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AUSTRALASIAN JOURNAL OF MARKET & SOCIAL RESEARCH

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Australasian Journal of Market & Social Research

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AMSRS recognises the contribution of Associate Professor David Bednall and Deakin University.

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and opinion pieces (non-refereed).

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A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for the research. Empirical studies should conclude this section with hypotheses or research questions. Non-empirical papers are encouraged to expand this section to give adequate background and treatment of the issues.

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Present formulae using the Word equation editor. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

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Acknowledgements

Collate acknowledgements in a separate section at the end of the article after the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals

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Brennan, M. & Charbonneau, J. (2010). The effect of an incentive (chocolate) and a replacement questionnaire on sample composition, item non-response and response distribution in a mail survey. *Australasian Journal of Market and Social Research*, 18(2), 19-31.

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Strunk, W., Jr., & White, E. B. (1979). *The elements of style*. (3rd ed.). New York: Macmillan, (Chapter 4).

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- Manuscript has been spellchecked and grammar-checked
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- All references mentioned in the Reference list are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Web)

The use of a copy editor to check the text for completeness and readability is advised.

If you have further queries, please contact the editor prior to submission.

The end of an ERA

The Australian government's scheme to measure the quality of academic research in Australia is known as Excellence in Research Australia (ERA). The results of the first ERA round were published in early 2011. These results classified the success or otherwise of universities and discipline areas within them, like marketing and market research, on an ordinal scale from 1 to 5. One of the metrics used was journal rankings, using an A*, A, B and C classification. This journal was rated as a "B". Unfortunately this attempt to classify journals led to some unsatisfactory and unintended consequences. The emphasis switched to publishing in high status A* journals like the Journal of Marketing Research and Journal of Consumer Research and A journals like the Journal of Marketing Management. "C" journals particularly and "B" journals like this one were instantly devalued and submissions have dropped as a result. As this meant less research ended up being accepted and published, this was highly undesirable.

For the next ERA round for 2012, the journal rankings have been abolished. However, rather than disappear completely, implicit journal status rankings are likely to be used in ERA evaluations leading to some of the same undesirable outcomes. Hopefully this effect will dissipate and journals like this one will prosper. We need the Australasian Journal of Market Research to connect the MR and social research industry with academia. We need a forum to discuss new developments in research methods and to debate methodology. We will be active in recruiting articles from industry and academic sources, but we need your help to do it.

The Australasian Journal of Market Research will now be appearing in the worldwide EBSCO journal database (from 2011 on) and in Google Scholar (right back to issue 1). So you can expect your article to be accessed by researchers around the world. But you have to be published in the journal first! I look forward to your contributions.

Associate Professor David Bednall
Editor
June 2011

Recruiting Opinion Leaders and Innovators: A Comparison of Mail versus 'Web plus Mail' Using Addressed-based Sampling

Mike Brennan, Massey University

ABSTRACT

The present study examined the effectiveness of using a mixed-mode mail/Web survey to reach Opinion Leaders and Innovators, using an addressed based sample with initial and follow-up contacts via mail. A random sample of 3000 members of the general public, selected from the electoral roll, was assigned to either a simultaneous mixed-mode (mail/Web) survey (N = 2000), or a parallel mail survey (N = 1000). Potential respondents were contacted via mail and invited to either take part in a Web survey, or return a postcard to request a questionnaire and respond by mail. The mixed-mode approach produced a slower initial response and a much lower overall response rate than the parallel mail survey (26% vs. 41%), and both the mixed-mode mail and Web respondents differed significantly from each other and from the parallel mail survey with respect to age, income, ownership of new technology and use of the Web. However, combining the mixed-mode Web and mail responses effectively eliminated the differences between the mixed-mode and the parallel mail survey, for all but one variable (Web access at home). While the Web mode produced a much higher proportion of Innovators and Opinion Leaders than the parallel mail survey (9% to 21% vs. 4% to 10%), the response rates to the Web survey for these groups were very similar to those obtained in the parallel mail survey (1% to 4%). Whilst there was no advantage in this study from using a simultaneous mixed-mode mail/Web approach rather than a conventional mail survey, there are possible advantages for large surveys of the general public as household Web access increases.

INTRODUCTION

The high risk of failure of new products has prompted marketers to search for more reliable methods for estimating demand prior to launch so they can eliminate those products unlikely to succeed (McDonald, Corkindale & Sharp, 2003). One approach, which prompted the current study, is based on the suggestion that if one wishes to predict the uptake of a new product, one should ask the early adopters, as these customers become the opinion leaders, the people who will influence the later adopters to adopt (Kingsley & Anderson, 1998). Kingsley and Anderson argue that there is little point in asking late adopters whether they are likely to adopt an innovative product, as they probably do not know; their behaviour will be changed under the influence of the opinion leaders. If one accepts this argument, then the conventional approach of eliciting purchase probabilities from a random sample of members of the general public is flawed. Instead, one should use Opinion Leaders and Innovators to estimate demand for new products.

In order to investigate this issue further, two key questions need to be addressed first: "How do you identify 'Innovators' and 'Opinion Leaders' prior to launch?", and "How do you reach them?" The answer to the first question is straight forward, as a number of researchers have developed self-completion scales for

identifying Opinion Leaders and Innovators (e.g. Flynn, Goldsmith & Eastman 1996; Goldsmith & Hofacker 1991; King & Summers 1970; Midgley & Dowling 1978), and their scales have been extensively tested. This leaves the question of how to best reach these potential opinion leaders in order to classify them using the scales. The purpose of the present study was to examine the effectiveness of using a mixed-mode mail/Web survey to reach Opinion Leaders and Innovators, using an addressed based sample with initial and follow-up contacts via mail.

Whilst there are numerous ways one could recruit opinion leaders and innovators, Kingsley and Anderson (1998) propose recruiting via the Web. Their argument is that a sample of Web users will be biased in favour of Opinion Leaders and Innovators as, by definition, they are more likely to be the early adopters of the Web and thus have Web access. In contrast, later adopters and laggards are less likely to have Web access in the early phase of the Web product diffusion process, and less likely to respond via the Web even if they have access. Thus, the proportion of Opinion Leaders and Innovators among the responders to a Web survey should be much higher than for other modes. Of course, this approach pre-supposes that adequate response rates can be obtained via the Web.

A problem, however, is that selecting a sample of Web users is not straight forward, as there is no comprehensive sampling frame available (Couper, 2000; Fricker, Galesic, Tourangeau & Yan, 2005), even today. Thus a researcher wishing to use a survey of Web users has to find some way of recruiting respondents for their survey. Furthermore, in order to evaluate the performance of Opinion Leaders or Innovators, comparisons will need to be made with people who are not Opinion Leaders or Innovators, and in order to make inferences about the wider population, probability sampling is required. So while at least three different approaches can be used to survey people via the Web, not all meet the requirements of the current study.

One approach is to recruit a sample using Web based interest groups, banner ads or social media sites (Bradley, 1999; Schillewaert & Meulemeester, 2005). However, all of these methods suffer from three important limitations: they produce samples that are self-selected, so may be biased in some important way; they are not probability samples, so do not meet the criteria for applying inferential statistics; and they exclude all members of the public who do not have access to the Web, which prevents comparisons of Web users and non-users unless alternative complementary modes of sample recruitment are also used.

Another approach is to randomly select respondents from a panel of willing participants previously recruited from the general public (AAPOR, 2010; Berrens et al., 2001; Cooke, Watkins & Moy, 2008; Goritz, 2004). This approach offers the same advantages as a client list, in that detailed demographic and behavioural information about the sample members is known before the survey is conducted, so non-response error can be examined, and respondents have given permission to contact them, so legal and ethical issues associated with the use of email addresses are avoided (CASRO, 2008; Department of Internal Affairs, 2011). This method has gained wide popularity for market research in countries such as the USA and is becoming more popular than telephone (Blyth, 2008). However, while a number of research organisations have adopted this approach, and some use propensity score weighting (Rosenbaum & Rubin, 1983) to adjust for attitudinal and behavioural differences (Duffy, Smith, Terhanian & Bremer, 2005), reservations about selection bias and the reliability of estimates remain (Couper, 2000; Schonlau, Van Soest, Kapteyn & Couper, 2009; Sparrow & Curtice, 2004).

