Published in final edited form as:

Psychol Addict Behav. 2014 September ; 28(3): 899–906. doi:10.1037/a0035711.

Reported planning before and after quitting and quit success: Retrospective data from the ITC 4-Country Survey

James Balmford, Elena Swift, and Ron Borland

VicHealth Centre for Tobacco Control, Cancer Council Victoria

Abstract

Planning prior to quitting smoking is widely believed to be beneficial and is usually recommended in cessation counselling, but there is little evidence on the efficacy of specific planning activities. Using data from 1140 respondents who reported quit attempts at Wave 8 of the ITC 4-Country Survey, we analysed use of eight specific planning strategies before (5) and after (3) implementation of a quit attempt, in relation to cessation outcomes, delay in implementation of the attempt, and recent quitting history. Most participants reported some planning both before and after quitting, even among those reporting quitting ‘spontaneously’. Younger smokers, those who cut down prior to quitting, and users of stop-smoking medication were more likely to report planning. Those who planned pre-quit were also more likely to plan post-quit. Unexpectedly, we found no clear benefit of planning on short term (1 month) cessation outcomes, while one pre-quit strategy (practicing not smoking) was negatively related to outcome. There was evidence for a predicted moderating effect of recent quitting experience on planning for the pre-quit task ‘practice replacement strategies’. This predicted quit success among those with multiple quit attempts in the past year, but failure among those without. This finding suggests that the quality of planning may be critical. More research, particularly on the moderating effect of quit experience, and where measures of planning are collected before outcomes become evident, is needed before clear recommendations can be made on the utility of various forms of planning for the success of quit attempts.

Keywords

smoking cessation; planning; cohort study

It is widely believed that planning for a difficult task like quitting smoking should result in increased success. Planning is emphasized in stage-based models (Prochaska, DiClemente, & Norcross, 1992), is implicit in models such as the theory of planned behaviour (Ajzen, 1991), and is recommended in smoking cessation guidelines for health professionals (e.g. Zwar et al., 2011). However, there is remarkably little evidence that any specific planning strategy contributes to quit success, but convincing evidence that a range of cognitive-behavioural (CBT) interventions which include both pre-and post-quit planning activities do

increase successful quits (Jepson, Harris, Platt, & Tannahill, 2010). If some forms of planning are not contributing to quit success, support programs might be able to be streamlined to only focus on aspects which provide benefits.

This paper explores the potential contribution to short-term quit success of several forms of planning. Some planning activities are designed to better understand the nature of one's addiction, such as keeping smoking diaries and exploring how it feels not to smoke in various situations. These activities need to occur before making an attempt. If a smoker has made a recent quit attempt, it should be possible to draw on learnings from that attempt, so it might be that such activities are only of value for those without relevant recent experiences. Other forms of planning are designed to improve coping, including things like seeking social supports and developing strategies to deal with high risk situations. These activities can occur both before and after the initiation of an attempt (Borland, Balmford, & Swift, 2013), and may be more effective for those with recent quitting experience, as the planning will be informed by the experience of how and when the previous attempt failed, allowing more specific planning to occur. Some, like practicing coping strategies within high risk situations, are much easier to do post quitting. If planning helps it is likely to be most important the first time specific challenges are faced, as capacity to survive would be expected to improve with experiences of successful efforts (Segan, Borland, Hannan, & Stillman, 2008).

In this study, we explore the extent of use of a number of specific planning activities, both pre- and post- implementation of a quit attempt, and their relationships with short-term quit success (achievement of 1 month quit). We also consider planning in the context of the timing of the decision to quit in relation to the initiation of the attempt. While there is some evidence that delayed attempts are less successful than those that occur spontaneously (e.g. West and Sohal, 2006; Ferguson, Shiffman, Gitchell, & Sembower, 2009; Cooper et al., 2010), this may in part be because smokers do not generally use the delay to engage in useful planning. We hypothesise that (a) smokers who engage in planning, both pre- and post- initiation of a quit attempt, will be more likely to be successful than those who do not, independent of use of stop-smoking medication and quitting method (abruptly or after cutting down); (b) spontaneous quitters who engage in post-quit planning will be more successful than those who do not; (c) planning will moderate any negative effect of delay; that is, delaying the initiation of a quit attempt will be associated with success only among those who report pre-quit planning; and (d) that pre-quit coping strategies will be more useful for those with recent quitting experience, but not activities to better understand one's smoking.

