacted by landline

U_{LL} is the population of landline numbers (estimated as 6 376 633)

LL indicates the presence of a landline telephone (0 for no, 1 for yes)

AD_{LL} is the number of in-scope adults in the respondent's household

S_{MP} is the number of survey respondents contacted by mobile

U_{MP} is the population of mobile numbers (estimated as 17 039 761)

MP indicates the presence of a mobile phone (0 for no, 1 for yes)

The design weight (wt_i) of the i th case is therefore calculated as

$$wt_i = 1/p_i$$

3.4.2 Post-stratification weights

Raking (also known as 'rim weighting' or 'iterative proportional fitting') was used to adjust the weights. Through a process of iteration, this method ensures that weights simultaneously match the population proportions of several demographic variables.

The design weights were raked to benchmarks for:

- phone use (mobile only, landline only, dual user)
- age × education (18–24, 25–34 with university degree, 25–34 without university degree, 35–44 with university degree, 35–44 without university degree, 45–54 with university degree, 45–54 without university degree, 55–64 with university degree, 55–64 without university degree, 65–74 with university degree, 65–74 without university degree, 75+ with university degree, 75+ without university degree)

- sex (female, male)
- internet use (internet user, not internet user).

See Table 4 for details on benchmarks.

3.4.3 Final enrolment weight

These two weights (the design weight and the post-stratification weight, wt_2) make up the enrolment weight (wt_3):

$$wt_{3i} = wt_{1i} \times wt_{2i}$$

4 Operation of Life in Australia™

Having described how Life in Australia™ was built, we now describe various features of the operation of the panel.

4.1 Fieldwork procedures

Keeping attrition rates (i.e. panel members dropping out or being dropped) low and completion rates (i.e. the rate that questionnaires are completed by panel members) as high as possible are important goals in an ongoing panel. The issue here are panel members who become inactive by failing to complete questionnaires or withdraw from Life in Australia™.

4.1.1 Frequency of surveys

One aspect of our strategy has been to conduct surveys about once per month. The aim is to have surveys conducted frequently enough to keep the panellists engaged but not so frequently that they become fatigued. The monthly cadence also benefits project management for staff at the SRC.

4.1.2 Contacts

To ensure high completion rates, an extensive set of reminder strategies has been implemented. The description of the first online survey (wave 1) exemplifies the procedure. Reminders were sent using a multimode approach involving email, SMS (where mobile number was available) and telephone calls. For the online part of the panel, the wave 1 schedule was:

- invitation (email and SMS), 1 December 2016
- reminder 1 (email), 6 December 2016
- reminder 2 (email), 8 December 2016
- reminder 3 (SMS), 12 December 2016
- reminder 4 (CATI), 12 December 2016
- reminder 5 (email), 19 December 2016
- survey closed, 22 December 2016.

For the offline part of the panel, the wave 1 schedule was:

- invitation (SMS), 1 December 2016
- calls begin (non-SMS), 1 December 2016
- calls begin (SMS), 2 December 2016
- reminder (SMS), 9 December 2016
- calls end, 18 December 2016.

A four-call design with a maximum of six attempts was used for offline landline panel members. A six-call design with a maximum of eight attempts was used for offline mobile panel members.

4.1.3 Incentives

Continued payment of incentives supports our goal of keeping panellists engaged. Incentives of \$10 per wave are paid; respondents have a similar choice of incentive types to the recruitment and enrolment phases. During the first 16 waves, an average of 32.9% of respondents donated their incentives to charity and 0.8% opted for no incentive; the remaining panellists chose to receive the incentive themselves.

4.1.4 Panel maintenance

Finally, we deploy 'panel maintenance' activities to ensure that active panellists feel appreciated, out-of-date contact information is updated and we remain in touch with nonrespondents. After each wave, panellists who responded to the wave are thanked via email (where an email address is available) or letter (where no email address is available). For those who choose to donate their incentive to charity, the message confirms that the donation has been made and provides the total amount donated to charity so far. Nonrespondents to each wave are also sent a message after each wave via either email or letter: those who refused to participate are thanked for letting us know that they were unable to take part; those who could not be reached are told that we will be in touch; and those with a bad phone number are asked to update their contact details.

4.2 Wave weighting

To ensure that results from each wave are as representative as possible of the population of Australian adults, wave-specific weights are calculated. Weighting takes place in three steps, using the panel weights described in Section 3.3 as a starting point. These steps are described below.

4.2.1 Response propensity adjustment

Propensity weights are calculated as the inverse of the predicted probability of panellists taking part in each wave (response propensity). Response propensity is estimated using a logistic regression model to predict whether a panellist would respond to the survey, based on enrolment information available for both respondents and nonrespondents to a particular wave. Although the variables included in the final response propensity model differ somewhat across waves, the variables included in the wave 1 propensity model exemplify the procedures used:

- sex × age group
- state × Australian Statistical Geography Standard remoteness structure classification
- education × age group
- sample type (online or offline)
- country of birth
- telephone use (landline only, mobile only, dual user)
- internet use
- number of landlines
- whether the respondent had a mobile phone.

Predicted probabilities for panellists were used to create five classes of response probabilities. The inverse of each class probability (p_c) was used as the propensity weight, which, when multiplied by the enrolment weight, yielded base weights for the wave. The response propensity weight (wt_{4c}) of the c th class (where $c = 1, 2, \dots, C$) is therefore

$$wt_{4c} = 1/p_{2c}$$

4.2.2 Adjustment to population benchmarks

To ensure that estimates made from each wave are representative of Australians aged 18 years or older, the base weights (i.e. $wt_{3i} \times wt_{4c}$) are raked to match external benchmarks. As with the response propensity adjustment, there was some variation in the variables included in different waves. Table 4 shows the benchmarks used in wave 1. Where the raking adjustment for the i th case is (wt_{5i}), the final weight for a wave is (wt_{6i}) therefore

$$wt_{6i} = wt_{3i} \times wt_{4c} \times wt_{5i}$$

4.2.3 Trimming

It is common for surveys to have a small number of influential cases with extreme weights. These cases lead to a high degree of sampling error, reducing the precision of survey estimates. Weight trimming enforces a maximum and sometimes a minimum value on weights, reducing the sampling error caused by extreme weight values (Potter 1988, 1990). In each wave, the SRC statisticians evaluate the impact of weight trimming on weighting efficiency; the final weights are trimmed in most waves.

4.3 Research topics

Life in Australia™ has been used to collect data on a variety of topics between December 2016 and June 2018, summarised in Table 5.

