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Peter M. Siminski

University of Wollongong, siminski@uow.edu.au

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Abstract

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Keywords

question order effects; survey research; questionnaire; Australia; survey design; emergency department; context effects, ERA2015

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Author: Peter Siminski

Affiliation: Centre for Health Service Development, University of
Wollongong

Full address for correspondence: Peter Siminski
Centre for Health Service Development
University of Wollongong
Wollongong NSW 2522
Australia

Telephone number: +(61) (2) 4221 4411

Fax number: +(61) (2) 4221 4679

E-mail address: siminski@uow.edu.au

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ABSTRACT

Batteries of questions with identical response items are commonly used in survey research. This paper suggests that question order has the potential to cause systematic positive or negative bias on responses to all questions in a battery. Whilst question order effects have been studied for many decades, almost no attention has been given to this topic. The primary aim is to draw attention to this effect, to demonstrate its possible magnitude, and to discuss a range of mechanisms through which it might occur. These include satisficing, anchoring and cooperativeness. The effect seems apparent in the results of a recent survey. This was a survey of Emergency Department patients presenting to Wollongong Hospital (Australia) with apparently less urgent conditions in 2004. Two samples were taken. Question order was fixed in the first sample (n=104; response rate RR2 = 94%), but randomized in the second sample (n=46; response rate RR2 = 96%). Respondents were asked to indicate whether each of eighteen reasons for presenting to the ED was a 'very important reason', a 'moderately important reason', or 'not a reason'. The mean number of very important reasons selected was 56% higher in the first sample as compared to the second sample.

Order Effects in Batteries of Questions

1. Introduction

One of the most efficient and common formats for gathering data in a written survey is through ‘batteries’ of questions. In particular, series of questions are often presented with the same response options for each question. For example, patients at a hospital Emergency Department (ED) were recently asked to indicate whether each of eighteen reasons were ‘very important’, ‘moderately important’ or ‘not important’ for their decision to attend the ED [*reference to author’s own work suppressed*]. The questionnaire for that survey is contained in an Appendix.

Survey researchers have long been aware of bias associated with question order. The mechanisms of such bias are numerous and complicated. The most relevant theoretical contributions will be discussed below. However, almost no attention has been given to the ways that question order may systematically bias the responses to all questions in the same direction. That is the topic of this paper. The aim is to draw attention to this form of bias, to demonstrate its possible magnitude, and to discuss the range of mechanisms through which it might operate.

2. Mechanisms For Systematic Bias

2.1 Satisficing

The cognitive demands of survey response are great, whilst the rewards are often small. Krosnick (1991) discusses the forms of bias that can emerge when respondents are unable or unwilling to meet these demands. He distinguishes between ‘optimizing’ and ‘satisficing’ response strategies.

Optimizing involves careful, comprehensive consideration of survey questions. Satisficing occurs when respondents attempt to reduce the cognitive demands by giving merely satisfactory answers.

While the possible consequences of satisficing are numerous, one is of particular relevance. Krosnick (1991) refers to ‘non-differentiation’, which can occur when respondents are presented with a series

of questions with the same response alternatives. A respondent who is not optimizing may “simply select a point on the response scale that appears to be reasonable for the first object, and then rate all of the remaining objects at that point” (p.219). Therefore, if an agreeable question is listed first in a battery, satisficing may lead to all questions being answered more agreeably than under alternate question orders. A less agreeable first question may have the opposite effect. Satisficing may also lead to a higher proportion of missing values in latter questions than in earlier questions.

2.2 Context effects

The understanding of context effects has benefited from theories of the cognitive steps involved in survey response. The work of Tourangeau and colleagues (Tourangeau, 1984; Tourangeau & Rasinski, 1988) as well as Schwarz and colleagues (Schwarz & Hippler, 1991; Sudman et al., 1996; Schwarz, 1996; Wanke & Schwarz, 1997) is significant in this field. According to their theories, the process of answering a survey question consists of four components: comprehension; retrieval; judgment; and response. In a systematic discussion of these steps, Wanke and Schwarz (1997) argue that each step is subject to potential question order effects. More specifically, preceding questions may influence each step.