Method

Participants

The International Tobacco Control Four Country Survey (ITC-4) is a longitudinal representative cohort study of adult smokers in the United States, Canada, United Kingdom and Australia conducted via computer-assisted telephone interview. At each wave, those lost to follow-up are replaced by a replenishment sample selected using the same procedure. The study recruits only current smokers, but seeks to retain them even if they subsequently quit

(see Fong et al. (2006) and Thompson et al. (2006) for more detail). Wave 8 of the ITC-4 was conducted from July 2010 to February 2011. The current study includes data from 1140 respondents who reported making a quit attempt lasting at least 24 hours in the 6 months before being interviewed, and provided full data on each of the socio-demographic and smoking-related control variables. Preliminary analysis suggested that there may be differential recall (e.g. lower reported planning) for quit attempts beginning prior to this period, and so any such cases were not included. Short-term abstinence outcomes could not be determined for 98 participants who were quit for less than 1 month at time of survey, thus the outcome analyses were conducted on a reduced sample of 1042.

Measures

Demographic variables included age (18–24, 25–39, 40–54, and 55+ years), gender, country, and socioeconomic status (SES). SES was derived from measures of income and education classified into within-country tertiles (low, moderate and high). In each country, low education designated those who did not complete secondary school and high education those with a university degree. Low SES corresponds to low-low and low-moderate combinations of income and education, and high SES corresponds to moderate-high and high-high combinations. Where respondents refused to give their income ($n=78$), only education was used to estimate SES.

Planning strategies were chosen from those recommended in protocols for counsellors and self-help manuals. Five forms of pre-quit planning were assessed with respect to the days or weeks leading up to respondents' previous quit attempt: (a) practicing not smoking; (b) practicing replacement strategies; (c) keeping a smoking diary; (d) asking a friend or family member for social support; and (e) thinking about tempting situations and making plans to avoid smoking. We asked about three forms of post-quit planning in the first week of the attempt: (a) planning for tempting situations; (b) seeking social support as for pre-quitting, and (c) practicing strategies for coping in problematic situations.

The extent of delay between the decision to quit and the initiation of the quit attempt was derived from Cooper et al. (2010), resulting in a 6-level categorical variable: (a) stopped immediately they decided (this defines spontaneous quitting); (b) quit later on same day; (c) decided the day before; (d) decided 2–6 days before; (e) decided a week or more before stopping; and (f) decided after having not smoked for some other reason.

Nicotine dependence was assessed using the Heaviness of Smoking Index (HSI; Heatherton, Kozlowski, Frecker, Rickert, & Robinson, 1989) based on number of cigarettes per day and time to first cigarette. Scores were recoded into low (0–1), moderate (2–3), and high nicotine dependence (4–6). The HSI score was taken from the previous wave (Wave 7), or for those quit at Wave 7, from Wave 6 where available. Recent quitting experience was defined as multiple quit attempts in the Wave 7 to Wave 8 inter-survey interval. We also assessed use of stop-smoking medication and quit method (stopped abruptly vs cut down). Finally, we controlled for the number of days since the start of the most recent quit attempt, expressed as a logarithm to achieve a normal distribution.

The cessation outcome was successfully quitting for at least 1 month, chosen because it corresponds with the typical period of active coping (Herd, Borland & Hyland, 2009) in which planning is likely to be most beneficial.

Analyses

Multivariate logistic regression was used to determine predictors of planning and the relationship between planning and success. We constructed models to determine whether engaging in pre-quit planning moderates the relationship between delay and quit success, and to determine whether the observed bivariate relationships (step 1) persisted after controlling for socio-demographic variables (step 2), and for a set of potential mediating and/or moderating variables (step 3). All analyses used Stata v.12.1.