Table 4 Variables used for weighting of population parameters

Demographic characteristic	Category	%
State or territory ^a	ACT	1.6
	NSW	32.1
	NT	1.0
	Qld	19.8
	SA	7.2
	Tas	2.2
	Vic	25.3
	WA	10.8
Sex ^a	Male	49.3
	Female	50.7
Telephone status ^b	Mobile only	31.0
	Landline only	7.6
	Dual user	61.4
Home internet use ^c	Internet user	84.5
	Did not use internet	15.5
Age × education ^d	18–24 years	12.3
	25–34 years with university degree	6.5
	25–34 years without university degree	12.5
	35–44 years with university degree	5.0
	35–44 years without university degree	12.5
	45–54 years with university degree	3.8
	45–54 years without university degree	13.1
	55–64 years with university degree	2.8
	55–64 years without university degree	12.0
	65–74 years with university degree	1.4
	65–74 years without university degree	9.5
	75+ years with university degree	0.6
	75+ years without university degree	7.8

Sources:

a ABS (2016c)

b ACMA (2016)

c ABS (2016a)

d ABS (2011)

Table 5 Waves and topics

Wave	Primary sponsor	Primary topic (reference)	Field period
1	ANU	Australian Personas Survey (Hanna et al. 2017)	1–22 December 2016
2	SRC	Health, Wellbeing and Technology Survey (Pennay et al. 2018a)	16 January – 6 February 2017
3	ANU	ANUPoll 24: Attitudes to Housing Affordability (Sheppard et al. 2017)	6–27 March 2017
4	Amaze	Community Awareness and Attitudes towards Autism (Jones et al. 2018)	10–30 April 2017
5a	Office of the eSafety Commissioner	National Survey of Image-Based Abuse (Office of the eSafety Commissioner 2017)	4–21 May 2017
5b ^a	ACMA	Annual Consumer Survey 2017 (ACMA 2017)	16 May – 4 June 2017
7	ANU	Omnibus survey (no reference)	4–24 July 2017
8	Victorian Department of Education and Training	Early childhood education and care research (no reference)	22–31 August 2017
9	A nonprofit organisation ^b	Health-related research (no reference)	4–25 September 2017
10	ANU	ANUPoll 25: Job Security and the Future of Work (Sheppard et al. 2018a)	16 October – 5 November 2017
11	SRC	Historical Events Survey (Pennay et al. 2018b)	15 November – 3 December 2017
12	A nonprofit ^b organisation	Health-related research (no reference)	22 January – 11 February 2018
13	Lowy Institute	Lowy Institute Poll 2018 (Oliver 2018)	5–19 March 2018
14	ANU	Australian Values Survey (Sheppard et al. 2018b)	4–16 April 2018
15	An academic institution ^b	Health-related research (no reference)	24 April – 6 May 2018
16	ACMA	Annual Consumer Survey 2018 (ACMA 2019)	14–27 May 2018

ACMA = Australian Communications and Media Authority; ANU = Australian National University; SRC = Social Research Centre

a There was no wave 6.

b Results not publicly released with attribution to Life in Australia™; sponsorship and topic held confidential.

5 Assessing performance

In this section, we consider the performance of Life in Australia™ using two approaches. The first approach is to compare the estimates for key variables in the panel with benchmark values from authoritative sources such as official statistics. The second approach is to compare survey estimates generated from Life in Australia™ with those obtained when the same questionnaire is administered to different probability and nonprobability samples. The first approach allows profound insight into the total error of estimates, and the second approach is a reality check against other data collection options.

The SRC conducted the OPBS to determine the accuracy of survey estimates derived from different probability and nonprobability sampling approaches relative to each other and relative to independent population benchmarks (Pennay et al. 2018a). Repeating this study on Life in Australia™ provided another point of comparison.

The SRC administered the questionnaire used for the OPBS, conducted between October and December 2015, to wave 2 of Life in Australia™. This replication study was conducted in January and February 2017. All active panel members at that time were invited to take part in the survey. Key project statistics are summarised in Table 6.

Following the analytical approach of Pennay et al. (2018a), we show the performance of Life in Australia™ compared with other probability and nonprobability surveys for key demographic

variables (Table 7) and substantive variables (Table 8). The OPBS samples were reweighted to follow the standard Life in Australia™ weighting approach (see Section 4.2), to ensure comparability across all nine samples.

The main metric used to measure bias is average absolute error (*AAE*), as used by Yeager et al. (2011) and others. This is a measure of the mean of absolute percentage point errors across variables for which independent benchmarks are available:

$$AAE = \sum_{j=1}^k |\hat{y}_j - y_j| / k$$

where

\hat{y}_j is the j th ($j = 1, 2, \dots, k$) estimate from Life in Australia™

y_j is the value of the j th benchmark.

The comparison surveys were the following, as described in Pennay et al. (2018a):

- A standalone DFRDD telephone survey fielded on 30 November 2015 to 18 December 2015, with 50% of interviews completed via the landline frame and 50% via the mobile frame ($n = 601$). For the landline frame, 15 probability proportional-to-size geographic strata were established, based on the distribution of adults between capital cities and other cities; the Australian Capital Territory was treated as a single stratum. For the landline sample,

Table 6 Key statistics from the Health, Wellbeing and Technology Survey (OPBS replication)

Statistic	Online panel members	Offline panel members	Total
Number invited to undertake complete survey	2841	442	3283
Total interviews achieved	2228	352	2580
Completion rate (COMR) (%)	79.6	78.4	78.6
Main fieldwork start date	16 January 2017	16 January 2017	16 January 2017
Main fieldwork finish date	6 February 2017	6 February 2017	6 February 2017

when there were two or more in-scope people in a household, the person with either the next birthday or the most recent birthday was randomly selected (see Gaziano 2005). A single national stratum was used for the mobile frame.