In answering a given question, respondents will use prior information in one of two ways. They may ‘assimilate’ it (i.e. use previous information or cognitions in answering the new question), or they may ‘contrast’ it to the new question in order to avoid redundancy (Grice, 1975). ‘Assimilation effects’ and ‘contrast effects’ bias responses in opposite directions, though it may be difficult to predict which effect is more likely to occur. Every possible order of options may result in (perhaps subtly) different comprehensions, retrievals, judgments and responses for a given respondent. Furthermore, these may differ between respondents. It is clearly impossible to ‘remove’ such effects, or even to understand them completely. But some types of context effects can systematically bias responses to all questions in a given direction. Two specific cases are discussed below.

2.3 Scale Anchoring

As discussed above, one of the steps of answering a question is the ‘response’. In responding, respondents decide how to code their judgement into one of the categories presented (Wanke & Schwarz, 1997). In the case of an ordinal scale (for example ‘very important’; ‘moderately important’; ‘not important’), the decision facing the respondent as to where the boundaries lie between categories is not straightforward.

A common theory is that respondents ‘anchor’, or calibrate, the scale according to the most extreme stimuli that come to mind. These stimuli may include ideas from previous questions. If a respondent assimilates such ideas, an extreme stimulus from an earlier question may lead to the formation of a more extreme scale of comparison. Alternatively, if information conveyed in previous questions is contrasted by the respondent to the content of the question at hand, extreme stimuli in previous questions could plausibly lead to a less extreme scale for the question at hand.

However, it seems clear that questions presented in a battery are to be assessed on the same scale. It seems unlikely that a respondent would deliberately exclude information from early questions in anchoring the scale used to evaluate subsequent questions. Thus the direction of an anchoring effect should be predictable, and subject to assimilation of previous information. Extreme stimuli in early questions should result in a scale that is calibrated in accordance with that extremity.

Scale anchoring appears to be the only cause that has been explicitly proposed as a mechanism for the effect under consideration (Dillman et al., 2003). But as argued in this paper, it is only one of a number of possible explanations.

2.4 Cooperativeness

A second specific context effect is proposed. This effect relates to Grice’s (1975) ‘cooperative principle’. Survey response can be seen as a conversation between the respondent and the researcher. By this principle, participants in a conversation usually strive to be cooperative in order to form a

shared ‘common ground’ of understanding. However, the cooperative principle does not apply in some circumstances such as a courtroom scene, since a shared understanding between participants is not the goal (Schwarz, 1996).

It follows that survey respondents who feel threatened or are otherwise uncooperative may respond differently to cooperative respondents. They may adopt a guarded, defensive response strategy. Also relevant to this suggestion is ‘positivity bias’ (or ‘leniency bias’), which is a tendency for respondents to overuse the positive end of rating scales (Tourangeau et al., 2000). Various reasons have been given to explain positivity bias. But the cooperative principle suggests that positivity bias might affect a cooperative respondent more than a guarded respondent. Indeed, Schwartz (1996: 16) argues that “many well-known biases are either attenuated or eliminated” when the assumption of cooperativeness is called into question. If this is the case, one might argue that to lose the cooperation of respondents will reduce positivity bias. However, a respondent who is sufficiently uncooperative may not conform to other conversational maxims and thus provide information that is biased in other ways. In any case, it does not seem like a good strategy to deliberately create conditions under which respondents become uncooperative!

In some situations, the content of early questions may influence respondents’ understanding of the survey researcher’s motives. This may affect a respondent’s cooperativeness and hence the likelihood of a positivity bias throughout the questionnaire.

2.5 Summary

Question order effects may systematically bias responses to batteries of questions in the same direction through a number of mechanisms. Those identified here are satisficing, scale anchoring and cooperativeness.

3. An Example: The Ed Patient Survey

A possible case of this effect is apparent in the results of a recent survey. This was a survey of hospital Emergency Department (ED) patients with apparently less urgent conditions, conducted in the former Illawarra Health Area in Australia.¹ An ED specialist nurse researcher visited Wollongong Hospital on numerous occasions between 8am and 6pm on weekdays and between 8am and 12pm on Saturdays. They were administered in the waiting room after patients had been assessed and were waiting to be seen. Approximately half of the respondents (those who were not accompanied by friends or family) were assisted in responding to the questionnaire by the nurse researcher. In the other cases, the questionnaire was completed unaided or with the assistance of a family member or friend who was present. Respondents were asked to indicate whether each of eighteen reasons for presenting to the ED was a 'very important reason', a 'moderately important reason', or 'not a reason'.