Yet another approach is to conduct a simultaneous mixed-mode survey, where a sample is selected from traditional survey sampling frames such as electoral rolls or telephone directories (also referred to as 'address based sampling or ABS' (Messer & Dillman, 2010)). Respondents are then contacted by mail or telephone and invited to participate in a survey via the Web. Those without Web access, or who prefer not to use it, can be offered the opportunity to complete the survey via the traditional mode (telephone, mail or face-to-face) (Dillman, Phelps, Tortora, Swift, Kohrell, Berck & Messer, 2009; Messer & Dillman, 2010; Quigley, Riemer, Cruzen & Rosen, 2000; Parackal 2003; Schonlau, Fricker & Elliot, 2002; Schonlau, Asch & Du, 2003). An advantage of this mixed-mode approach is that a probability sample can be drawn and used for a mode (i.e. the Web) that does not have a sampling frame, while at the same time including respondents unable (or unwilling) to use that mode. Furthermore, a great deal is known about how to implement mail and telephone surveys and, with mail surveys, pre-paid incentives can be used (Brennan & Charbonneau, 2009). However, the usefulness of this approach depends on whether or not the procedure generates acceptable response rates, in either mode. As this is still a relatively new approach, ongoing research is needed to test its efficacy. The present study utilises this approach

The primary reason researchers might adopt a simultaneous mixed-mode approach is so the researcher can use a sampling frame with high cover and also take advantage of the potential benefits the Web may offer, such as reduced fieldwork costs due to minimal or no variable costs (Cobanoglu, Warde & Moreo, 2001; Couper, Traugott & Lamias, 2001; Sills & Song 2002; Watt, 1999), shorter completion times (Bates, 2001; Yun & Trumbo, 2000), automated data collection and faster access to the data collected (Adam & McDonald, 2003; Couper, 2000; Couper & Miller, 2008; Dillman, Smyth & Christian, 2009; Illieva, Baron & Healey, 2002; Kaplowitz, Hadlock & Levine, 2004), more flexible formatting and presentation options (Dillman, 2000; Meckel, Walters & Baugh, 2005), and new capabilities such as audio, video and animated graphics (Bachman, Elfrink & Vazzana, 1999).

An alternative to a simultaneous mixed-mode approach is a sequential mixed-mode approach, such as advocated by Dillman and others (Dillman 2000; Dillman, Phelps, Tortora, Swift, Kohrell & Berck, 2001; McCabe, Diez et al. 2006), where

different modes are used during different phases of the survey. However, this mode requires prior information about respondents to enable contact via different modes, which effectively restricts the method to panel or organisational sampling frames. The primary purpose of a sequential approach is to increase coverage, increase response rates and decrease non-response and total survey error, rather than reduce costs or achieve faster responses. Of course coverage, representativeness and data quality are very important considerations in any survey. There is little point in adopting a simultaneous approach, simply because it is cheaper and faster, if it produces low response rates, unacceptable bias, high non-response error or poor data quality (Couper, 2000; Crawford, Couper & Lamias, 2001; Dillman, 2000). The question of whether people who choose to respond to different modes differ in important ways (de Leeuw, 2005) is a concern for both forms of mixed-mode surveys.

It is clear that mail and Web survey respondents differ at least with respect to their willingness and ability to respond to a particular mode. There is also some evidence that people who respond via these modes may differ with respect to either their demographic characteristics, or responses to survey questions, or both (Cooke, Watkins & Moy, 2008; Kiesler & Sproull, 1986; McDonald & Adam, 2003; Messer & Dillman 2010; Schillewaet & Meulemeester, 2005; Stringfellow, Roman & Lischko, 2006). However, other studies report only marginal, if any, differences across modes (Carini et al. 2003; De Beuckelaer & Lievens 2009; Denscombe 2006; Forsman & Varedian, 2002; McCabe, Boyd, Couper, Crawford & d'Arcy, 2002; McCabe, Couper et al. 2006; Miller et al. 2002; Pettit 2002; Wilkerson, Nagao & Martin, 2002).

A possible reason for the conflicting findings to date is that comparisons across surveys are impeded by the differences in sample characteristics, topics, contexts and coverage. For example Lewis, Zandberg and Kliener (2006) analysed the mode of choice (mail, fax or Web) for responding to a simultaneous survey (mailed questionnaire with URL provided for optional Web response) across eight surveys involving high Internet coverage samples. They obtained response rates ranging from 18% to 65% via the Web and from 34% to 80% via mail/fax. An important observation was that the choice of response mode was highly correlated with the degree of 'technology relatedness' of the survey topic. Technology related

topics tended to generate higher Web than mail/fax response; whereas non-technological topics tended to do the opposite.

The mode used to make initial contact with respondents can also have a dramatic effect on response rates and response mode, in part because it determines the coverage of the survey. Most of the studies to date that have compared Web and mail surveys have used specific survey populations, such as college students, school principals, teachers, employees or health related groups, for whom they have email addresses, and high (complete) Internet coverage. So contact was possible via email, with a hyperlink to the Web survey. There is little comparative evidence for surveys of the general public, for whom email addresses are not readily available. Furthermore, even if email addresses are available, it is no longer considered acceptable practice to use them for uninvited surveys (AMSR, 2007; CASRO, 2008; ESOMAR, 2011; MRSNZ, 2008), and in New Zealand and Australia, contact via email may be deemed SPAM and in breach of the 'Unsolicited Electronic Messages Act 2007' (New Zealand) or 'Unsolicited Electronic Messages Act 2003' (Australia), depending on the purpose of the survey (Department of Internal Affairs, 2011). This development provides a further incentive to test the viability of using address-based sampling in a simultaneous mixed-mode survey.

While any mode can be used as the initial mode of contact in a simultaneous mixed-mode survey, the focus of the current paper is surveys where the initial mode of contact is mail. To date, very few studies have examined simultaneous mixed-mode surveys involving Web and mail, where the mode of contact with respondents was mail (Quigley et al., 2000; Parackal, 2003; Meckel et al., 2005; Messer & Dillman, 2010; Schonlau et al., 2003), and only two studies have involved a survey of the general public (Messer & Dillman, 2010; Parackal, 2003). A summary of these studies is provided in Table 1.

A common finding with respect to simultaneous mixed-mode surveys is that response rates tend to be higher for the mode that is 'preferred' in the survey. For example, a mail survey that provides a questionnaire but offers the option of responding via the Web tends to generate most of the responses via mail, with only a relatively small proportion responding via the Web (Quigley et al., 2000; Meckel et al., 2005;

Table 1: Response Rates for Mail and Web Surveys Using Mail Addresses for Initial Contact