- An address-based sample fielded on 6 November 2015 to 18 December 2015 ($n = 538$). The sampling frame used for this survey was the Geocoded National Address File (G-NAF), and questionnaires were mailed. G-NAF is maintained by PSMA Australia (formerly the Public Sector Mapping Authority) and is the authoritative national address index for Australia. The sample was selected from the G-NAF database using a stratified sample design in accordance with the distribution of the Australian residential population aged 18 years and above across the 15 geographic strata described for the landline sample above. To accommodate situations in which more than one person in a household was in-scope, the printed instructions on the questionnaire asked for the person aged 18 years or over with either the next birthday or the most recent birthday (alternating) to complete the questionnaire.
- The October 2015 ANUPoll, fielded on 19 October 2015 to 11 December 2015 ($n = 560$). Participants in this survey were recruited at the end of the ANUPoll, a DFRDD survey with a 60:40 split between landline and mobile phone interviews. The sampling scheme was otherwise identical to that described for the standalone DFRDD telephone survey. For landline households with two or more in-scope people, the 'next birthday' method was used to select the person invited to participate. Respondents who completed the ANUPoll, which explored attitudes to ageing and money, were invited to take part in 'a future survey about health and wellbeing'. Those who agreed to participate in the subsequent survey provided contact details; out of 1200 respondents who completed the survey, 693 agreed to be recontacted. Depending on their preferences, these individuals were either emailed a link to complete the survey online or sent a hard-copy questionnaire to return via the mail.
- We asked the nonprobability panel providers to conduct a 'nationally representative' survey of 600 respondents from their respective panels, fielded in November and December 2015 (exact field dates varied by panel). We did not provide instructions on how this task should be carried out. Four of the five panel providers moved the questions on age, sex and place of residence to the beginning of the questionnaire and used these as screening questions, even though these data (along with a great deal of other demographic, nondemographic, psychographic and other data) had already been collected as part of the initial recruitment and profiling activities undertaken to construct the panels. These screening questions allowed the imposition of age, sex and geographic quotas, so that the sample reflected the distribution of these characteristics in the Australian adult population. The remaining provider designed its sample to be an 'Australian Bureau of Statistics representative' sample and applied quotas to the online survey, allowing for $\pm 5\%$ variation in the number of respondents per quota group. To determine how much sample to draw, this panel provider assumed a within-panel 20% response rate (based on average response rates for similar surveys). All online panel providers used in this study approached panel members via an email to their personal address. Other methods of invitation included SMS, emails to panel members' panel accounts and social media. Sample sizes for panels were 601 (panel 1), 600 (panel 2), 626 (panel 3), 630 (panel 4) and 601 (panel 5).

As discussed by Pennay et al. (2018a), probability and nonprobability surveys generally perform similarly with respect to the measurement of secondary demographics. The average absolute error achieved by Life in Australia™ is consistent with these findings, being less than 1 percentage point away from the lowest absolute average error and less than 1.5 percentage points away from the highest absolute average error.

With respect to the substantive measures, Life in Australia™ is considerably more accurate than all nonprobability panels and slightly more accurate than the other probability surveys: the three initial probability surveys used in the OPBS were on

average 4.8 percentage points more accurate than nonprobability surveys, whereas Life in Australia™ is on average 4 percentage points more accurate than the nonprobability surveys.

Overall, when substantive and secondary measures are combined, Life in Australia™ is the least biased of the nine surveys (see Table 9). Notwithstanding some of the limitations of these comparisons – such as different reference periods for the nine samples, a much larger sample size than for comparison surveys, a different weighting scheme and the limited range of benchmark measures – these results are consistent with the expectations of superior accuracy of the probability panel compared with the nonprobability online panels. The benchmarking results support the use of Life in Australia™ as a potential reference sample and a superior source for collection of data for social research purposes.

Table 7 Benchmark values and errors for secondary demographics

Secondary demographic	Benchmark value	Error for probability surveys (percentage points)					Error for nonprobability surveys (percentage points)				
		DFRDD	A-BS	ANUPoll	Life in Australia™	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5	
Australian citizen	83.93	2.67	8.07	2.63	5.70	7.88	4.12	7.11	6.83	9.02	
Couple with dependent children	38.35	-10.45	-10.15	-11.38	-10.55	-15.22	-14.38	-13.73	-12.89	-10.23	
Currently employed	59.39	9.95	5.20	7.04	3.07	-10.25	-6.06	-6.28	-8.39	-10.35	
Enrolled to vote	78.47	4.59	10.21	4.55	8.48	6.47	1.70	7.11	6.28	10.74	
Home ownership with a mortgage	29.61	4.14	10.35	7.79	-0.07	-1.05	1.31	0.80	0.30	-1.61	
Not Indigenous	98.10	0.66	0.30	0.32	-0.83	-0.20	-1.61	0.00	0.17	0.73	
Language other than English (speak only English)	75.72	9.73	4.66	8.75	6.13	9.38	9.66	11.81	9.03	9.58	
Living at last address 5 years ago	54.80	7.30	-0.11	3.65	3.36	4.99	3.32	7.00	8.86	11.10	
Most disadvantaged quintile for area-based SES	20.00	-6.24	-4.92	-9.73	-6.01	-3.03	-5.25	-5.15	-5.48	-5.86	
Resident of a major city	70.22	-1.19	2.69	-0.46	-0.88	2.93	-0.34	-1.91	2.41	1.59	
Voluntary work (none)	74.22	-11.57	-11.24	-11.66	-11.72	0.29	2.92	-2.76	-4.36	-3.57	
Wage and salary income \$1000-1249 per week	13.80	-2.02	-0.99	1.24	-2.71	-4.07	-1.03	-0.84	2.13	-0.90	
Average absolute error		5.88	5.74	5.77	4.96	5.48	4.31	5.38	5.59	6.27	

A-BS = address-based sample; DFRDD = dual-frame random digit dialling; SES = socioeconomic status

Notes:

1. Modal category of variable is shown.
2. See Appendix D for sources of benchmark measures.

Table 8 Benchmark values and errors for substantive measures

Substantive variable	Benchmark value	Error for probability surveys (percentage points)					Error for nonprobability surveys (percentage points)				
		DFRDD	A-BS	ANUPoll	Life in Australia™	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5	
Consumed alcohol in last 12 months	81.87	4.00	3.60	2.87	1.50	-2.39	-5.26	-3.89	-4.21	-1.50	
Daily smoker	13.52	1.60	-4.16	3.51	-0.43	9.81	6.69	3.89	2.67	4.32	
General health status (very good)	36.20	-2.65	0.35	-2.00	-4.77	-4.14	-5.84	-5.31	-4.96	1.53	
Life satisfaction (8 out of 10)	32.60	1.90	-2.02	-2.00	-2.06	-11.93	-11.57	-4.49	-9.22	-7.88	
Has private health insurance	57.10	3.25	3.38	1.95	0.07	-8.88	-12.51	-3.68	-0.64	-2.56	
Psychological distress (low) ^a	82.20	-8.08	-10.59	-11.57	-18.82	-25.86	-23.52	-22.20	-24.96	-23.20	
Average absolute error		3.58	4.02	3.98	4.61	10.5	10.9	7.24	7.78	6.83	

A-BS = address-based sample; DFRDD = dual-frame random digit dialling

^a Kessler 6 (ABS 2012)

Notes:

1. Modal category of variable is shown.

2. See Appendix D for sources of benchmark measures.

Table 9 Summary of absolute average error

Variable	Average absolute error, probability surveys					Average absolute error, nonprobability surveys				
	DFRDD	A-BS	ANUPoll	Life in Australia™	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5	
Secondary demographics	5.88	5.74	5.77	4.96	5.48	4.31	5.38	5.59	6.27	
Substantive variables	3.58	4.02	3.98	4.61	10.50	10.90	7.24	7.78	6.83	
Combined	5.11	5.17	5.17	4.84	7.15	6.51	6.00	6.32	6.46	
Rank (lowest has least error)	2	3	4	1	9	8	5	6	7	

A-BS = address-based sample; DFRDD = dual-frame random digit dialling



6 Discussion

In this section, we discuss various elements of Life in Australia™. Section 6.1 discusses findings and limitations of the exploratory research undertaken to facilitate the development of Life in Australia™. Section 6.2 describes other ongoing research related to Life in Australia™. Section 6.3 considers Life in Australia™ from a total survey error perspective.

