

The impact of asking about interest in free nicotine patches on smoker's stated intent to change: Real effect or artefact of question ordering?

John A Cunningham^{1,2*}, Vladyslav Kushnir^{2,3}, Jim McCambridge⁴

¹National Institute for Mental Health Research, Australian National University, Canberra, Australia

²Centre for Addiction and Mental Health, Toronto, Canada

³University of Toronto, Canada

⁴University of York, York, United Kingdom

Post-print version

*Corresponding author

National Institute for Mental Health Research, Australian National University, Building 63, Acton, 2601, Australia. Email: john.cunningham@anu.edu.au

Abstract

Introduction: Stage of change questions are often included on general population surveys to assess the proportion of current smokers intending to quit. The current study reported on a methodological experiment to establish whether participant's self-reported stage of change can be influenced by asking about interest in free nicotine patches immediately prior to asking about intent to change.

Methods: As part of an ongoing random digit dialling survey, a randomised half of participants were asked if they would be interested in receiving nicotine patches to help them quit smoking prior to being asked whether they intended to quit smoking in the next six months and 30 days.

Results: Participants who were first asked about interest in free nicotine patches were more likely to rate themselves as in preparation for change (asked first = 33%; not asked first = 19%), and less likely to rate themselves as in the precontemplation stage of change (asked first = 34%; not asked first = 47%), compared to participants who were not asked about their interest in free nicotine patches prior to being asked about their stage of change ($p < .001$).

Conclusions: There are several possible explanations of the results. It is possible that offers of free nicotine patches increases smokers intentions to quit, at least temporarily. Alternatively, smokers being asked about interest in free nicotine patches may expect that the researchers would like to hear about people intending to quit, and respond accordingly.

Asking about smoker's intent to change is a common question in epidemiological surveys focussing on smoking cessation. The most common format is probably the stage of change algorithm, where current smokers are asked nested questions about intent to quit in the next 6 months and in the next 30 days.^{1,2} These questions are regarded as indicators of the extent to which those surveyed are likely to stop smoking in the near future and, in fact, have some predictive validity of this outcome.³

One possible concern associated with the measurement of intent to change in smokers is the potential for what has been called demand characteristics,^{4,5} in which some smokers might regard a stated intent to quit as a response preferred by the researchers, and shape their answers' accordingly. There is a literature on question-order effects, demonstrating that earlier questions can change responses to later questions,⁶ and creating new thinking in so doing.⁷ Systematic reviews on mere measurement or assessment reactivity effects provide evidence that, at least in certain circumstances, answering questions produces small effects on subsequent behaviour, with objectively ascertained outcomes in some studies.⁸⁻¹¹ The current study investigated the impact of question order on smokers' stated intent to change; assessing whether asking about interest in free nicotine patches before asking about intent to change might have an impact on the proportion of smokers who stated they were thinking about quitting. Asking questions about future intentions has been identified as particularly likely to give rise to subsequent reactivity effects.^{12,13}

Methods

This study took advantage of a random digit dialling survey used to recruit participants for a randomized controlled trial (RCT) examining the impact of mailing free nicotine patches to smokers interested in receiving them.¹⁴ Participation was restricted to adult

smokers, 18 years of age and older, who smoked 10 or more cigarettes per day, and were willing to take part in 3 interviews (now, 8 weeks, and 6 months), and to provide a saliva sample by mail at each time point. Participants were paid \$20 for the completion of each survey. The survey was offered in both English and French, and participants were recruited from across all of Canada.

After being asked a series of questions about the quantity, frequency and severity of their current smoking (the latter being assessed using the Fagerstrom Test for Nicotine Dependence),¹⁵ participants were randomized to two conditions that varied the order in which the next series of questions were asked. Group one was asked about their intent to quit smoking (stage of change algorithm) in the next 6 months and 30 days (nested questions), and their confidence in quitting smoking for good (1 = very little confidence; 10 = very confident) before being asked about their interest in free nicotine patches. In group two, the order of questions was reversed (interest in free nicotine patches asked before the other questions). The specific wording asking about interest in free nicotine patches was, “The Ministry of Health is considering different ways to help people stop smoking. One option would be to provide interested smokers with free Nicotine Patches. If Nicotine Patches were offered for free, would you be interested in receiving them?” Participants who said they would be interested in free nicotine patches were also asked a series of nested questions asked about how they would use the patches. These questions were asked before the questions about stage of change in group two.