Two samples of patients were surveyed. The first consisted of 104 respondents and was conducted between January and July of 2004. The second consisted of 46 respondents and was conducted between September and November 2004. The questionnaire used in the initial sample (included in the Appendix) was characterised by fixed question ordering. In the second sample, the questions were ordered randomly (46 different question orders).² The response rates (RR2) were 94% (104/111) in the first sample and 96% (46/48) in the second sample.³

It is acknowledged that the two samples were conducted at different times in the year, and respondents were not randomly allocated to the two groups. This may have affected the results due to unobserved differences between groups. However, there is no specific difference between the two periods that are apparent to the research team. In any case, these data serve the purpose of illustrating a possible case of the effect under consideration. This study does not aim to prove the existence of the effect, merely to raise it as an issue worthy of further investigation.

The key finding was a large difference in the mean number of ‘very important reasons’ selected by respondents in the two samples. The mean was 2.28 in the first sample, and 1.46 in the second sample. The difference between the two was thus 0.82 (95% CI: 0.78 to 0.87).

[Table 1 about here]

This result was examined further using Ordinary Least Squares multiple regression to control for any observed differences between samples. The number of ‘very important’ reasons was modeled as a function of the sample (0 for sample 1; 1 for sample 2), whilst sex, age, age squared, Indigenous status, language, day of week, health insurance status, usual place of health care, and who completed the questionnaire were held constant. The results are shown in the first three columns of Table 2, and they suggest an even greater difference in the number of very important reasons chosen between the samples (1.02), when these characteristics are held constant. The other columns of Table 2 will be discussed subsequently.

[Table 2 about here]

The study design did not enable conclusive tests for the mechanisms discussed above. However, an attempt was made to investigate which mechanisms might explain the findings.

3.1 Satisficing

Krosnick (1991) argues that the extent of satisficing varies according to task difficulty, respondent ability and respondent motivation. In the ED survey, the task was constant across respondents and respondent motivation was not measured. But a proxy for respondent ability is present in the data. Order effects are weaker among highly educated people (McClendon, 1986; Alwin and Krosnick, 1991; Narayan and Krosnick, 1996), though educational attainment was not asked in the ED survey. However, using meta-analysis of 14 response order experiments, Knauper (1999) demonstrated that much of the apparent education effect may in fact be explained by age. She argues that answering

survey questions requires the same cognitive faculties that decline with the normal process of ageing, beginning in early adulthood.

Thus there is an inverse relationship between age and ability to meet the cognitive demands of answering surveys. A measurable age effect on the result under consideration would provide support to the satisficing hypothesis. To test this, the sample was restricted to the set of self-respondents and split into two roughly equal groups on the basis of age. The OLS regression (described above) was repeated for both sub-groups and the results are shown in columns 4 to 7 in Table 2. The dummy variable of interest (Sample 2) was statistically significant in the older subset ($p < 0.01$), but not in the younger subset ($p < 0.13$). However, the point estimate of the co-efficient was similar for the two groups (-0.81 in the younger group and -1.04 in the older group), and the difference therein was not significant.

There was also no evidence of a greater proportion of missing values for later questions. Indeed missing values were very rare. In the first sample, each question had only one missing response each, with the exception of Q1 (no missing values) and Q7 (two missing values). Similarly, each question *position* in the second sample had one missing response each, with the exception of the sixth position, which had no missing values.

3.2 Scale Anchoring

In the first sample, two of the three most extreme positive stimuli were listed first and second.⁴ By the discussion above, this should have the effect of shifting the mental boundary between ‘very important’ and ‘moderately important’ to a ‘higher’ position. Thus subsequent responses would be less likely to be coded as ‘very important’, resulting in a lower mean number of very important reasons as compared to alternate question orders. But the difference in the mean between the two samples discussed here is in the opposite direction. Thus anchoring is not apparent. Alternatively, anchoring is off-set by other, stronger, effects.