6.1 Exploratory research

We set out to build the first Australian probability-based online panel: Life in Australia™. After reviewing existing approaches to recruitment for probability-based online panels in other countries, it was clear that several elements of the recruitment design should be tested before large-scale implementation. Testing material ahead of fieldwork is good practice and allowed us to address several research questions for the Australian context.

One research question was about the best time within a panel recruitment interview to ask respondents to join Life in Australia™ and how best to collect the panel profile information. The results indicated that asking respondents to join Life in Australia™ at the beginning of the recruitment interview was preferable to asking at the end, in combination with allowing respondents to delay the decision to enrol and complete the panel profile by themselves. This result yielded the highest cumulative response rates after 16 waves of data collection. The SRC made the decision to use this ‘ask-first’ approach in its main recruitment efforts; however, for practical reasons, respondents could decide to enrol immediately during the telephone interview or have information about Life in Australia™ sent to them. Delayed enrolment made it necessary to follow up with a strong reminder strategy.

Another research question was the preferred blend of mobile and landline numbers for use in recruiting the panel. The trial led to an adjustment

from a 60% mobile content used for the randomised trial pilot study to 70% in the main study.

Qualitative testing of the communications materials in individual in-depth interviews and focus groups provided valuable suggestions for adjusting the terminology in the communications materials – for example, avoiding terms such as ‘panel’.

Several limitations of the trial recruitment study should be considered when evaluating the above results. First, although the initial sample in the trial was substantial – with 2817 respondents in four conditions – the number of respondents making it into the panel was between 63 and 78 in each condition, resulting in little variation in the number of successful enrolments. Second, because of the practice of CATI management and fieldwork, interviewers could not be randomly assigned to the different treatment conditions across the entire control; thus, interviewer effects could not be fully controlled for. Although we cannot entirely rule out interviewer effects as a contributing factor, we see no strong evidence that this is the case. Finally, although the trial can be considered to cover the English-speaking Australian population, similar to common approaches in defining the frame, it is limited to adults aged 18 years and over who have access to a telephone, and can understand and speak English.

6.2 Additional activities

In striving to maintain Life in Australia™ as a high-quality sample, the SRC has undertaken other projects to improve the panel. These include converting noncompliant panellists back to active panellists (Lavrakas et al. 2018) and exploring various possibilities for correcting bias with weighting approaches.

6.3 Assessment of total survey error

Total survey error (see, for example, Groves et al. [2009]) is the dominant paradigm for understanding the quality of surveys. We assess Life in Australia™ with respect to different types of survey error.

6.3.1 Coverage error

Coverage errors are systematic differences between the target population of a survey (here, Australian residents) and the sampling frame (here, DFRDD). As discussed earlier, it is estimated that 2.0% of Australian residents have neither a landline nor a mobile phone (ABS 2019). In addition, an estimated 1% of working numbers in the SamplePages frame are misclassified as nonworking and not dialled. Based on these numbers, we estimate coverage at 97.0% and, consequently, undercoverage at 3.0%. Because offline respondents are included in Life in Australia™ through telephone surveys, there is no additional coverage error due to the omission of offline respondents. This level of coverage error is similar to Australian DFRDD telephone surveys.

6.3.2 Sampling error

Sampling errors arise as a result of stochastic variation in the specific sample selected from a sampling frame. Sampling error is affected by a variety of factors, including sample size, the sampling scheme and the degree of weighting adjustment needed. In Life in Australia™, the number of weighting steps – although important for ameliorating coverage and nonresponse errors – contributes to sampling error. The average margin of error for survey waves drawn from the whole Life in Australia™ panel is 2.8%. Because the sample sizes vary by waves, weighting efficiency is a more useful measure of sampling error. Weighting efficiency measures the effective sample size of a survey compared with a simple random sample of the same size.⁶ On average, weighting efficiency for full waves of Life in Australia™ is 53.6%.

6.3.3 Nonresponse error

Nonresponse errors arise as a result of systematic variations between the characteristics of respondents and nonrespondents. Because of the multiple stages of recruitment and the panel design, nonresponse can occur at multiple stages in Life in Australia™:

- Recruitment – individuals who do not respond to the invitation to participate in the panel. The recruitment rate for the combined trial and main sample was 21.1%. As recruitment was in English only, there is systematic nonresponse error. The proportion of the Australian population who speak English at least ‘well’ is 96.3% (ABS 2016b).
- Enrolment – individuals who indicate their interest in joining the panel but do not complete enrolment (i.e. complete the panel profile questionnaire). The profile rate for the combined trial and main sample was 77.7%.
- Attrition – individuals who leave the panel. The retention rate was 86.7% as of wave 16.
- Wave-level completion rates – some active panellists do not complete every survey. Wave-level completion rates varied between 68.9% and 78.8% for waves 1–16.

As a result of these multiple levels of nonresponse, wave-level cumulative response rate (CUMRR2) varied between 10.2% and 12.7% in waves 1–16. (See Box 2 for definitions of outcome rates.)

Although cumulative response rates are low in absolute terms, multiple steps in survey weighting are used to adjust for nonresponse. The panel weights described in Section 3.4 adjust for nonresponse to the recruitment and enrolment stages by ensuring that the distribution of the sample matches population parameters with respect to telephone use, age, education, sex and internet use. For panel attrition and wave-level nonresponse, a wealth of information is available in the panel profile about nonrespondents. The wave-level weights detailed in Section 4.2 take advantage of this information by modelling nonresponse as a function of the panel profile information. To ensure that the final weights for each wave continue to mirror the characteristics of the Australian adult population, weights are raked to age, education, sex, internet access, telephone use and state.

6.3.4 Adjustment error

Adjustment errors occur when erroneous population totals are used to adjust for error. Every effort is made to use the most up-to-date data available for raking the final wave samples. For age, sex and state, Estimated Resident Population (updated monthly) from the Australian Bureau of Statistics (ABS) is used. For education, the most recent census for which data are available is used. For internet and telephone use, the most recent survey from the ABS or the Australian Communications and Media Authority for which data are available is used.

6.3.5 Specification error

Specification error – also referred to as validity – is a property of the degree of fit between a construct and its measure. This is a product of congruence between the specific questions asked in a given survey and the constructs that the questions are intended to measure. This form of error is therefore specific to each measure in each wave and its intended use.