Author	Popln.	Topic	Cover-age	Response mode	N	1st contact	2nd contact	3rd contact	4th contact	5th contact	Response rate %
Quigley et al. (2000)	Armed Services personnel	Computer and Internet use	Mail+ Internet	Mail	7279	Letter	Letter, Q	Letter	Letter, Q	Letter, Q	40 Mail (100)
				Mail + Web (Q supplied)	21805	Letter, URL	Letter, Q URL	Letter, URL	Letter, Q URL	Letter, Q URL	32 Mail (77) 10 Web (23) 42
				Web + mail (Q requested)	720	Letter, URL	Letter, URL	Letter, URL	Letter, URL	Letter, Q URL	10 Mail (27) 27 Web (73) 37
Parackal	General public	WAP phones	Mail	Web or mail	2430	Letter, URL, Postcard to request Q	Letter, URL, postcard	Letter, URL postcard Letter, URL +Q	-	-	13 Mail (45) 17 Web (55) 30 Mail returns: 11 Postcard 89 Mailed Q
(2003)	Senior high school students	Employment financial incentive packages	Mail	Web or mail	1750	Letter, URL, Option to request Q	Letter, URL	Letter, Q URL, \$3 incentive Letter, Q URL Telephone reminder, Letter, URL	Postcard Postcard Postcard Postcard	Letter, Q Letter, Q Letter, Q Letter, Q	13 Mail (65) 7 Web (35) 20 18 no Phone 30 Phone reminder 6 no incentive 32 incentive (only affected responses via mail)
Schonlau et al. (2003)	SMEs NW USA	Attitudes towards	Mail + Internet	Mail with Web option	1000	Letter, Q URL	Letter, URL	Letter, Q URL	-	-	24 Mail (80) 6 Web (20) 30
Messer & Dillman (2010)	General public	e-business / strategy	Mail	Mail + \$5 incentive	471	Pre-notice letter	Letter, Q, \$5	Postcard	Letter, Q	-	57 Mail (100)
				Mail or Web + \$5 incentive	474	Pre-notice letter	Letter, Q, \$5	Postcard	Letter, Q, URL	-	53 Mail (98) 1 Web (2) 54
				Mail or Web - no incentive	648	Pre-notice letter	Letter, Q	Postcard	Letter, Q, URL	-	39 Mail (98) 1 Web (2) 40
				Web or mail - no Web card	554	Pre-notice letter	Letter, URL \$5	Postcard + URL	Letter, Q, URL	-	29 Mail (67) 14 Web (33) 43
				Web or mail + Web card + \$5 incentive	464	Pre-notice letter	Letter, URL Web card, \$5,	Postcard + URL	Letter, Q, URL	-	31 Mail (67) 15 Web (33) 46
				Web or Mail + Web card - no incentive	643	Pre-notice letter	Letter, URL Web card,	Postcard + URL	Letter, Q, URL	-	13 Mail (52) 12 Web (48) 25
				Web or Mail + \$5 incentive	667	Pre-notice letter	Letter, \$5, URL	Letter + URL	Letter, Q, URL	-	28 Mail (62) 17 Web (38) 45
				Web or Mail + \$5 incentive + Web card	665	Pre-notice letter	Letter, \$5, URL	Letter + URL + Web card	Letter, Q, URL	-	26 Mail (60) 17 Web (40) 43
				Mail or Web + \$5 incentive + Web card	476	Pre-notice letter	Letter, \$5, URL	Letter + URL + Web card	Letter, Q, URL	-	52 Mail (95) 3 Web (5) 55

Note. The results reported in brackets () are the relative proportion of the total mixed-mode responses achieved by each mode.

Messer & Dillman, 2010). In contrast, asking people to take part via the Web, but offering a mail option that requires a request for a printed questionnaire, tends to prompt higher response rates via the Web (Parackal, 2003; Quigley et al., 2000; Schonlau et al., 2003). And, as mentioned earlier, there is some evidence that the topic of the survey may influence the choice of response mode (Lewis, Zandberg & Kliener 2006).

These mixed-mode studies also provide compelling evidence that people are more likely to respond by mail if they are sent a questionnaire, rather than having to request one. Quigley et al. (2000), Parackal (2003), and Schonlau et al. (2003) all report very few requests for a printed questionnaire when this option was provided to respondents. However, in each study, response rates rose significantly when a questionnaire was posted out with a reminder letter. For example, Parackal (2003) reports that 89% of all responses obtained by mail were received after a questionnaire was sent with the second reminder letter, compared with only 11% returned following a request for questionnaire. Although Messer & Dillman (2010) obtained a higher response via mail even though respondents were requested (by mail) to complete a Web survey, most of the mail responses occurred when respondents were sent a printed questionnaire with the fourth mail contact. In other words, this study used both a simultaneous and a sequential mode approach.

In general, the response rates obtained via the Web in these mixed-mode surveys were not very high (see Table 1), even from two studies (Quigley et al., 2000; Schonlau et al., 2003) that used samples with very high Web coverage: 27% and 10% for Quigley (military personnel); and 7% for Schonlau (high school students). Parackal (general public) obtained 16% and Meckel (SMEs) just 6%. These results are consistent with findings reported elsewhere that response rates for Web surveys tend to be lower than those for Mail surveys (Dillman et al, 2009), but of course the Web response rates will depend on the level of Web coverage for the sample surveyed, so will vary across different survey populations.

The overall mixed-mode response rates were also quite low in most of these mixed-mode studies (see Table 1): 36% and 42% (Quigley); 30% (Meckel; Parackal) and 20% (Schonlau), although Messer and Dillman did manage to obtain better than 50% in some surveys.

Furthermore, the combined Web/mail response rates were generally lower, or no better, than those achieved in a parallel mail survey when employed: Messer and Dillman (2010) achieved response rates of 57% in a parallel mail survey compared with between 25% and 55% using a mixed-mode; Quigley achieved 40% in a parallel mail compared with 36% and 42% using a mixed-mode. Neither Schonlau, Meckel nor Parackal conducted a parallel single-mode mail (or Web) survey, so one cannot determine what effect the mixed-mode had on response rates, sample composition or item non-response.

While the use of the Web for survey research has appeal, the evidence to date suggests that, if a probability sample is required, address based samples using mail as the initial mode of contact are viable, but may struggle to achieve acceptable response rates. However, the information to date comes from studies that differ in terms of sample population, topic, survey design, sampling frame and country, so replication and extension studies are needed to help identify generalisable principles for conducting mixed-mode surveys. And to date, no one has examined whether a Web based survey can generate a higher response rate, or even a higher proportion of responses, from Innovators and Opinion leaders, than could be obtained in a comparable mail survey.

The purpose of the present study is examine whether a mail/Web mixed-mode approach using address based sampling offers an effective way to recruit Opinion Leaders and Innovators, and whether those who respond via the Web differ in any important ways from respondents who respond via the mode used to recruit them (mail). The specific survey method employed in this study is a simultaneous mixed-mode survey where members of the general public are recruited via mail, invited to participate via the Web, but offered the opportunity to request a printed questionnaire and respond via mail.

METHOD

A sample of 3000 members of the New Zealand public was randomly selected from the 2003 Electoral Roll (voter registration is mandatory). A sub-sample of 1000 names was randomly assigned to a group for whom the entire survey was conducted by mail. The remaining 2000 names were assigned to a mixed-mode survey, where respondents were invited by mail to participate via the Web, but could return a reply-paid postcard to request a printed questionnaire and participate by mail.

The surveys were conducted, in parallel, between November 9 and December 24, 2004. Two reminders were sent out by mail, 10 days and 30 days respectively, after the initial mail-out. Two days are added to these when defining a "wave", to allow for mail in transit. For the mixed-mode sample, both reminders were letters. The letter reminded them of their Web User ID, and provided a reply-paid postcard they could use to request a printed questionnaire. For the parallel mail survey, the first reminder was either a letter or letter plus replacement questionnaire. The adjusted sample sizes (excluding mail returned Gone-no address, deceased, or incapacitated) were 1811 for mixed-mode survey and 928 for the mail survey. The response rates are reported in Table 1.

The topic of the survey was New Product Adoption. Respondents were required to answer questions regarding ownership and probability of purchase of four "innovative" electronic products or services (camera cell phone, broadband internet connection, MP3 player and MP3 file download service), and complete two sets of 18-item 5-point agree/disagree scales comprising the six Opinion Leadership Scale items and the six Opinion Seeking Scale items of Flynn, Goldsmith and Eastman (1996), and the six Innovator Scale items of Goldsmith and Hofacker (1991), plus two scale items from Kingsley and Anderson (1998), demographic questions, and a request for permission to conduct a short follow-up survey. This last question was used as a proxy measure of survey burden.