3.3 Cooperativeness

The context of the ED survey makes it susceptible to question order effects on respondent cooperativeness. Recall that respondents were recruited from the waiting rooms of Emergency Departments. It is likely that many of them were in pain or otherwise feeling unwell, and judging by their responses (Table 1) most seemed to perceive themselves as legitimate users of the service. Respondents in the first sample were presented with notions of urgency and complexity as the first two reasons for explaining their presence in the waiting room. It would seem likely that these respondents would consequently feel legitimated, and would thus form a positive impression of the research and the researcher. In the second sample, many respondents were presented with less sympathetic initial questions. Whilst not intended by the research team, many of these questions could have been perceived to question the legitimacy of the respondents' presentation to ED. If so, those respondents may have felt misunderstood, and may have been less likely to relate to the researcher. Worse still, these respondents may have suspected an ulterior motive on the part of the researcher. For example, an initial question that asks whether financial reasons are important to the ED presentation might be interpreted by some respondents as a *suggestion* that they attended the ED to save money, consequently limiting access to people with generally urgent cases.

The mean number of 'very important' reasons was compared for different question orders within the second sample. Responses to those surveys where one of the three most prevalently selected reasons (towards which respondents were clearly most agreeable) was listed first were compared to the cases of other question orders. The three most frequently selected reasons in each sample were Q1, Q7 and Q2. Within the second sample, the mean was indeed higher when one of these three was listed first than otherwise (2.0 compared to 1.36, $p < 0.04$ one sided). This suggests that cooperativeness may be influenced by question order. But this result could also be explained by assimilation of perceptions related to the early items, a possibility that was not able to be examined.

4. Discussion

The aim of the paper has been to suggest that question order has the potential to cause systematic positive or negative effects on responses to questions in batteries. This may occur through a number of mechanisms. The ED survey suggests that the effect can be large. However, the survey results do not constitute proof of the effect and further research is needed to substantiate the results and further investigate the mechanisms.

In the meantime, survey researchers are urged to consider randomising the order of questions in batteries (unless perhaps some questions could be perceived as particularly confronting if presented early). This suggestion to randomize order is not new, but is often dismissed as too costly (Krosnick & Alwin, 1987; Duffy, 2003). However, in the second ED sample, the randomisation added no more than a few hours of labour to the process. Of course, only 46 questionnaires were conducted in this sample. In a larger sample, similar benefits could be obtained by producing a comparable number of versions (perhaps 30 versions), with each version characterised by a randomly chosen order. This approach does not remove order effects, but it seems likely to reduce the magnitude of resulting bias.

5. References [excluding one reference to authors' own work]

Alwin, D. F. & Krosnick, J. A. (1991). The Reliability of Survey Attitude Measurement: The Influence of Question and Respondent Attributes. *Sociological Methods and Research* 20: 139-181.

American Association for Public Opinion Research (2004) *Standard Definitions: Final Disposition of Case Codes and Outcome Rates for Surveys*, 3rd edition. Lenexa, Kansas: AAPOR. Available online at <http://www.aapor.org> (accessed July 2005).

Dillman, D. A., Smyth, J. D., Christian, L. M. & Stern, M. J. (2003, August). *Multiple Answer Questions in Self-Administered Surveys: The Use of Check-All-That-Apply and Forced-Choice Question Formats*. Paper presented at the annual meeting of the American Statistical Association, San Francisco, CA.

Duffy, B. (2003). Response order effects-how do people read?. *International Journal of Market Research* 45: 457-475.

Grice, H. P. (1975). Logic and conversation. In Cole, P. & Morgan, J. L. (Eds.) *Syntax and semantics, Volume 3 Speech acts*. New York: Academic Press, pp. 41-58.

Knauper, B. (1999). The Impact of Age and Education on Response Order Effects in Attitude Measurement. *Public Opinion Quarterly* 63: 347-370.

Krosnick, J. A. (1991). Response Strategies for Coping with the Cognitive Demands of Attitude Measures in Surveys. *Applied Cognitive Psychology* 5: 213-236.

Krosnick, J. A. & Alwin, D. F. (1987). An Evaluation of a Cognitive Theory of Response-Order Effects in Survey Measurement. *Public Opinion Quarterly* 51: 201-219.