6.3.6 Measurement error

Measurement error occurs when there are systematic differences between the true value on a given measure for an individual and the response obtained on that measure. Measurement error is a product of various factors. Use of a mix of online and telephone data collection for Life in Australia™ has the potential to affect measurement error. Possible systematic sources of measurement error are described below.

Acquiescence response bias

Acquiescence response bias is the psychological tendency of humans to agree with statements, regardless of the content of the statements (Holbrook 2008a). In survey questionnaires, it is particularly likely in agree–disagree and yes–no items. One explanation of acquiescence response bias is that it is shaped by social norms of politeness. As a social norm, acquiescence response bias is likely to be greater for interviewer-administered modes. Because a large majority of responses to each wave of Life in Australia™ are self-administered, the risk of non-ignorable acquiescence response bias is likely to be low.

Survey formatting

Online surveys are an inherently visual medium and subject to a wide variety of possible errors relating to formatting (see, for example, Couper [2008] and Tourangeau et al. [2013]).

Images

Research suggests that respondents take cues from visual imagery in online surveys (Couper et al. 2004a, 2007; Witte et al. 2004). To avoid this potential bias, Life in Australia™ does not include imagery other than the study logo (see Figure 2) in survey questionnaires, unless it is vital for a particular question to do so.

Figure 2 Question in stacked item-by-item format for mobile device



SECTION A: SOCIAL VALUES, ATTITUDES, & STEREOTYPES

For each of the following, indicate how important it is in your life. How important is ...

Please select only **ONE** box in each row

Family	<input type="radio"/>	Very important	<input type="radio"/>	Rather important	<input type="radio"/>	Not very important	<input type="radio"/>	Not at all important
Friends	<input type="radio"/>	Very important	<input type="radio"/>	Rather important	<input type="radio"/>	Not very important	<input type="radio"/>	Not at all important

Mobile device format

Mobile devices are challenging when it comes to displaying online questions and questionnaires, because of the restricted space available for display and the use of touch for data entry.

The restricted display area is potentially problematic because response options pushed off the screen are far less likely to be selected (Couper et al. 2004b).

Grid (also known as matrix or table) items are particularly difficult for mobile devices (see Figure 3). The width of grid items means that it is easy for response options on the right-hand side to be out of sight, especially for mobile devices used in portrait mode. The height of grid items means that it is easy for labels for response options to be pushed off screen, at the risk of error in selecting response options. To avoid this problem in Life in Australia™, grid items are rendered in stacked item-by-item format on a single page (see Figure 2). The use of item-by-item format at times raises concerns about the possible effects on inter-item correlations in scales. However, in keeping with most other research (see Tourangeau et al. [2013] for a summary), no impact on inter-item correlation has been found in Life in Australia™ (Phillips 2018).

Nonsubstantive response options

‘Don’t know’, ‘refused’ and similar nonsubstantive response options present various difficulties for web surveys. One dilemma is whether to display these options or not. If they are explicitly included, the proportion of respondents selecting these options will be much higher than for interviewer-administered surveys that generally treat them as volunteered options (available for the interviewer to record, but not read aloud to the respondent). If they are not displayed, the proportion of respondents selecting these options will be much lower than for interviewer-administered surveys. In dealing with nonsubstantive response options for questions fielded on Life in Australia™, the SRC generally follows the practices described by de Leeuw et al. (2016), which are designed to be as close as possible to the way in which an interviewer would behave, using a nondirective probe. Thus, nonsubstantive response options are not initially displayed. If the respondent attempts to move past the question without answering, they will receive a soft prompt (i.e. one that allows them to dismiss and move past the question without answering it). If the respondent does this, they are then offered the nonsubstantive response options.

Figure 3 Question in grid format for desktop



SECTION A: SOCIAL VALUES, ATTITUDES, & STEREOTYPES

For each of the following, indicate how important it is in your life. How important is ...

Please select only **ONE** box in each row

	Very important	Rather important	Not very important	Not at all important
Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leisure time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Politics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Next

Previous

Save

For any queries, please call the Social Research Centre on 1800 023 040 or email LifInAus@srcentre.com.au.

You are able to stop the survey at any time by clicking save and return to complete it later. You can re-start the survey by clicking on the same link, it will take you to where you left.

Another potential source of error is the way in which the nonsubstantive response options are displayed. If they are not visually separated from the substantive response options, the visual midpoint of the scale may be affected, changing the mean of responses for Likert-type scales (Tourangeau et al. 2007). When nonsubstantive response options are offered in Life in Australia™, they are visually separated by empty space from the substantive response options, to avoid impact on the scale's visual midpoint.

Panel conditioning

Panel conditioning occurs when a panel member's response is influenced by prior questionnaires the panelist has completed and/or prior contacts with the panelist (Cantwell 2008). As a panel, Life in Australia™ is potentially subject to panel conditioning effects. Because the period of Life in Australia™ that we cover in this paper only includes the two cohorts recruited in the pilot phase and the initial main recruitment phase, we lack a control group against which to measure conditioning. Notwithstanding, diversity of survey topics fielded on Life in Australia™ offers some defence against panel conditioning: the same sequences of questions are not asked in each wave, which could otherwise lead to undesirable outcomes such as respondents learning to respond in a way that avoids unfolding or skip logic (i.e. to minimise the number of questions they need to answer).

Response order effects

Response order effects are systematic differences in survey responses associated with the order in which response options are presented to the respondent (Holbrook 2008b). In interviewer-administered surveys, respondents are disproportionately likely to select options that were most recently read by an interviewer; this is termed a recency effect. In self-administered surveys, respondents are disproportionately likely to select options presented at the start of a list; this is termed a primacy effect. To reduce the likelihood of such effects, the SRC generally systematically rotates response options for questions fielded on Life in Australia™. In a test of items from the World Values Survey (a cross-national time-series survey) administered to Life in Australia™ panellists, order effects were not

found for items using Likert scales; they were only found for a particularly cognitively demanding item that asked respondents to select up to 5 items from a list of 11 (Phillips 2018).

Social desirability bias

Social desirability bias is the tendency of respondents to report an answer in a way that they deem to be more socially acceptable than their true answer, particularly for sensitive items (see, for example, Callegaro [2008]). Self-administered survey modes are far less at risk of this form of measurement error than interviewer-administered survey modes. Because a large majority of responses to Life in Australia™ in each wave are from the self-administered online mode, the risks of socially desirable responses are minimal.

6.3.7 Processing error

Processing errors occur after data collection, such as when coding verbatim responses to open-ended questions. The SRC employs professional coding staff, is certified under ISO (International Organization for Standardization) 20252 (ISO 2012), and follows ISO coding and data editing procedures.