While the survey was conducted using random digit dialling procedures, we are not treating the findings as a representative sample, in part because the inclusion criteria employed were so restrictive, but also because the procedures used to recruit participants

emphasised recruiting participants for the RCT rather than to recruit a representative sample of smoking. The analyses are conducted on unweighted data.

Results

A total of 2092 participants who smoked 10 or more cigarettes per day completed the telephone survey. There were no significant differences between condition on smoking and demographic characteristics ($p > .05$). Table 1 displays demographic and smoking characteristics by the two question order groups.

Insert Table 1 about here

There was a significant difference in participants' self-reported stage of change, depending on whether they were asked about interest in free nicotine patches before or after being asked about stage of change [$\chi^2 = 59.0$, 5 df, $p < .001$]. Inspection of the pattern of results displayed on Figure 1 indicates that participants who were asked about interest in free nicotine patches first were more likely to rate themselves in the preparation stage (asked first = 33%; not asked first = 19%), and less likely to rate themselves in the precontemplation stage (asked first = 34%; not asked first = 47%), as compared to participants who were asked about their interest in free nicotine patches after being asked to rate their stage of change.

Insert Figure 1 about here

There was no significant difference ($p > .05$) in the proportion of participants who stated that they would be interested in receiving free nicotine patches depending on whether

participants were asked about their interest in nicotine patches before (73%), or after (72%), being asked their stage of change. Finally, there was a significant difference in participant's ratings of their confidence that they could quit smoking for good [$t(2,067) = 7.9, p < .001$] with participants first being asked about their interest in free nicotine patches rating themselves as more confident that they could quit as compared to participants who were not asked about interest in free nicotine patches first [Mean (SD): Asked about nicotine patches first = 5.6 (2.7); Not asked about nicotine patches first = 4.7 (2.6)].

Discussion

There was a large impact on participants' stage of change resulting from asking about interest in free nicotine patches first. When asked about interest in nicotine patches first, participants were more likely to rate themselves as considering quitting smoking than when they were not asked about interest in nicotine patches. Similarly, first asking about interest in free nicotine patches also appeared to increase participants' confidence in their ability to quit. Asking stage of change first had no impact on the proportion of participants who stated that they would be interested in free nicotine patches.

There are several possible interpretations for these findings. The most positive interpretation from a tobacco control perspective would be that the offer of free nicotine patches, even a hypothetical one, itself encourages people to think about making a quit attempt. Simply asking the question could also be responsible for the observed effect. We cannot know, however, whether this increase in stated intentions to quit smoking is a lasting one. It is possible that an additional aspect of the benefit of mass distribution initiatives that offer free nicotine patches is that they get more people to think about

quitting smoking, regardless of whether they actually respond to the offer and receive free nicotine patches.

The alternate type of explanation for this pattern of findings is that they are a methodological artefact which has little real world meaning. For example, participants who are asked about interest in free nicotine patches before being asked about their stage of change may be more likely to anticipate that the interviewer would prefer to hear that they are thinking about quitting, as compared to participants who are not asked about their interest in nicotine patches first. It is also possible that other aspects of engagement with the questions are involved in the differences between the two groups. There is no way to rule out this alternate explanation with the current data. This study suggests the need for careful survey design, and attention to how participants actually engage with the research process.¹⁶

Funding

This research is funded by the Canadian Institutes of Health Research (CIHR).

Declaration of Interests

The authors have no conflicts of interest to declare.

Acknowledgements

Support to CAMH for salary of scientists and infrastructure has been provided by the Ontario Ministry of Health and Long Term Care. The views expressed in this article do not necessarily reflect those of the Ministry of Health and Long Term Care.