In the mixed-mode survey, each posting included a cover letter plus a reply-paid postcard for requesting a printed copy of the questionnaire. The cover letter provided the URL for the Web survey, and provided each respondent with the unique Username and Password they needed in order to participate in the Web survey. The cover letter for the mail survey was

as similar as possible to that in the mixed-mode survey, and the printed questionnaires were identical. The pages in the Web survey matched those in the mail questionnaire, but with drop-down boxes or radio buttons in place of check boxes. Each web survey page needed to be submitted before the next page appeared.

In both the mixed-mode and parallel mail surveys, respondents were randomly assigned to either a control or treatment group to test the effectiveness of using an incentive (prize draw or no prize draw). In the mail modes, a factorial design was used to examine the interaction of an incentive and the timing of a replacement questionnaire (second or third mail-out). In the mixed-mode survey, various forms of postcard and reminder letter were also tested. Details of the results are reported elsewhere (Brennan, 2004, 2005). As the differences between the treatments were not statistically significant, and the focus of this paper is on the recruitment of Opinion Leaders and Innovators, the analyses use the aggregated data.

RESULTS

Effect of survey mode on response rate and response speed

Two major considerations in survey research are response rates and response speed, because of the potential impact of non-response bias and survey costs. The response rates for the different survey modes in this survey are displayed in Table 2.

A notable feature in Table 2 is that the overall response rates are low for all modes, but particularly for the mixed-mode survey (26% for mixed-mode; 41% for mail). The low response rate even for the parallel mail survey is consistent with those achieved in a later survey on the same topic (innovative products) and using similar scales, but with a different incentive, which produced response rates between 37-46% (Brennan, 2010). These results suggests that both the topic (demand for hypothetical new products) and the demands of the survey were a major contributor, given that the sample selection and mail survey procedures employed typically produce response rates of 55-65% (Gendall & Healey, 2008). This view is supported by comments written by respondents and some people who refused to participate. While only 17% of the mixed-mode sample chose to

Table 2: Cumulative Response Rates for Mail versus Mixed-Mode (Web/mail) Survey

	W1 %	W1+W2 %	W1+W2+W3 %
Mixed-Mode (Web/mail)			
Web response	6	14	17
% of returns for mode	(35)	(83)	(100)
Request for Questionnaire	0.3	10	13
Mail response	0	7	9
Cumulative Return Rate	(0)	(51)	(72)
% of returns for mode	(0)	(77)	(100)
Total (Web+mail)	6	21	26
% of returns for mode	(23)	(81)	(100)
Single-Mode Mail			
Mail response	17	33	41
Cumulative Return Rate	(42)	(80)	(100)
% of returns for mode			

Note: For mixed-mode survey N=1811. For mail survey, N=928

W1. Response rate at the end of Wave 1 (12 days)

W2. Cumulative response rate to end of Wave 2 (32).

W3. Cumulative response rate to end of Wave 3 (50 days)

The number in square brackets is the return rate for requested questionnaires ((mail response/requests)*100).

respond via the Web, this rate is probably reasonable given the 41% response rate for the parallel mail survey and the likelihood that only about 51% of the total sample had Web access at the time of the survey (51% of 41% = 21%), based on estimates of population uptake (Internet World Stats, 2007).

The mixed-mode mail response rate is also very low (9%), as was the questionnaire request rate (13%), indicating very clearly that having respondents request a questionnaire is not an effective procedure. While this is not an unexpected finding and is consistent with the results displayed in Table 1, it was hoped that in this study this barrier would encourage more Web responses. Given the response rate for the parallel mail survey, it is clear that the use of a postcard to enable participation in the mail mode failed to elicit responses from a substantial proportion of the sample that could reasonably have been expected to have taken part in a mail survey.

One rationale for using a Web survey is to increase the speed of response to the survey; in other words, get more respondents to respond more quickly. However, the Web mode did not produce a faster response than mail. The Web mode generated 35% of total Web responses in the first wave, compared with 42% for the parallel mail survey, and even after wave 2, the Web was only slightly faster (83% vs. 80%). Thus the Web mode did not deliver the expected benefit of a higher response speed. The combined mixed-mode survey also produced much slower responses in wave 1 than the parallel mail survey (23% vs. 42%), but this was to be expected, given the extra time required for respondents to request, receive, complete and return a printed questionnaire.

Because of the relatively low response rate, the Web component of the mixed-mode survey will need to elicit a substantially higher proportion of responses from Innovators or Opinion Leaders to justify using this mixed-mode approach.

Effect of survey mode on respondent characteristics

An important consideration for survey researchers is whether or not respondent characteristics are influenced by mode. The characteristics of the respondents to each mode are reported in Table 3 (Columns A, B, C, D), while tests of differences between the single-mode mail and mixed-mode web, mail, and web+mail are reported in Columns E, F and G respectively.

The single-mode mail survey produced significantly (statistically) different response distributions from the web mode for eight of the 10 variables, but only two of these had effect sizes that would be considered "moderate" ($ES \approx 0.3$; Cohen, 1992): Web access at home ($ES=.33$) and Internet use ($ES=.31$). Similarly, the single-mode mail distributions differed significantly (statistically) from the mixed-mode mail mode for eight of the 10 variables, although only one of these differences represents a moderate effect size (Internet use: $ES=.29$). Yet, when the results of the single-mode mail survey and the combined mixed-mode mail and Web survey results are compared, only a single variable had a (statistically) significantly different response distribution (Web access at home), but the effect size was very small (.02). Thus, while both mixed-mode mail and Web results were somewhat different relative to the single-mode mail survey, the effects were small and combining their results effectively cancelled these differences out.

Effect of survey mode on recruitment of Opinion Leaders and Innovators

This study examined the proposition that a simultaneous mixed-mode mail/Web survey of the general public would attract more responses from Innovators and Opinion Leaders than would a mail survey of the general public. Based on their scale ratings of the Innovator scale (Goldsmith & Hofacker, 1991) and Opinion Leader scale (Flynn et al., 1996), respondents were classified into three groups (Low, Medium or High), with those in the High rating groups designated Opinion Leaders, or Innovators. It should be noted that the cut-off points are arbitrary; there is no set rule. The cutoffs were made at points that gave a useable sample of respondents classified as Opinion Leaders or Innovators (21+/30), bearing in mind that these are minority groups in the population. The effect of mode on the response rates for Opinion Leaders and Innovators is reported in Table 4.

As can be seen in Table 4, the proportion of Opinion Leaders or of Innovators among respondents was considerably higher for the Web than for the parallel mail survey in both domains (cell phone or Internet). However, the actual response rates for Opinion Leaders and Innovators were lower for the Web than for mail across both domains. When the combined mixed-mode results are compared with mail (columns D and A), mail still produces a higher response rate than the mixed-mode for Opinion Leaders in both modes, although it produces slightly lower response rates than mixed-mode for Innovators, in both modes. However, the differences are minimal.

DISCUSSION

The response rates for the different modes differed significantly in the present study, with the mixed-mode survey producing a much lower overall response rate than the parallel mail survey (26% c.f. 41%). This result is consistent with results from other studies that have conducted both a mixed-mode and a parallel mail survey (Quigley et al., 2000; Messer and Dillman, 2010). Thus the evidence to date suggests that response rates are likely to be substantially lower for mixed-mode surveys than for a traditional mail survey, so researchers need to take this into consideration.

One reason for these lower simultaneous mixed-mode response rates is that people who are unable or do not wish to participate via the Web are also less likely to request a printed questionnaire. This effect has now been observed in all of the mixed-mode studies, including this one. A number of the other studies report a dramatic increase in mail response rates when Web non-responders were sent a paper questionnaire rather than having to request one (Messer & Dillman, 2010; Parackal, 2003; Quigley et al., 2000; Schonlau et al., 2003). These results suggest that the task of requesting a questionnaire is a substantial barrier to survey participation by those who would otherwise respond via mail. A similar conclusion has been expressed by Smyth, Dillman, Christian and O'Neill (2010).