7 Conclusion

The SRC established Life in Australia™ to provide Australian researchers, policy makers, academics and businesses with access to a scientifically sampled cross-section of the English-speaking Australian population that predominantly provides data via the internet at lower cost than cross-sectional telephone surveys.

Life in Australia™ was recruited via telephone using a DFRDD sample, with the main recruitment effort using a 70% mobile, 30% landline split. Although most panellists complete surveys online, the offline population is included via telephone interviews.

To develop an effective recruitment strategy, the SRC considered the methods used by overseas probability-based online panels. Having reviewed these methods, contact materials were tested in individual in-depth interviews and focus groups. A randomised trial pilot study then tested two pairs of recruitment strategies in a crossed design. The first pair of strategies consisted of 'ask-first', where the concept of joining the panel was addressed early in the call, and 'ask-last', where the interviewer began with several minutes of questions to build rapport before broaching the concept of the panel. The second pair of strategies were 'immediate enrolment', where the interviewer attempted to complete the panel profile questions, and 'delayed enrolment', where information about Life in Australia™ was sent to the respondent to review in their own time. Ask-first – delayed enrolment proved to be the most effective strategy.

Main recruitment efforts implemented the ask-first strategy, but gave interviewers and respondents discretion to enrol either immediately on the phone or after being sent additional material.

Including both the trial and main recruitment efforts, a recruitment rate (RECR) of 21.1% was achieved; this is the estimated percentage of eligible individuals contacted who initially agreed to participate in the panel. Of those who initially

agreed to participate, 77.7% completed the panellist profile; this is the profile rate (PROR). Attrition from the panel is low, with a retention rate (RETR) of 86.7% at wave 16, approximately 18 months after recruitment. Completion rates (COMR) – the percentage of those invited to complete the questionnaire for a given wave – are also high, at 73.0% for wave 16.

For each wave, online panellists are contacted via email, SMS (if a mobile phone number is available) and telephone reminder calls by an interviewer. Offline panellists are interviewed by phone, as well as receiving a link to the online survey via SMS (if a mobile phone number is available). For each completed questionnaire, respondents can choose to receive a small incentive payment themselves or donate it to a preselected charity.

Each panel member received a weight for probability of selection, which was raked to population benchmarks for age, education, sex, internet use and telephone use to account for nonresponse in the recruitment and panel profiling stages. For each wave, respondents receive a wave-level weight that builds on the panel weight; adjustments are made for response propensity modelled using the wide range of variables available for panel members and raked to population benchmarks for age, education, sex, internet use, telephone use and state of residence.

Results from Life in Australia™ were compared with a variety of demographic and substantive benchmarks from high-quality surveys, and contrasted with results on these benchmarks from various probability surveys and nonprobability web panels collected as part of the OPBS (Pennay et al. 2018a). Across these measures, Life in Australia™ was the most accurate survey of the nine compared.

The goals of the studies and analyses presented in this paper were to allow evidence-based

decision making in setting up the probability-based online panel in Australia and evaluate the success of the recruitment efforts using well-established quality metrics, including cost-effectiveness and benchmarks. Overall, the various pretesting and piloting activities helped in navigating the many design decisions and resulted in Life in Australia™ being a high-quality source that is suitable for generating valid and reliable data on a broad spectrum of topics.



Appendix A Advance letters

Advance letters were sent to landline households for which the telephone number could be matched with an address. They are shown on the following pages.



**Social
Research
Centre**

An ANU Enterprise business

The Social Research Centre Pty Ltd
PO Box 13328 LAW COURTS VIC 8010

Phone 03 9236 8500
Fax 03 9602 5422

Email info@srcentre.com.au
Web www.srcentre.com.au

ABN 91 096 153 212

Ref: 9028t
To the Smith household or current resident
123 Example Street
SYDNEY NSW 2000

24 August 2016

Dear Smith household or current resident,

Life in Australia

I am writing to you from the Social Research Centre (part of the Australian National University) to ask for your help with important new research.

We are developing a national study, called *Life in Australia*, and we would like to invite your household to be included in this study. If you accept, you or another household member will be part of an invitation-only study of 3,000 people from all walks of life.

This invitation provides a real opportunity to have your views heard and represented. The results will be used by researchers, policymakers and academics to improve our understanding of Australian society.

What does being part of this research involve?

People who are part of *Life in Australia* will be invited to do short monthly surveys (10-15 minutes each time) on important social issues. The surveys can be completed online or by phone.

What happens next?

We will phone your household soon to invite one adult to join *Life in Australia*. The person selected will receive \$10 (gift card, PayPal or charity donation) as a thank you for joining, with \$5 to \$10 for each future survey.

With your help, we can ensure the research is as accurate as possible.

If you have any queries about this research, you can contact the Social Research Centre on 1800 023 040 or via LifeinAus@srcentre.com.au. To learn more about *Life in Australia* you can visit www.srcentre.com.au/LifeinAus.

We will be in touch soon.

Yours sincerely,

Darren Pennay
Chief Executive Officer
The Social Research Centre



**Australian
National
University**

ANU
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Fax 03 9602 5422
Email info@srcentre.com.au
Web www.srcentre.com.au
ABN 91 096 153 212

Ref: 9028t
To the Smith household or current resident
123 Example Street
SYDNEY NSW 2000

24 August 2016

Dear Smith household or current resident,

Life in Australia

I am writing to you from the Social Research Centre (part of the Australian National University) to ask for your help with important new research.

We are developing a national study, called *Life in Australia*, and we would like to invite your household to be included in this study. If you accept, you or another household member will be part of an invitation-only study of 3,000 people from all walks of life.

This invitation provides a real opportunity to have your views heard and represented. The results will be used by researchers, policymakers and academics to improve our understanding of Australian society.

What does being part of this research involve?

People who are part of *Life in Australia* will be invited to do a short 10 to 15 minute survey.

What happens next?

We will phone your household soon to invite one adult to take part in *Life in Australia*. The person selected will receive \$10 (gift card, PayPal or charity donation) as a thank you for taking part in the study.

With your help, we can ensure the research is as accurate as possible.

If you have any queries about this research, you can contact the Social Research Centre on 1800 023 040 or via LifeinAus@srcentre.com.au. To learn more about *Life in Australia* you can visit www.srcentre.com.au/LifeinAus.

We will be in touch soon.

Yours sincerely,

Darren Pennay
Chief Executive Officer



Main recruitment



Social
Research
Centre

An ANU Enterprise business

The Social Research Centre Pty Ltd
PO Box 13328 LAW COURTS VIC 8010

Phone 03 9236 8500
Fax 03 9602 5422

Email info@srcentre.com.au
Web www.srcentre.com.au

ABN 91 096 153 212

Ref: 9028

To the Smith household or current resident
123 Example Street

SYDNEY NSW 2000

28 October 2016

Dear Smith household or current resident,

Life in Australia

I am writing to you from the Social Research Centre (part of the Australian National University) to ask for your help with important new research.