McClendon, M. J. (1986). Response Order Effects for Dichotomous Questions. *Social Science Quarterly* 67: 205-211.

Narayan, S. & Krosnick, J. A. (1996). Education moderates some response effects in attitude measurement. *Public Opinion Quarterly* 51: 201-219.

Schwarz, N. (1996). *Cognition and Communication: Judgmental Biases, Research Methods, and the Logic of Conversation*. New Jersey: Lawrence Erlbaum Associates.

Schwarz, N. & Hippler, H. J. (1991). Response Alternatives: The Impact of Their Choice and Presentation Order. In Biemer, P. P., Groves, R. M., Lyberg, L. E., Mathiowetz, N. A. & Sudman, S.

(Eds.) *Measurement Error in Surveys*. Wiley Series in Probability and Mathematical Statistics. New York: Wiley, pp. 41-56.

Sudman, S., Bradburn, N. M. & Schwarz, N. (1996). *Thinking About Answers: The Application of Cognitive Processes to Survey Methodology*. San Francisco: Jossey-Bass.

Tourangeau, R. (1984). Cognitive Science and Survey Methods. In Jabine, T., Straf, M., Tanur, J. & Tourangeau, R. (Eds.) *Cognitive aspects of survey methodology: building a bridge between disciplines*. Washington D.C.: National Academy Press, pp. 73-100.

Tourangeau, R. & Rasinski, K. (1988). Cognitive Processes underlying context effects in attitude measurement. *Psychological Bulletin* 103: 299-314.

Tourangeau, R., Rips, L. J. & Rasinski, K. (2000). *The Psychology of Survey Response*. Cambridge: Cambridge University Press.

Wanke, M & Schwarz, N. (1997). Reducing Question Order Effects: The operation of Buffer Items. In: Lyberg, L. E., Biemer, P. P., Collins, M., de Leeuw, E., Dippo, C., Schwarz, N. & Trewin, D. (Eds.) *Survey Measurement and Process Quality*. New York: Wiley, pp. 115-139.

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Appendix – Survey Instrument

For office use only:

Location of ED: TWH/SHH/BDH/SDMH/MUH

Time: Date:

Day: Sun Mon Tues Wed Thur Fri Sat

Illawarra Health Emergency Department (ED) Research Project

Survey of Emergency Department (ED) Patients

A. Please complete these details and tick the boxes about the patient.

Male <input type="checkbox"/>	Female <input type="checkbox"/>	Are you Aboriginal or Torres Strait Islander?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Age of patient _____	Postcode of patient _____				
What language do you speak at home?	<input type="checkbox"/> English	<input type="checkbox"/> Other (please specify): _____			
Do you usually come to the Emergency Department (ED) or to a General Practitioner (GP) or Medical Centre for your health care?	<input type="checkbox"/> ED	<input type="checkbox"/> GP/ Medical Centre			
Do you usually come to the Emergency Department (ED) or to a General Practitioner (GP) or Medical Centre for your After Hours health care? (For this survey, 'after hours' means the hours between 6:00pm to 8:00am Monday to Friday, after 12.00 noon Saturday and all day Sunday).	<input type="checkbox"/> ED	<input type="checkbox"/> GP/ Medical Centre			
Thinking back over the last 12 months, how many times have you visited an Emergency Department (ED) before today (not just this ED, but also any other ED you may have been to)?	Never <input type="checkbox"/>	Once <input type="checkbox"/>	2-5 times <input type="checkbox"/>	6 times or more <input type="checkbox"/>	
Thinking back over the last 12 months, how many times have you visited a General Practitioner (GP)?	Never <input type="checkbox"/>	Once <input type="checkbox"/>	2-5 times <input type="checkbox"/>	6 times or more <input type="checkbox"/>	
Do you have private health insurance?	<input type="checkbox"/> Yes	<input type="checkbox"/> No			
Person completing this survey (tick one):	The patient <input type="checkbox"/>	Parent <input type="checkbox"/>	Other family member <input type="checkbox"/>	Friend <input type="checkbox"/>	Other <input type="checkbox"/>

B. Please tick the box that best describes the problem that led you (or the patient you are caring for) to come to the ED today

<input type="checkbox"/> An injury	<input type="checkbox"/> An illness	<input type="checkbox"/> Other
------------------------------------	-------------------------------------	--------------------------------

C. Why did you come to the Emergency Department (ED) today rather than a General Practitioner (GP) or medical centre?

Please tick the box that best describes the importance of each of the following possible reasons that you came to the Emergency Department today. There may be more than one reason that you came to the ED today.