A possible explanation for this effect may simply be the extra burden imposed by this task. Certainly, the effects of respondent burden on response rates have long been recognised in survey research (Day, 1975; Goyder, 1985; Heberlein & Baumgartner, 1978). In the present study, 27% of those in the mixed-mode group who took the time to request a printed questionnaire failed to return it, demonstrating considerable drop-off even among those willing to put in the extra effort to participate.

Table 3: Comparison of Respondent Characteristics and Behaviour for the Mail versus Mixed-Mode (Web/Mail) Survey

	Single-Mode	Mixed-Mode:			Single-mode Mail vs. mixed-mode Web				Single-mode Mail vs. mixed-mode Mail				Single-mode Mail vs. mixed-mode Web+Mail			
	Mail (A)	Web (B)	Mail (C)	Web + Mail (D)	A versus B (E)				A versus C (F)				A versus D (G)			
	%	%	%	%	χ^2	df	p	ES	χ^2	df	p	ES	χ^2	df	p	ES
Gender																
Male	41	48	46	47	3.5	1	0.06	0.07	1.1	1	0.3	0.05	3.41	1	0.07	0.06
Female	59	52	54	53												
Age																
18-24	5	9	4	8	24.1	5	0	0.19	20.1	5	0	0.19	7.68	5	0.18	0.1
25-34	12	19	10	16												
35-44	17	24	11	19												
45-54	26	24	19	22												
55-64	24	16	26	20												
65+	15	8	30	16												
Income																
<= \$20,000	31	29	42	34	5.7	3	0.12	0.09	12.2	3	0.01	0.16	4.5	3	0.21	0.07
\$20,001-\$40,000	28	25	32	27												
\$40,001-\$60,000	25	24	13	20												
>\$60,000	15	22	13	19												
Own a camera cell phone	11	19	5	14	9.1	1	0	0.12	3.8	1	0.05	0.08	2.2	1	0.13	0.05
Own a cell phone	81	91	71	84	12.8	1	0	0.14	6.8	1	0.01	0.11	1.1	1	0.29	0.04
Subscribe to Broadband	12	18	5	13	4.5	1	0.03	0.08	6.1	1	0.01	0.11	0.3	1	0.58	0.02
Web access at home	60	89	39	72	72.2	1	0	0.33	20.5	1	0	0.2	11.9	1	0	0.02
Web access at work	52	63	27	52	6.7	1	0.01	0.11	24.3	1	0	0.23	0	1	0.85	0.01
Subscribe to MP3 service	3	4	4	4	0.8	1	0.38	0.03	0.1	1	0.72	0.02	0.6	1	0.43	0.03
Consent to follow-up	63	62	63	62	0.2	1	0.67	0.02	0	1	0.94	0	0.12	1	0.77	0.01
Internet use																
Don't use	25	4	52	20	64.5	4	0	0.31	42	4	0	0.29	4.8	4	0.44	0.08
<= 5 hours p.w.	50	54	39	49												
6-10 hours	12	20	5	14												
11-20 hours	8	14	3	10												
>20 hours	6	9	1	6												
Approximate n	374	307	168	475												

ES = Effect size =Cramer's Φ = Cramer's V = $\sqrt{\chi^2/N-(k-1)}$ where k = smaller of r (no. rows) or c (no. columns) (Welkowitz, Cohen & Ewen (2006) p.423)

Rule of Thumb: ES of approximately 0.1 is considered small and of negligible practical importance; ES of approximately 0.3 is considered medium and of moderate practical importance; ES of approximately 0.5 is considered large and of crucial practical importance (Cohen (1992), p157).

Table 4: Relative Effectiveness of Mail versus Mixed-Mode (Web/mail) for Recruiting Opinion Leaders (OL's) and Innovators (IN's)

	Single-Mode Mail (A) %	Mixed-Mode Web (B) %	Mixed-Mode Mail (C) %	Mixed-Mode Combined (D) %
Opinion Leaders (OL)				
Cell Phone domain				
Proportion of responders who are OL's	4.5	7.8	3.0	6.1
Response Rate for OL's ¹	1.8	1.3	0.2	1.6
Internet domain				
Proportion of responders who are OL's	8.9	11.7	2.4	8.5
Response Rate for OL's	3.5	2.0	0.1	2.2
Innovators (IN)				
Cell Phone domain				
Proportion of responders who are IN's	4.3	9.1	4.2	7.3
Response Rate for IN's ¹	1.7	1.6	0.4	1.9
Internet domain				
Proportion of responders who are IN's	9.5	21.1	4.2	15.2
Response Rate for IN's	3.8	3.6	0.4	4.0

Notes:

1. Each scale set has 6 5-point scale items so scores range from 6-30. Low = 6-12, Medium = 13-20, High (Innovators or Opinion Leaders) = 21-30.

2. The Response Rate for OL (or IN) = (number of responders who are OL or IN / N) *100

i.e, A mail survey of the general population with a sample of 100 people randomly selected from the electoral roll would provide 3.5 people who are Opinion Leaders in the Internet domain.

The evidence to date supports the conclusion of Dillman et al. (2001), based on comparisons of other survey modes (mail, telephone, face-to-face), that allowing respondents to choose a response mode does not necessarily generate a higher response rate. Indeed, our results suggest that requiring respondents to request a questionnaire, even via a postage paid postcard, is likely to result in a significant lowering of the response rate one could reasonably expect to obtain in a single-mode mail survey. An obvious solution, supported by evidence from a range of studies (Meckel et al., 2005; Messer & Dillman, 2010; Parackal, 2003; Schonlau et al., 2003) is to send out a questionnaire in a subsequent mail-out. This was not an option in the present study, for financial reasons.

The response rate via the Web in the present study was also low (17%), but possibly reasonable given the demands of the survey (many rating scales), the topic (new electronic products that were not of interest to many older respondents) and level of in-home web

access at the time (about 51%). It is possible that the task of logging in using a supplied ID and password also acted as a barrier. While requiring a login code is recommended practice to prevent non sample members from completing the survey, this task can cause problems (Couper, Traugott & Lamias, 2001, p.242), although there is no record of this happening in the present study. It is likely that the response rate is also a reflection of mode effects; a number of studies have noted that Web based surveys tend to generate lower response rates than comparable mail (and telephone) surveys (Cook, Heath & Thompson, 2000; Roster, Rogers, Albaum & Klein, 2004; Manfreda et al., 2008), and almost all of the studies reported in Table 1 show lower response rates via the Web than via mail when a questionnaire is provided, even when Web coverage is high (Meckel, et al., 2005; Quigley, et al., 2000).

Over time, as a greater proportion of the population gain Web access at home, one might expect the response rate for a mixed-mode survey to improve

due to higher Web participation. But as Lewis et al. (2006) have noted, level of participation via a mode can be strongly influenced by survey topic. Since there are likely to be other important factors that influence participation via Web, as yet unknown, more research is needed to identify these key factors. It is also clear that a mixed-mode mail/Web survey using mail as the initial contact needs to send out a printed questionnaire with the second or third reminder if there is to be any hope of obtaining a respectable response rate from those unable or unwilling to respond via the Web (Messer & Dillman 2010).