We are developing a national study, called *Life in Australia*, and we would like to invite your household to be included in this study. If you accept, you or another household member will be part of an invitation-only study of 3,000 people from all walks of life.

This invitation provides a real opportunity to have your views heard and represented. The results will be used by researchers, policymakers and academics to improve our understanding of Australian society.

What does being part of this research involve?

People who are part of *Life in Australia* will be invited to do short monthly surveys (10-15 minutes each time) on important social issues. The surveys can be completed online or by phone.

What happens next?

We will phone your household soon to invite one adult to be part of *Life in Australia*. The person selected will receive \$10 as a thank you for joining, with \$5 to \$10 for each future survey.

With your help, we can ensure the research is as accurate as possible.

If you have any queries about this research, you can contact the Social Research Centre on 1800 023 040 or via LifeinAus@srcentre.com.au. To learn more about *Life in Australia* you can visit www.srcentre.com.au/LifeinAus.

We will be in touch soon.

Yours sincerely,

Darren Pennay
Chief Executive Officer
The Social Research Centre



Australian
National
University

ANU
enterprise



Appendix B Pre-notification SMS

The pre-notification SMS was sent to mobile numbers before the first call attempt was made. Text used in the trial and the main recruitment effort was:

The Social Research Centre at Australian National University has selected you for the Life in Australia study. We will call soon. To opt out call 1800 023 040.

Appendix C Outcome rates for various panels

Table C.1 Recruitment rate (RECR)

Country	Panel	RECR (%)	Notes
Netherlands	LISS	73.2	RR2; recruited 2007, and replenished 2009, 2011 and 2013 (Blom et al. 2016)
Germany	German Internet Panel	52.1	RR2; recruited 2013 and replenished 2014 (Blom et al. 2016)
France	ELIPSS	31.3	RR3; recruited 2012 (Blom et al. 2016)
Germany	GESIS Panel	29.0	RR1; recruited 2013 (Bosnjak et al. 2018)
		20.2	RR1 (with e = 1); replenished 2016 on the back of another study (Schaurer & Weyandt 2018)
Australia	Life in Australia™	21.1	RR3; recruited 2016
USA	KnowledgePanel	12.9	RR3; recruited 1999–2016; survey fielded 2016 (CFPB 2017)
USA	American Trends Panel	10.2	Calculated based on reported PROR, RETR, COMR and CUMRR2 for panel wave conducted 7–16 November 2018; recruited 2014, and replenished 2015, 2017 and 2018 (Pew Research Center 2018)

RR = response rate

Table C.2 Profile rate (PROR)

Country	Panel	PROR (%)	Notes
France	ELIPSS	87.2	Calculated from reported RECR and $RECR \times PROR$ (Blom et al. 2016)
Germany	GESIS Panel	79.4	Recruited 2013 (Bosnjak et al. 2018)
		80.5	Replenished 2016 (Schaurer & Weyandt 2018)
Australia	Life in Australia™	77.7	Recruited 2016
Netherlands	LISS	66.0	Recruited 2007, and replenished 2009, 2011 and 2013 (Blom et al. 2016)
USA	American Trends Panel	64.3	Sum of joined divided by invited; recruited 2014, and replenished 2015, 2017 and 2018 (Keeter 2019)
USA	KnowledgePanel	62.6	Recruited 1999–2016; survey fielded 2016 (CFPB 2017)
Germany	German Internet Panel	34.7	Calculated from reported RECR and $RECR \times PROR$ (Blom et al. 2016)

Table C.3 Recruitment rate × profile rate (RECR × PROR)

Country	Panel	RECR × PROR (%)	Notes
Iceland	Social Science Research Institute	54.3	Recruited 2010–15 (Jónsdóttir 2015)
Netherlands	LISS	48.3	Recruited 2007, and replenished 2009, 2011 and 2013 (Blom et al. 2016)
USA	American Life Panel – Vulnerable Population Cohort	42.5	Recruited 2012 (Pollard & Baird 2017)
USA	AmeriSpeak	33.7	Recruited 2014–17 (Shadel et al. 2017)
UK	NatCen Panel	30.8	Recruited 2015–17; calculations account for response rate to the British Social Attitudes survey the panel was recruited from (Jessop 2018)
France	ELIPSS	27.3	Calculated from reported RECR and RECR × PROR (Blom et al. 2016)
USA	American Life Panel – Stanford Cohort	23.9	Recruited 2009 (Pollard & Baird 2017)
Germany	GESIS Panel	23.0	Recruited 2013 (Bosnjak et al. 2018)
		16.3	Replenished 2016 (Schaurer & Weyandt 2018)
UK	NatCen Panel	22.2	Recruited 2015 and 2016 (calculated from Jessop 2018)
Norway	Norwegian Citizen Panel	20.9	Weighted average of recruitment waves in 2013, 2014 and 2017 (Høgestøl & Skjervheim 2013; Skjervheim & Høgestøl 2014, 2017)
USA	American Life Panel – University of Michigan Monthly Survey Cohort	18.4	Recruited 2002 (Pollard & Baird 2017)
Germany	German Internet Panel	18.1	Recruited 2013 and replenished 2014 (Blom et al. 2016)
Australia	Life in Australia™	16.4	Recruited 2016
USA	KnowledgePanel	8.1	Survey fielded 2016 (CFPB 2017)
USA	American Trends Panel	6.5	Calculated based on reported PROR, RETR, COMR and CUMRR2 for panel wave conducted 7–16 November 2018; recruited 2014, and replenished 2015, 2017 and 2018 (Pew Research Center 2018)

Table C.4 Retention rate (RETR)

Country	Panel	RETR (%)	Notes
Germany	German Internet Panel	>95	Approximately 2 years after recruitment (Blom et al. 2016)
France	ELIPSS	>90	Approximately 1 year after recruitment (Blom et al. 2016)
Netherlands	LISS	>90	Approximately 1 year after recruitment (Blom et al. 2016)
USA	AmeriSpeak	89.0	Composite rate 0–3 years after recruitment (Shadel et al. 2017)
Australia	Life in Australia™	86.7	Approximately 1.5 years after recruitment
UK	NatCen Panel	83.8	Composite rate 1–2 years after recruitment (calculated from 2015 and 2016 cohorts in Jessop 2018)
USA	American Trends Panel	72.5	Composite rate 0–5 years after recruitment (Pew Research Center 2018)
USA	American Life Panel – Stanford Cohort	62.4	Approximately 8 years after recruitment (Pollard & Baird 2017)
Germany	GESIS Panel	62.1, 77.1	Survey conducted in 2018, cohort numbers for approximately 5 years after initial recruitment and approximately 2 years after replenishment (Minderop et al. 2018)
Iceland	Social Science Research Institute	53.4	Composite rate 0–5 years after recruitment (Jónsdóttir 2015)
USA	American Life Panel – Vulnerable Population Cohort	48.8	Approximately 5 years after recruitment (Pollard & Baird 2017)
USA	KnowledgePanel	29.7	Composite rate 0–17 years after recruitment (CFPB 2017)
USA	American Life Panel – University of Michigan Monthly Survey Cohort	26.9	Approximately 15 years after recruitment (Pollard & Baird 2017)