Results

Table 1 shows that no individual planning activity was undertaken by a majority. Nearly all were positively correlated, albeit slightly in some cases, indicating some general tendency to either plan or not. In particular, those who sought social support before quitting were much more likely to also do so afterwards. Overall, 73.9% reported at least one of the pre-quit planning tasks (mean = 1.7, SD=1.37), and most also carried out at least one of the post-quit tasks (61.7%, mean = 1.1, SD=1.10). Overall, 36.4% had successfully quit for at least a month on the target quit attempt.

Patterns of pre- and post-quit planning are reported in Table 2. Pre-quit planning was lower among older participants, and those from the UK and Australia. It was more common among those who used stop-smoking medication, cut down to quit, and delayed implementation. Post-quit planning showed no clear demographic trends, but was more common among those who reported cutting down to quit, and those who reported a delay in implementation of more than 1 week.

All of the planning tasks were significantly related to implementation delay except for post-quit planning for tempting situations ($p=.06$), see Table 3. Any delay, even within the same day, was associated with more planning for the pre-quit tasks, with only some showing increasing trends with increased delay. Over half of those who quit spontaneously without delay reported some pre-quit planning activity. Those who decided to quit after having not smoked for some other reason tended to perform fewer pre- or post-quit plans than all groups, bar the spontaneous quitters.

Hypothesis A was not supported (see Table 4), indeed one strategy, practicing not smoking before quitting, was associated with failure to remain quit after controlling for demographics and smoking-related variables. There were no other significant effects.

We found a significant relationship between delay and abstinence ($\chi^2(5)=23.34$, $p<.001$), but this was not linear. Those who quit 'spontaneously' (36.4%) or later the same day (38.6%) were more likely to be quit for a month than those who delayed implementation until the following day (27.4%) or for 2–6 days (28.5%). However, those who delayed for a week or more had the highest success rate (49.2%). Those quitting after having already

stopped for some other reason were similarly likely as spontaneous quitters to successfully quit for a month (36.1%).

Contrary to Hypothesis B, among those who quit spontaneously, engaging in any post-quit planning was unrelated to quit success (34.9% quit vs 38.2% quit with no post-quit planning, $\chi^2(1)=0.27$, $p=.604$), with the trend in the opposite direction. Hypothesis C was also not supported; among those who delayed their attempt or quit after having stopped for some other reason, a significant negative effect of pre-quit planning was found for abstinence (34.2% compared with 44.3% among those who did not plan, $\chi^2(1)=5.99$, $p=.014$) rather than the predicted positive effect. The negative effect was largely due to ‘practicing not smoking’; when it was excluded, pre-quit planning was no longer related to failure ($\chi^2(1)=0.93$, $p=.34$).

Those who made more than one quit attempt in the interval between waves 7 and 8 were significantly more likely to engage in only two of the individual pre-quit planning tasks; practice not smoking (49.7% vs 40.2%, $\chi^2(1)=8.89$, $p<.01$), and practice replacement strategies (44.1% vs 34.2%, $\chi^2(1)=10.20$, $p<.01$). No significant differences were found for any post-quit planning tasks. Recent quitting experience was negatively related to quit success (30.3% vs 50%, $\chi^2(1)=37.06$, $p<.001$).

As predicted by Hypothesis D, significant interactions with recent quitting experience were found for pre-quit practice replacement strategies ($p<.001$) and post-quit plans for tempting situations ($p=.01$), but not for others, although there were trends (see Table 5). Logistic regression analyses conducted for each planning task, separately for smokers with and without recent quitting experience and controlling for use of the other planning tasks, demographics and smoking-related variables, are displayed in Table 5. The effect for practice replacement strategies remained significant. As shown in Figure 1; among smokers with recent quitting experience, those who practiced replacement strategies were significantly more likely to achieve a month of abstinence, but the effect was reversed in those without recent quitting experience. Notably, the group without recent quitting experience who did not practice replacement strategies had by far the highest success rate. Contrary to Hypothesis D, however, there was no evidence that either keeping smoking diaries or practicing not smoking were of greater benefit to smokers without recent quitting experience.