	A very important reason	A moderately important reason	Not a reason
1. My health problem needed immediate attention and was too urgent to wait to see a GP or Medical Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. My health problem was too serious or complex to see a GP or Medical Centre, including after hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I feel the medical treatment is better at the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I wanted a second opinion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I did not want my GP to know about this particular health problem so I came to the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I usually prefer to talk to a doctor I don't know about my health problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	A very important reason	A moderately important reason	Not a reason
7. I am able to see the Doctor and have any tests or X- rays all done in the same place at the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am not able to get in as a patient at a GP surgery as the books are closed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I am not happy with the time I have to wait to get an appointment with a GP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I do not like making appointments and prefer the ED as I can attend when I want	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. It is easier for me to get to the ED than a GP surgery or Medical Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. There is no charge to see a doctor at the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. There is no charge for tests, x- rays or medicine at the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I wanted to see a female doctor and thought I could at the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I wanted to see a doctor or interpreter who speaks my language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I wanted to be able to see Aboriginal health staff if I needed to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I prefer to be in the ED environment than at a GP surgery or Medical Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. My family has traditionally used the ED (Casualty) for our health care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you are attending After Hours (that is, between 6pm and 8am Monday to Friday, or after 12noon Saturday and all day Sunday) please complete the following questions.

Please tick the box that best describes the importance of each of the following possible reasons that you came to the Emergency Department today. There may be more than one reason that you came to the ED today.

19. I do not know how to contact an After Hours GP service or Medical Centre
<input type="checkbox"/> A very important reason <input type="checkbox"/> A moderately important reason <input type="checkbox"/> Not a reason

20. My family has traditionally used the ED for all our After Hours health care
<input type="checkbox"/> A very important reason <input type="checkbox"/> A moderately important reason <input type="checkbox"/> Not a reason

D. Would you like to make any additional comments on why you chose the ED to provide your health care today or at other times?

Thank you for participating in this survey

Table 1 Respondents selecting each reason as very important (% of valid responses) and mean number of very important reasons (initial vs subsequent sample)

Variable	Fixed order	Random order	Difference	95% CI	
Q1	66.3%	43.5%	22.9%	5.8%	39.9%
Q2	44.7%	33.3%	11.3%	-5.9%	28.6%
Q3	19.4%	4.4%	15.0%	2.5%	27.4%
Q4	12.6%	15.6%	-2.9%	-14.9%	9.0%
Q5	2.9%	0.0%	2.9%	-2.0%	7.8%
Q6	3.9%	0.0%	3.9%	-1.8%	9.6%
Q7	51.0%	37.8%	13.2%	-4.3%	30.7%
Q8	4.9%	2.2%	2.6%	-4.3%	9.5%
Q9	3.9%	8.9%	-5.0%	-12.9%	2.9%
Q10	3.9%	0.0%	3.9%	-1.8%	9.6%
Q11	7.8%	2.2%	5.5%	-2.8%	13.9%
Q12	2.9%	0.0%	2.9%	-2.0%	7.8%
Q13	4.9%	0.0%	4.9%	-1.5%	11.2%
Q14	0.0%	0.0%	0.0%	0.0%	0.0%
Q15	0.0%	0.0%	0.0%	0.0%	0.0%
Q16	0.0%	0.0%	0.0%	0.0%	0.0%
Q17	0.0%	0.0%	0.0%	0.0%	0.0%
Q18	1.0%	0.0%	1.0%	-1.9%	3.8%
mean number of very important reasons	2.279	1.457	0.822	0.776	0.868
mean number of very important reasons (excluding Q1, Q2, Q3, Q7)	0.481	0.283	0.198	0.169	0.227
mean number of reasons (Q1, Q2, Q3, Q7 only)	1.798	1.174	0.624	0.584	0.664

* Question numbering refers to the ordering in the original questionnaire.