Table C.5 Completion rate (COMR)

Country	Panel	COMR (%)	Notes
Germany	GESIS Panel	90.7, 90.0	Survey conducted in 2018, cohort numbers for approximately 5 years after initial recruitment and approximately 2 years after replenishment (Minderop et al. 2018)
USA	American Life Panel – Stanford Cohort	81	End of 2016, approximately 8 years after recruitment (Pollard & Baird 2017)
USA	American Trends Panel	78.4	Survey conducted in 2018, 0–5 years after recruitment (Pew Research Center 2018)
USA	American Life Panel – Vulnerable Population Cohort	78	End of 2016, approximately 5 years after recruitment (Pollard & Baird 2017)
USA	American Life Panel – University of Michigan Monthly Survey Cohort	78	End of 2016, approximately 15 years after recruitment (Pollard & Baird 2017)
Australia	Life in Australia™	73.0	Survey conducted in 2018, 1.5 years after recruitment
Germany	German Internet Panel	69.8	Survey conducted in 2015, approximately 3 years after recruitment (Cornesse 2018)
Norway	Norwegian Citizen Panel	69.1	Survey conducted in 2017, 0–5 years after recruitment (Skjervheim & Høgestøl 2017)
Iceland	Social Science Research Institute	64	Survey conducted in 2013, 0–5 years after recruitment (Jónsdóttir 2015)
UK	NatCen Panel	59.4	Survey conducted in 2018, 2–3 years after recruitment (calculated from Jessop 2018)
USA	KnowledgePanel	44.4	Survey conducted in 2016, 0–17 years after recruitment (CFPB 2017)
USA	AmeriSpeak	36.5	Survey conducted in 2017, 0–3 years after recruitment (Shadel et al. 2017)

Table C.6 Cumulative response rate 2 (CUMRR2)

Country	Panel	CUMRR2 (%)	Notes
Germany	German Internet Panel	14.3	Survey conducted in 2015, 2–3 years after recruitment (Cornesse 2018)
UK	NatCen Panel	14.0	Survey conducted in 2018, 2–3 years after recruitment (calculated from Jessop 2018)
USA	American Life Panel – Vulnerable Population Cohort	14.0	End of 2016, approximately 5 years after recruitment (Pollard & Baird 2017)
Germany	GESIS Panel	13.0, 11.3	Survey conducted in 2018, cohort numbers for approximately 5 years after initial recruitment and approximately 2 years after replenishment (Minderop et al. 2018)
USA	American Life Panel – Stanford Cohort	12.1	End of 2016, approximately 8 years after recruitment (Pollard & Baird 2017)
USA	AmeriSpeak Panel	10.9	Survey conducted in 2017, 0–3 years after recruitment (Shadel et al. 2017)
Australia	Life in Australia™	10.4	Survey conducted in 2018, 1.5 years after recruitment
USA	KnowledgePanel	6.1	Survey conducted in 2006, 0–7 years after recruitment (Callegaro & DiSogra 2008)
USA	American Life Panel – University of Michigan Monthly Survey Cohort	3.9	End of 2016, approximately 15 years after recruitment (Pollard & Baird 2017)
USA	American Trends Panel	3.7	Survey conducted in 2018, 0–5 years after recruitment (Pew Research Center 2018)
USA	KnowledgePanel	1.1	Survey conducted in 2016, 0–17 years after recruitment (CFPB 2017)

Appendix D Sources of benchmark measures

Tables D.1 and D.2 list the sources used for independent benchmark measures in Pennay et al. (2018a).

Table D.1 Sources for secondary demographics

Benchmark	Source
Australian citizenship	ABS (2011), CITP by AGEP, persons aged 18 years and over, place of usual residence
Enrolled to vote	AEC (2015)
Indigenous status	ABS (2011), INGP by AGEP, persons aged 18 years and over, place of usual residence
Language other than English at home	ABS (2011), LANP – 2 Digit Level by AGEP, persons aged 18 years and over, place of usual residence
Geographic mobility	ABS (2011), UAI5P by AGEP, persons aged 18 years and over, place of usual residence
Remoteness	ABS (2011), RA by AGEP, persons aged 18 years and over, place of usual residence
Employment status	ABS (2011), EMTP by AGEP, persons aged 18 years and over, place of usual residence
Volunteerism	ABS (2011), VOLWP by AGEP, persons aged 18 years and over, place of usual residence
Wage and salary income	ABS (2015a), persons aged 18 years and over, employed income groups
Household tenure	ABS (2011), TEND, dwellings: location on census night
Household composition	AIHW (2013)
Socioeconomic status	ABS (2013)

Table D.2 Sources for substantive measures

Variable	Source
Life satisfaction	ABS (2015b)
Psychological distress (Kessler 6)	ABS (2015a), persons aged 18 years and over, psychological distress, Australia
General health	ABS (2015a), persons aged 18 years and over, self-assessed health status, Australia
Private health insurance	ABS (2015a), persons aged 18 years and over, private health insurance, Australia
Daily smoker	AIHW (2013)
Alcoholic drink of any kind in the past 12 months	AIHW (2013)

Notes

1. The International Organization for Standardization (ISO 2012:1) defines an access panel as 'a sample database of potential respondents who declare they will cooperate for future data collection if selected'.
2. The list of panels shown in Table 1 is illustrative but not fully comprehensive.
3. May 2018 is selected as the cut-off for presenting results because new panellists were added after that time.
4. Most notably, research is being conducted on possibilities for converting nonrespondents back into active members of the study (Lavrakas et al. 2018) and undertaking a panel refreshment exercise/top-up survey to improve the demographic balance of the panel (Phillips et al. 2018). As well, sophisticated weighting options are being evaluated to improve the estimates.
5. The PayPal option had to be removed from the incentive mix several times because of issues relating to slow setup and chunks of payments being rejected without a cause being found. Despite these initial problems, the PayPal option remains an option in the main study.
6. Weighting efficiency is defined as $1/(1 + CV^2)$, where CV is the coefficient of variation of the sampling weights.

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