The results of this study uncovered significant differences in key demographic characteristics and behavioural item responses for the mixed-mode mail sample compared with the parallel mail sample and Web sample. However, when the mixed-mode mail and Web data was combined, the results were very similar to those of the parallel mail survey, except for 'Web access at home'. These results appear to suggest that offering respondents alternative survey modes simply segments the sample rather than increasing the participation of people who might otherwise not have participated in the survey. This is the conclusion reached by Groves and Kahn (1979) when the choice was mail or telephone, and surmised by Meckel et al. (2005) with regard to a mail or Web choice. However, we cannot rule out the possibility that the people who responded via the Web are people who would have not responded if only mail had been offered. This, after all, is a major motivation for using different modes in a survey. Until more is known about the effects that modes have on 'reluctant' respondents it would be unwise to dismiss this mixed-mode method.

While the proportion of respondents who were Innovators and Opinion Leaders was considerably higher for the Web mode than for the mail mode in the parallel mail survey and the mixed-mode survey, the actual response rates for Innovators and Opinion Leaders were very similar across modes. These results suggest that it would be just as effective to use a standard mail survey rather than a mixed-mode approach recruit Opinion Leaders and Innovators. While one would expect the overall responses rates for Web surveys to improve over time as more people become Web users, one would not necessarily expect the proportion of Opinion Leaders or Innovators to increase, as it is highly likely that these people are already using the Web. In fact one would expect the proportion to decrease as more people use the Web.

Nor would one expect the response rates for Opinion Leaders and Innovators to improve, since there is no reason to believe that their willingness to take part in a Web survey will change. Given these outcomes, it is difficult to justify the extra work required to run a mixed-mode survey when the purpose is to survey Opinion leaders and Innovators, unless there is some economic benefit. It is possible that this could be the case.

Given that Opinion Leaders and Innovators make up of a relatively small proportion of the population, the only way to recruit large numbers is to use large samples. Thus, given the similar response rates across mail and Web modes for Innovators and Opinion Leaders observed in the present study, either method would do. However, the larger the sample the more cost effective it becomes to employ a mixed-mode survey, as the cost of posting an introductory letter is cheaper than posting a questionnaire, and a mail survey has the additional cost of printing enough questionnaires to send to the entire sample in the first mail-out. In other words, mixed-mode surveys tend to have higher fixed costs and lower variable costs than mail surveys, so the larger the survey, the more cost-effective a mixed-mode approach is likely to be.

As for a mail survey, pre-paid or other incentives can be used to boost early response rates (Goritz, 2004) thereby reducing the costs of follow-up mail-outs. Sending out a printed questionnaire can be delayed to encourage Web responses, and then sent with the second or third reminder, to a reduced number of non-respondents. This is essentially the approach adopted by Messer and Dillman (2010). Of course, the cost-effectiveness of this approach will depend on the response rate for the Web and for the first mail-out of the questionnaire. At the time of the present survey (2004), an estimated 51% of households had Internet access. However, Internet access has increased significantly in New Zealand since then and has risen to 85% in 2011 (Internet World Stats, 2007, 2011). Furthermore, over this period, telephone response rates have been falling (Bednall & Shaw, 2003; Steeh, 2008), using email addresses has taken on legal and ethical implications (CASRO, 2008; Department of Internal Affairs, 2011), and panels still have serious limitations (Couper 2000; Schonlau, Van Soest, Kapteyn & Couper, 2009). Thus the mixed-mode mail/Web technique using address based sampling deserves further consideration, not only for recruiting Opinion Leaders and Innovators, but for surveys of the general public.

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Are the Prompt Responders to an Online Panel Survey Different from Those Who Respond Later?

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Abstract

Online panels are increasingly used in market research, but generalisations about how they can best be used and the factors that affect their data quality are still being developed. One important issue is response timeliness of panellists and the impact that this potentially has on data quality and sample representativeness. It is not known whether those who respond promptly to an invitation to participate in an online survey are different from those who do not respond as quickly. This paper investigates this issue by assessing the role of demographic variables, such as age, gender and education, attitudinal variables such as evaluations of service quality and the behavioural variable of recency of contact with the survey's sponsor, on response timeliness. It investigates whether particular types of panellists respond to invitations to participate in online surveys more promptly than others. The paper also builds upon and extends initial research findings on how quickly online panellists typically respond to a survey after its launch.

The findings indicate that those who are first to respond to an online panel survey do not differ demographically, attitudinally, or behaviourally in consistent or significant ways from those panellists who take longer to respond. This suggests that an online panel survey with a short data collection period will not be less representative than a survey with a longer data collection period. The paper also finds that approximately 45% of participants responded within 24 hours of the survey's launch and 55% responded within 48 hours. Hereafter, responses tended to plateau.

These findings add to the developing literature regarding response patterns for online panel surveys and provide practical guidance about fieldwork periods. The paper also contributes to understanding how the promptness with which panellists complete an online survey may affect the representativeness of the resultant data.

INTRODUCTION

Online panels have a number of key benefits. A principal one is that they can have shorter field times compared to traditional data collection methods, such as mail or telephone, because a large number of responses can be collected in a short amount of time (Aoki and Elasmr, 2000). In regards to this advantage of reduced field times, this paper investigates the impact of response timeliness on sample representativeness and what effect short field times may have on data quality. Response timeliness refers to the time it takes for a potential respondent (in this case an online panellist) to commence a survey after the initial survey invitation has been sent.

Another cited benefit of online panels is reduced data collection costs derived from having a pre-recruited group of people willing to participate in surveys on an on-going basis. As such, the incremental costs of increasing the number of people surveyed are

also low (Duffy et al., 2005; Göritz, 2004a, 2004b). Additionally, online panels also offer the ability to run studies with both cross-sectional and longitudinal designs cost-effectively (Duffy et al., 2005; Evans and Mathur, 2005) and allow for the easy identification and analysis of panel members' demographic, attitudinal and behavioural characteristics (Göritz, 2004a). For these reasons, as well as the inherent advantages of the online medium, marketing academics, practitioners and researchers are increasingly using online panels for market research. It is therefore important to understand the pattern of responses to such surveys and any inherent representativeness issues that may result in the data. This paper goes some way towards making a contribution to both these issues.

Literature on Online Panel Data

The advantages of online data collection have been well reported and mostly stem from greater efficiencies due to automation (Couper, 2000; Evans & Mathur, 2005; Fricker et al., 2005; Gould, 2004; Milgate,

2007); the ability to sample from large databases of pre-recruited, comprehensively profiled respondents (Evans & Mathur, 2005; Göritz, 2004a); the ability to personalise the survey experience easily and make it more convenient for respondents (Milgate, 2007); and the ability to incentivise and remind individuals, thereby improving response rates (Evans & Mathur, 2005). These all contribute to a streamlined survey experience for respondents and faster survey turnaround times for researchers, ultimately resulting in quicker reporting times.

Prior research has established that most responses to online panel and email surveys are received quite quickly. An initial study of response timeliness for three online panels found that 60% of survey respondents responded within two days of a survey's launch, after which responses only increased with the sending of a reminder (Reynolds et al., 2009). Similar findings are reported by Kellner (2004), Mehta and Sivadas (1995) and Schaefer and Dillman (1998), suggesting most responses are received within a few days of an online survey's launch and that additional days do not contribute much in terms of respondent numbers, unless additional invites or reminders are sent. This paper extends the initial studies in this area, investigating at what point responses to five online surveys plateaued.

While short survey times are an advantage when it comes to analysis and reporting of results, it may be that longer field times are still important for ensuring the representativeness of the sample in online research. Whilst no such research has yet been conducted in an online context, research with mail surveys has found this to be the case (Garland & Tweed, 1998). Yet this concern about online research representativeness of the samples and validity of resulting data for decision-making has been raised by several authors (Duffy et al., 2005; Ilieva et al., 2002). Researchers and users of research are often sceptical about the ability of Internet panels and online surveys to access a broad cross-section of the population and are concerned about the extent to which some groups of the population may be under-represented or excluded (Blackadder, 2006). Certainly the coverage of the Internet remains of concern. Whilst the coverage of the Internet has grown rapidly, both in Australia, with over 70 percent accessing it regularly (Australian Bureau of Statistics, 2009) and abroad, the 'digital divide' perseveres and some groups continue to be systematically under-represented in online samples because of a lack of

Internet access and/or computer skills amongst these groups. Australian figures mirror patterns globally, in that older people (those over 65 years of age); those not employed, the less educated, and those in lower socio-economic groups; or living in regional areas, continue to have lower rates of Internet connectivity and usage (Australian Bureau of Statistics, 2009). Furthermore, the self-selected nature of most Internet panels and online surveys also remains of concern, as does the potential of non-response to bias results (Baker et al., 2010).