- Q1 My health problem needed immediate attention and was too urgent to wait to see a GP or Medical Centre
- Q2 My health problem was too serious or complex to see a GP or Medical Centre, including after hours
- Q3 I feel the medical treatment is better at the ED
- Q4 I wanted a second opinion
- Q5 I did not want my GP to know about this particular health problem so I came to the ED
- Q6 I usually prefer to talk a doctor I don't know about my health problems.
- Q7 I am able to see the Doctor and have any tests or X-rays all done in the same place at the ED
- Q8 I am not able to get in as a patient at a GP surgery as the books are closed
- Q9 I am not happy with the time I have to wait to get to an appointment with a GP
- Q10 I do not like making appointments and prefer the ED as I can attend when I want
- Q11 It is easier for me to get to the ED than a GP surgery or medical centre
- Q12 There is no charge to see a doctor at the ED
- Q13 There is no charge for x-rays or medicine at the ED
- Q14 I wanted to see a female doctor and thought I could at the ED
- Q15 I wanted to see a doctor or interpreter who speaks my language
- Q16 I wanted to be able to see Aboriginal health staff if I needed to
- Q17 I prefer to be able to be in the ED environment than at a GP surgery or Medical Centre
- Q18 My family has traditionally used the ED (Casualty) for our health care

Table 2 OLS regression results – number of very important reasons chosen

Variable (omitted category)	All respondents		Respondents who self-completed			
	143		Younger (< 40 years)		Older (40+ years)	
Valid observations (n)	143		44		47	
	Parameter estimate	Pr > t	Parameter estimate	Pr > t	Parameter estimate	Pr > t
Intercept	2.12	0.03	1.79	0.34	4.72	0.26
Sample2	-1.02	< 0.001	-0.81	0.13	-1.04	< 0.01
Female	0.01	0.97	-0.56	0.17	-0.46	0.19
Indigenous	0.40	0.49	1.42	0.18	-0.69	0.41
Age	-0.02	0.43	-0.11	0.32	0.06	0.62
Age squared	0.00	0.23	0.00	0.10	0.00	0.71
Non-English	0.10	0.78	0.33	0.68	-0.94	0.08
Usually go to GP	0.36	0.52	0.07	0.94	-2.66	0.03
<u>Day (Monday)</u>						
Tuesday	-0.17	0.64	-0.74	0.35	-0.64	0.19
Wednesday	-0.41	0.23	-0.87	0.33	-0.93	0.04
Thursday	-0.31	0.38	-1.31	0.12	-1.57	< 0.01
Friday	-0.54	0.10	-0.99	0.19	-0.56	0.39
Saturday	-0.17	0.80	-2.26	0.18	-0.92	0.28
<u>Who Completed (Self)</u>						
Parent	0.84	0.08	n/a	n/a	n/a	n/a
Other family member	0.37	0.47	n/a	n/a	n/a	n/a
Friend	-0.20	0.80	n/a	n/a	n/a	n/a
Other family member	-0.56	0.13	n/a	n/a	n/a	n/a
<u>Private health insurance (no)</u>						
missing	-0.64	0.08	-1.03	0.18	-0.43	0.55
Yes	-0.69	0.01	-0.68	0.22	-0.53	0.18

Endnotes

¹ See [*reference to authors' own work suppressed*] for a detailed description of the context of this survey and related definitions.

² The top section of the survey instrument was unchanged (i.e. details about age, sex, frequency of presentation to ED, etc.) The first eighteen questions on reasons for presentation were randomly ordered. The initial questionnaire also included two questions on reasons that were only relevant to after-hours patients. These were not included in the second sample. After hours respondents are not relevant to the present paper and they are excluded from all analysis, sample size etc.

³ Response rates were calculated using the response rate 2 calculation method described in American Association for Public Opinion Research (AAPOR) *Standard Definitions* (AAPOR 2004). Excluded persons either refused to participate, or provided missing responses to all eighteen questions, or provided missing responses to all questions on the reverse side of the questionnaire (i.e. they presumably did not realise there was a second page to the survey).

⁴ It is assumed that the questions selected as 'very important' by the highest proportions of people in the *second* (randomised) sample are the most extreme positive stimuli. The same three questions were also the most likely to be chosen as very important in the first sample, but this is incidental.