Discussion

Contrary to our hypotheses, we found no evidence of a benefit of planning either before or after the initiation of a quit attempt on short-term success. Indeed, reporting practicing not smoking before the attempt was associated with higher relapse rates. Post-quit planning was not associated with better outcomes, even among spontaneous quitters where we expected the strongest effects. Similarly pre-quit planning did not appear to be useful for those delaying initiation of their attempt. The only hypothesis to be confirmed, and this only partly, was the finding that practicing replacement strategies before quitting and planning for temptations after quitting appear to have relatively greater benefit among those with recent quitting experience. Practicing replacement strategies was significant in both subgroups;

positively associated with success among those who had recently tried to quit, but negatively associated among those who had not. Post-quit planning for tempting situations was not significant in either subgroup, though there was a significant interaction in the same direction as for replacement strategies. However, as pre-quit planning for temptations trended in the opposite direction, this result should be interpreted with caution. If anything, pre-quit planning would have been expected to have been more influenced.

Engaging in planning activities, both prior to and after the initiation of a quit attempt, is common among smokers, although few appear to engage in extensive planning. We acknowledge that there are a number of planning activities that we did not ask about (e.g. listing reasons for quitting), so levels of planning are likely higher than our estimates. Those who reported engaging in pre-quit planning were younger, consistent with the findings of Cooper et al. (2010), and greater users of stop-smoking medication, consistent with Ferguson et al. (2009). Cutting down prior to quitting, and delaying implementation, were also associated with pre-quit planning. Previous studies showing associations of planning with nicotine dependence (Sendzik, McDonald, Brown, Hammond & Ferrence, 2011) and gender (Murray, Lewis, Coleman, Britton & McNeill, 2009) were not replicated. The only independent predictors of engaging in post-quit planning were having cut down, and having delayed implementation of the attempt for a week or more. While it is plausible that pre-quit planning would reduce the need for post-quit planning, we found a positive association. This may reflect a general characteristic of people who like to plan, and thus may be both more likely to delay implementation to plan, and to continue to plan beyond implementation.

The finding that those who cut down their cigarette consumption prior to quitting were more likely to plan may be due to a confounding of cutting down on cigarettes and 'practicing not smoking' (they were correlated $r_s=0.35$). Cutting down has also been shown to be related to poorer cessation outcomes (Cheong, Yong, & Borland, 2007). However, the two postulated explanations of the cutting down effect, exhaustion of self-control and incidentally reinforcing the value of remaining cigarettes (Cheong et al., 2007), don't seem directly applicable to practicing in isolated situations. The experience of practicing not smoking may not be useful because it is too different to the experience when actually quit.

That over half of all those who reported a spontaneous quit attempt also reported pre-quit planning demonstrates that a sudden decision to quit should not be taken to mean that planning did not occur. This is not surprising as smokers are thinking about quitting much more often than they make attempts (Borland, Partos, Yong, Cummings & Hyland, 2012). Indeed, Cooper et al. (2010) found that two-thirds of 'unplanned' attempts were actually preceded by some prior consideration, rather than genuinely occurring on the spur-of-the-moment. Qualitative analysis indicates that quit decisions are often delayed in order to gain support (Murray, McNeill, Lewis, Britton, & Coleman, 2010).

As in Cooper et al. (2010), we found that short delays (1–6 days) were associated with the poorest cessation outcomes. The higher quit rates for delays of more than one week were only partly due to greater use of medication, as they occurred in both those using and not using medication. However, the expected relationships between planning, delay and outcome were not found; post-quit planning did not improve outcomes for spontaneous initiators, nor

did there appear to be a benefit of planning for those who delayed. Differential planning does not seem to explain why short delays were associated with lower quit success than longer delays.