Online panels specifically face two potential challenges in regards to representativeness. First, a representative group must be recruited from which to sample (a panel); second, a representative sample of respondents must be achieved for the subsequent surveys. This paper is concerned with the second challenge. One-way of ensuring a representative sample from a panel is to ensure all invited respondents have sufficient time to respond by having a long survey fieldwork period. However, long fieldwork periods are not always possible because of short reporting or decision deadlines, particularly in a commercial context where a rapid response to any number of internal or external factors may be required. Additionally, surveys are often closed after a certain quota of responses have been received from a large pool of invitees, meaning only those responding promptly have a chance to complete the survey before it is closed. These factors suggest that it is important to understand how data coming from the early responders in a online panel survey may differ from that coming later.

Research Questions

Initially this paper examines how quickly responses to five online surveys plateau, adding to the developing literature regarding response patterns for online surveys and providing practical guidance for fieldwork periods. Issues of sample representativeness and research quality are also then investigated.

Early responders to a survey are compared to late responders across five online panel surveys to determine if their attitudes, demographic, or behavioural characteristics differ. This provides an indication of whether the most eager responders to an online panel are different to those who only respond after reminders are sent, and whether later responders are important to include for representational accuracy of the research. These findings will provide guidance as to the effect of short fieldwork periods in online research.

In comparing early responders to later responders, demographic, attitudinal and behavioural characteristics are investigated. Prior research in the context of mail surveys has found gender and attitude to be related to response timeliness. Garland & Tweed (1998) found that women were slower to respond to a mail survey compared to men, and that early responders to a mail survey were slightly more positive in their responses to questions regarding service quality. These findings suggest demographic and attitudinal variables may be related to response timeliness in the online context. Furthermore, research demonstrates that age, education, and employment are all related to frequency of Internet usage in Australia (Australian Bureau of Statistics, 2009) suggesting that different demographic groups within an online panel may respond to an online survey at different rates. Behavioural characteristics are also potentially a source of response variation. A high level of involvement with the survey topic or recent contact with the organisation sponsoring the research may motivate respondents to respond more quickly (Groves et al., 2004; Groves et al., 2000). If this is the case then early responders to an online survey may be more highly involved or more polarised in their opinion and a short survey period may produce unrepresentative results.

Methodology

The data for this paper are drawn from five surveys across three different online panels established by South Australian councils for the purpose of conducting research with residents. The panel members, 2036 across the three councils, were local area residents who had volunteered to join their city council's panel and "have a say" on local issues through the completion of online surveys. All respondents were recruited via opt-in processes run

by the councils. No bought or pre-existing lists were used to build the panels. The recruitment processes were multiple-mode and were predominately offline in nature e.g. notice in the local paper, or a pamphlet with residents' rates. All online surveys reported here used a similar research design and collected a range of qualitative and quantitative information. These online surveys used a variety of different question types but analysis regarding attitudinal responses was limited to scale questions because fluctuations could be measured against response timeliness. These scales included Likert, satisfaction, and various other rating scales for non-satisfaction issues. For each survey, panellists were emailed a personalised invitation containing an individualised URL for the survey as well as information about the survey topic, estimated length of the survey, closing date, and incentive for participation. The use of an individualised URL with a unique identifier enabled respondents to be tracked over time and matched to demographic data that had been previously collected. The same researchers who administered each of the surveys reported on in this paper, ensuring consistency in treatments.

The characteristics of the surveys, including their response rates, total number of respondents and the types of scale questions used are summarised in Table 1. All scale questions had bipolar anchors at 0 and 10 or 1 and 5. A review of the literature suggests that caution must be used with the term 'response rates' in this context as this measurement often neglects response rates from each stage of recruiting and profiling the panel, and instead only reports the proportion of panellists who respond to that particular survey (Callegaro & Disogra, 2008). With this in mind, response rates in Table 1 refer to the completion rate for each particular survey rather than a cumulative response rate, starting from the recruitment stage.

Table 1: Summary of data sets

Data set	Number of respondents	Response Rate %	Number & type of scales
D1	738	57	2x5point, 10x11point
D2	393	52	13x11point
D3	377	58	6x11point
D4	322	53	6X5point
D5	206	51	14X11point
Total	2036	54	

The panels were diverse in their demographic profiles. The profiles of the analysed samples are detailed in Table 2. In addition, the three panels from which these samples were derived were found to be broadly representative of the populations from which they were drawn, although panellists were typically more highly educated (Sharp et al., 2009).

Data set one (D1) was a survey regarding panel member satisfaction, completed by 738 respondents. This data set, because of its sample size, was used to run all of the initial analyses, which were subsequently replicated in each of

the remaining four data sets. In D1 respondents were asked a range of questions using both five and 11-point scales. These scales measured satisfaction, agreement and ratings of a number of different aspects of panel membership, such as the frequency with which panellists were requested to complete surveys, the nature and relevance of the surveys and the sufficiency, or otherwise, of the information provided with each survey. The other four data set surveys pertained to various issues relevant to each of the three different councils. The appendix contains a more detailed description of each data set and the content of the survey data.

Table 2: Profile of respondents

	D1 (%)	D2 (%)	D3 (%)	D4 (%)	D5 (%)
Male	48	48	51	49	40
Female	52	52	49	51	60
Age: 18-34 years old	8	15	11	13	11
Age: 35-49 years old	28	27	26	22	32
Age: 50-59 years old	24	23	24	26	28
Age: 60+ years old	39	35	39	39	28
Household: Couple	49	52	54	56	45
Household: Couple with child(ren)	35	35	33	30	35
Household: Single	16	13	13	14	20
Employed	58	50	52	51	67
Not in labour force	39	37	38	36	23
Not stated	3	13	10	13	10
Education: Year 12	80	78	75	73	90
Education: Year 11 or below	20	22	25	27	10
Education: University	53	39	37	36	70
Education: Technical College	21	24	27	28	9
Education: Vocational	4	4	6	6	2
Education: None/Other/Not stated	21	32	29	30	18

Analysis Approach

The analysis method was to compare individual's response times to the demographic variables using Chi-square tests and ANOVAs for the scaled survey responses. Respondents were divided into four categories; those who responded within 24 hours or less of the survey opening, those who responded within 25-48 hours, those between 49-72 hours and lastly, those who took 73 hours or more to respond (this last category captured all those responding after a reminder had been sent). These time categories were chosen based on exploratory findings by Reynolds et al. (2009) regarding response timeliness that found 60% of responses would typically be gathered within the first two days, at which point they would plateau very quickly. The authors concluded that an online panel survey could be conducted in a very short time frame of only a few days if necessary. Twenty-four hour increments, therefore, were suitable for measuring response timeliness because they represent a realistic field time of between one and three days.

Results and Discussion

Looking firstly at the time panellists took to respond (Table 3), the generalisable pattern across the five online surveys analysed is that approximately 45% of participants responded within 24 hours of the survey's launch and 55% responded within 48 hours (two days). Hereafter, responses tended to plateau, only increasing substantially once a

reminder was emailed to those panellists who had not yet completed. These results are very similar to what was found in the initial study on response timeliness by Reynolds et al. (2009) and highlights that because a large number of responses can be generated within a few days, it is critical to know whether these early responders are representative of the final sample achieved.