References

1. DiClemente CC, Prochaska JO, Fairhurst SK, Velicer WF, Velasquez MM, Rossi JS. The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *J Consult Clin Psychol.* 1991;59:295-304. doi: 10.1037/0022-006X.59.2.295.
2. Velicer WF, Fava JL, Prochaska JO, Abrams DB, Emmons KM, Pierce JP. Distribution of smokers by stage in three representative samples. *Prev Med.* Jul 1995;24:401-411. doi: 10.1006/pmed.1995.1065.
3. Abrams DB, Herzog TA, Emmons KM, Linnan L. Stages of change versus addiction: a replication and extension. *Nicotine Tob Res.* Aug 2000;2:223-229. doi: 10.1080/14622200050147484.
4. Orne MT. On the Social-Psychology of the Psychological Experiment - with Particular Reference to Demand Characteristics and Their Implications. *Am Psychol.* 1962;17:776-783. doi: 10.1037/H0043424.
5. McCambridge J, de Bruin M, Witton J. The effects of demand characteristics on research participant behaviours in non-laboratory settings: a systematic review. *PLoS One.* 2012;7:e39116. doi: 10.1371/journal.pone.0039116.
6. Feldman JM, Lynch JG. Self-Generated Validity and Other Effects of Measurement on Belief, Attitude, Intention, and Behavior. *J Appl Psychol.* Aug 1988;73:421-435. doi: 10.1037//0021-9010.73.3.421.
7. Cartwright M, Ogden J, Grunfeld EA, Weinman J. Can Self-Report Questionnaires Create Illness Cognitions in Middle-Aged Men? *Health Psychol.* Jul 2012;31:534-538. doi: 10.1037/A0026504.
8. Rodrigues AM, O'Brien N, French DP, Glidewell L, Sniehotta FF. The Question-Behavior Effect: Genuine Effect or Spurious Phenomenon? A Systematic

- Review of Randomized Controlled Trials With Meta-Analyses. *Health Psychol.* Jan 2015;3461-78. doi: 10.1037/Hea0000104.
9. McCambridge J, Kypri K. Can simply answering research questions change behaviour? Systematic review and meta analyses of brief alcohol intervention trials. *PLoS One.* 2011;6e23748. doi: 10.1371/journal.pone.0023748.
 10. McCambridge J, Butor-Bhavsar K, Witton J, Elbourne D. Can research assessments themselves cause bias in behaviour change trials? A systematic review of evidence from solomon 4-group studies. *PLoS One.* 2011;6e25223. doi: 10.1371/journal.pone.0025223.
 11. McCambridge J, Witton J, Elbourne DR. Systematic review of the Hawthorne effect: New concepts are needed to study research participation effects. *J Clin Epidemiol.* Mar 2014;67267-277. doi: 10.1016/J.jclinepi.2013.08.015.
 12. Dholakia UM. A Critical Review of Question-Behavior Effect Research. *Review of Marketing Research.* 2010;7145-197. doi: 10.1108/S1548-6435(2010)0000007009.
 13. Godin G, Belanger-Gravel A, Vezina-Im LA, Amireault S, Bilodeau A. Question-behaviour effect: A randomised controlled trial of asking intention in the interrogative or declarative form. *Psychol Health.* 2012;271086-1099. doi: 10.1080/08870446.2012.671617.
 14. Cunningham J, Leatherdale S, Selby P, Tyndale R, Zawertailo L, Kushnir V. Randomized controlled trial of mailed Nicotine Replacement Therapy to Canadian smokers: study protocol. *BMC Pub Health.* 2011;11741. doi: 10.1186/1471-2458-11-741.
 15. Heatherton TF, Kozlowski L, Frecker RC. The Fagerstrom Test for Nicotine Dependence: A revision of the Fagerstrom Tolerance Questionnaire. *British*

Journal of Addiction. 1991;86:1119-1127. doi: 10.1111/j.1360-0443.1991.tb01879.x.

16. McCambridge J, Kypri K, Elbourne D. Research participation effects: a skeleton in the methodological cupboard. *J Clin Epidemiol*. Aug 2014;67:845-849. doi: 10.1016/J.jclinepi.2014.03.002.

Table 1 Demographic and Smoking Characteristics

	Group 1 (n = 1090)	Group 2 (n = 1002)	p-value
Age, mean (SD)	49.6 (13.7)	50.0 (13.6)	0.5
Female (%)	49.5	50.6	0.6
Married/Common-law (%)	53.8	51.8	0.4
Employed full- or part- time (%)	60.2	59.0	0.6
Cigarettes/day, mean (SD)	18.7 (8.0)	18.5 (7.8)	0.7
FTND score, mean (SD)	4.9 (2.0)	4.8 (2.0)	0.4
Years as smoker, mean (SD)	26.2 (15.1)	26.2 (15.0)	0.9

Note: FTND = Fagerstrom Test for Nicotine Dependence.

Figure 1: Effect of nicotine patch question presentation order on stage of change