Despite the lack of overall positive effects, there was evidence that some forms of planning may be beneficial among those with recent quitting experience, in line with the notion that it is the quality of the planning that is critical. Recent experience is likely to increase the likelihood that any pre-quit planning is done in relation to challenges that are actually likely to occur, and may be particularly important to confront as repeat attempts were overall less likely to succeed (confirming findings of Partos, Borland, Yong, Hyland & Cummings, 2013). Practicing replacement strategies was useful for this group as predicted. However, such an explanation would also predict a positive effect for planning to deal with temptations, and here there was not even a trend. While we expected a benefit of practicing replacement strategies for those with recent experience, we did not expect the significantly worse success rates among those using this strategy without recent quitting experience. Although it is not inconsistent with our explanation, it does require that the experiences of quitting are very different to expectations, something we have no real evidence of. These findings need to be replicated, ideally in a prospective study perhaps using Ecological Momentary Assessment (Shiffman, Stone, & Hufford, 2008), and including measures of the kinds of strategies planned for and how they relate to what the person was actually able to put in place.

The possibility of dispositional factors influencing rates of planning is just one reason why we cannot rule out that the relationships found here are due to some other influence than planning being ineffective or even counterproductive. We think it unlikely that the effects are due to differential memory of planned and unplanned quit attempts that failed early. For this to explain the findings, it would require that planning was more memorable in the context of failure, that this applied more to some forms of planning than others, and interacted with both recent quitting experience and delay in initiation. We can think of no plausible mechanism for these combined effects. In preliminary analyses (not reported), we examined differential forgetting of quit attempts as a function of reported planning and found no evidence of it within the 6 month period used here, but did find evidence over longer recall delays, and dropped these cases. Past work on memory effects (Borland et al., 2012) suggests that there may have been some reduction in the proportion of short attempts that occurred more than 3 months prior, but there was no evidence that this interacted with reported planning.

Of greatest concern, we cannot exclude the possibility that those who engage in planning are more likely to have trouble quitting, and without the planning they would have done even worse. That the effects we found were largely unrelated to nicotine dependence as measured by the HSI counts against this explanation, as does identifying strategies to cope helping with those with recent failed attempts, but it could just be that recent experience helps to identify the most useful strategies. The predictors of failure only account for a small proportion of outcome variance, so there remains scope for a relationship with planning and some unmeasured aspect of addiction.

There was less evidence of a negative effect of post-quit planning on cessation outcome. Here it is more likely that planning is in response to experienced difficulties. However, the primacy of current experiences makes it difficult to explain the apparent relative benefit of planning for tempting situations among those with recent experience. No comparable relationship was found for this activity pre-quitting, where a prior experience-based explanation would suggest such an effect most likely to occur.

Another limitation of this study is the possibility that retrospective recall of planning is influenced by the outcome of the attempt. We also made no attempt to evaluate the quality of the planning undertaken, something very difficult to do retrospectively as those who fail are likely to rate their planning more negatively. Thus, it is possible that the links with failure could relate to poor performance of the tasks. It is also possible that those who have automated their responses to upcoming challenges are better prepared, but are less likely to reflect on what they do, and thus may be less likely to report having prepared. Experimental studies, where planning activity is systematically varied, are needed. We are currently trialling a planning intervention (Borland et al., 2013), but more fine-grained studies are needed of the impact of specific forms of planning on short term outcomes. Finally, men and younger smokers were underrepresented in our sample; as younger age predicted planning, we may have underestimated the proportion of smokers who engage in planning. Similarly, we only asked about a small number of possible planning tasks, so nothing can be said about other forms of planning.

In conclusion, we have failed to find clear evidence of any benefit of planning quit attempts, either before or after, although those who practice replacement strategies in the context of another recent (failed) attempt appear to have gained some benefit. Further research is needed before abandoning the idea that planning improves quit outcome. In particular, more consideration should be given to the forms of planning undertaken and how this relates to the challenges faced. Perhaps too much emphasis is being placed on the skill aspect of quitting, and not on issues of vigilance and persistence which may be more important (Borland, 2014). In the interim, we advise caution about encouraging quitting smokers to engage in elaborate planning, especially before quitting, and encourage those counselling smokers to critically explore the impact of any planning undertaken.