The results in this paper are not confounded by early reminders encouraging panellists to respond faster than 'normal'. In all instances, reminder emails were only sent after 72 hours had elapsed. The last category of responders, 73+ hours, includes those who responded during the remainder of the survey period, which may be up to nine days. Overall, these findings demonstrate how fast online panel members can be expected to respond to an online survey. Importantly, incentives were not used to encourage panellists to respond faster. While incentives were offered for some surveys, in the form of a chance to win gift vouchers or movie tickets, all survey participants had an equal chance of winning regardless of when they completed the survey.

Across the five data sets three types of measures were compared looking for differences, examining the patterns, and testing for significance. These measures were the demographic, attitudinal and recency of contact with the council responses of panellists, split by each of the time category groups.

Table 3: Proportion of responses across the four time categories

Hours	≤24hrs	25-48hrs	48-72hrs	73+hrs	Total
D1	45	11	6	38	100
D2	47	9	4	40	100
D3	48	13	2	37	100
D4	26	12	14	48	100
D5	54	7	6	33	100
Ave.	44	11	6	39	100
Cumulative of Ave. Responses	44	55	61	100	45

Table 4: Significance and trends of tested variables

Data set	Variable	p value	Trend
D2	Gender	0.027	Females responded faster
D3	Gender	0.034	Males responded faster
D1	Age – 12 age groups	0.001	25-29 year olds responded faster
D1	Age – 4 age groups	0.002	20-34 year olds responded faster
D1	Age – 3 age groups	0.015	20-49 year olds responded faster
D4	Age – 4 age groups	0.042	No discernable trend
D4	Age – 3 age groups	0.023	No discernable trend
D3	Education	0.02	Year 9 or equivalent responded fastest
D5	Attitudinal	0.045	Early responders less enthusiastic

In each of the tested data sets there were very few statistically significant differences between the four response time groups. In fact, only nine out of the 88 tested variables proved to be statistically significant with a p value of less than 0.05. Of these nine, gender and age were the two most frequently appearing variables (age appeared five times as being significant, gender twice, education level and attitudinal response only once each). The results can be seen in Table 4.

In D2, the gender of the respondent had a p value of 0.023 and there was a marginal trend for females to respond to the survey slightly faster than males, however, in D3 – the only other data set to have gender as a statistically significant variable with a p value of 0.03 – males tended to participate slightly faster. Because these two trends conflict with each other, no discernible pattern emerges. Therefore, although participation by gender may drive response timeliness, no one particular gender group can be identified as more inclined to respond faster than the other.

Results for age also showed inconsistent results. Analysis of the effect of age on response timeliness initially began at a level of 12 age groups (in order to gauge potential trends by age with greater sensitivity). These age groups were then collapsed to form four

age group categories, and then three. The most notable pattern, in regards to age and response timeliness, was evident in D1 where, within the three separate age group categories, there was a tendency for the younger respondents to answer at a faster rate than the elderly. However, this tendency was not replicated in any of the other four data sets. In D1, groups aged between 25-29 were the fastest to answer in the broadest age categorisation (12 age groups); this test had a p value of 0.001. In the second age categorisation (four groups), people aged 20-34 were faster ($p < 0.01$) and in the final age categorisation (three groups), people aged 20-49 were the fastest to respond ($p = 0.02$). The other data set to have exhibited a statistically significant effect for age by response time was D4. In this data set, only the latter two age categorisations were significant; the category with four groups had a p value of 0.04 and the category with three groups had a p value of 0.02. No trend in response time by age was evident in D4. In total, age was a significant influence on response time in five out of 15 tests across the five data sets. The fastest groups to respond were skewed toward the younger age brackets in D1, however, this trend was not replicated in any of the other data sets.

The only other demographic variable where a statistically significant difference between response timeliness groups was evident was education. In

D3, respondents with a school education of 'Year 9 or equivalent' responded faster than those with a Year 10, Year 11 or a Year 12 level of education (significant at $p = 0.02$). Although this demographic sub-group responded at a faster rate than their more educated counterparts, no statistically significant examples of the same tendency were evident in any of the other data sets. Furthermore, in the instance mentioned, the sample size of people within the Year 9 or equivalent category was very small (only 11 out of 290), suggesting the results may be a sampling artefact.

The final remaining statistically significant variable to have affected response timeliness was an attitudinal measure in D5 ($p = 0.05$). Respondents were asked, on a scale of 0 to 11, to indicate their agreement with their council's goal of 'working in partnership with the local community in order to respond to and manage the impacts of climate change'. This question showed a small trend for early responders to answer less positively than later responders (an opposite trend to what was found in Garland & Tweed's (1998) study of New Zealand bank customers), yet there is no obvious explanation for why early respondents may have behaved this way. It is possible that this result is due to the small sample sizes following the initial 24-hour measurement period (104 responses were recorded within 24 hours, 11 in 25-48 hours, 12 in 49-72 hours and 60 from 73 hours+). Nevertheless, no findings such as this are replicated anywhere within any of the same data set's 11 other Likert scales, or in any of the four other data sets, suggesting the conclusion that attitude is not a main driver of response timeliness.

Finally, no statistically significant relationship was evident between the behavioural variable of recency of involvement with the organisation commissioning the research and response timeliness. In D2, those who had contacted the organisation a week prior to being sent an invitation to participate in an online survey were slightly faster to respond, however, this was not to a statistically significant degree and no other patterns such as this were seen in any of the other data sets.

Conclusion and Implications

The speed with which online panellists respond to a survey does not seem to be related to their demographic, attitudinal, or behavioural characteristics in any consistent, significant way. From this we can conclude that an online panel survey with a short data collection period of, say, just a few days will likely be just as representative as one collected over a longer time period, such as a few weeks. Whilst collection periods of less than 24 hours were not investigated, these results suggest that a total survey period of less than 48 hours is possible with a pre-recruited online panel and will not adversely affect the representativeness of the data. However, such a short survey period may limit the number of respondents if sufficient time is not allowed for a reminder. Furthermore, other errors including coverage, self-selection and non-response may still affect the representativeness of the data from online surveys.

No statistically significant patterns were established across the five data sets tested, suggesting that response time does not play a role in skewing the types of people that can be expected to respond to an online panel. The implication of these results for online panel survey administrators and those commissioning the research are positive. Closing a survey early will not result in a sample of demographically or attitudinally biased respondents, compared to if the survey had been allowed to run for a longer duration. It will also not capture respondents who are more likely to have had recent contact with the organisation. The advantage of this finding is that the process of reporting, and ultimately decision-making, can be brought forward, as surveys can be closed off as soon as it is deemed that a suitable number of responses have been collected. Given that the majority of responses for online panels are received within the first three days it may be possible to reach a suitable sample size within this time.

Appendix 1

Data set two (D2) was completed by 393 panellists and respondents were asked questions about the council's administration of the local library, including 13 satisfaction and approval questions, measured on 11-point scales. These questions ranged from satisfaction with the library's facilities and website, to approval of the library staff.

The third data set (D3), completed by 377 respondents of the same panel as D4, asked people a range of questions regarding water conservation and people's awareness and uptake of various government rebates, such as rebates for installing rainwater tanks. Six 11-point scale questions asked respondents to rate the importance of conserving water, as well as their likelihood of installing rainwater tanks given different incentives.

Data set four (D4), completed by 322 panel members, asked opinions regarding a potential amalgamation of the city's council with one or two other councils in the area. This survey included six rating scales, measured on five-point scales, regarding the potential effects of the merger.

Finally, data set five (D5) asked respondents their opinion about the use of reclaimed water for the irrigation of the local city's trees and open spaces, as well as asking people to indicate their level of support for the city's revised future planning framework. D5 was completed by 206 respondents and had a total of fourteen 11-point scales which measured acceptance of the use of reclaimed water and agreement with a range of statements regarding the city's future vision, community goals, economic strength and natural and built environment.

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