Acknowledgments

This research was supported by multiple grants including R01 CA 100362 and P50 CA111236 (Roswell Park Transdisciplinary Tobacco Use Research Center) and also in part from grant P01 CA138389 (Roswell Park Cancer Institute, Buffalo, New York), all funded by the National Cancer Institute of the United States, Robert Wood Johnson Foundation (045734), Canadian Institutes of Health Research (57897, 79551), National Health and Medical Research Council of Australia (265903, 450110, APP1005922), Cancer Research UK (C312/A3726), Canadian Tobacco Control Research Initiative (014578); Centre for Behavioural Research and Program Evaluation, National Cancer Institute of Canada/Canadian Cancer Society. We would like to thank members of the Data Management Core at the University of Waterloo for assistance in preparing the data for this analysis.

References

- Azjen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991; 50:179–211. [http://dx.doi.org/10.1016/0749-5978\(91\)90020-T](http://dx.doi.org/10.1016/0749-5978(91)90020-T).

- Borland, R. Understanding hard to maintain behaviour change: A dual-process approach. Oxford: Wiley Blackwell; 2014.
- Borland R, Balmford J, Swift E. Planning, timing and quit success: Study protocol of a randomised controlled trial. *BMC Public Health*. 2013; 13:235.doi: 10.1186/1471-2458-13-235 [PubMed: 23496992]
- Borland R, Partos TR, Yong HH, Cummings KM, Hyland A. How much unsuccessful quitting activity is going on among adult smokers? Data from the International Tobacco Control Four Country cohort survey. *Addiction*. 2012; 107:673–682. DOI: 10.1111/j.1360-0443.2011.03685.x [PubMed: 21992709]
- Cheong Y, Yong HH, Borland R. Does how you quit affect success? A comparison between abrupt and gradual methods using data from the International Tobacco Control Policy Evaluation Study. *Nicotine & Tobacco Research*. 2007; 9:801–810. DOI: 10.1080/14622200701484961 [PubMed: 17654293]
- Cooper J, Borland R, Yong HH, McNeill A, Murray RL, O'Connor RJ, Cummings KM. To what extent do smokers make spontaneous quit attempts and what are the implications for smoking cessation maintenance? Findings from the International Tobacco Control Four Country Survey. *Nicotine & Tobacco Research*. 2010; 12(Suppl 1):S51–S57. DOI: 10.1093/ntr/ntq052 [PubMed: 20889481]
- Ferguson SG, Shiffman S, Gitchell JG, Sembower MA. Unplanned quit attempts – Results from a U.S. sample of smokers and ex-smokers. *Nicotine & Tobacco Research*. 2009; 11:827–832. DOI: 10.1093/ntr/ntp072 [PubMed: 19509277]
- Fong GT, Cummings KM, Borland R, Hastings G, Hyland A, Giovino GA, ... Thompson ME. The conceptual framework of the International Tobacco Control (ITC) policy evaluation project. *Tobacco Control*. 2006; 15(Suppl 3):3–11. DOI: 10.1136/tc.2006.017244 [PubMed: 16436390]
- Heatherton TF, Kozlowski LT, Frecker RC, Rickert W, Robinson J. Measuring the heaviness of smoking: Using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *Addiction*. 1989; 84:791–800. DOI: 10.1111/j.1360-0443.1989.tb03059.x
- Herd N, Borland R, Hyland A. Predictors of smoking relapse by duration of abstinence: findings from the International Tobacco Control (ITC) Four Country Survey. *Addiction*. 2009; 104:2088–2099. DOI: 10.1111/j.1360-0443.2009.02732.x [PubMed: 19922574]
- Jepson RG, Harris FM, Platt S, Tannahill C. The effectiveness of interventions to change six health behaviours: a review of reviews. *BMC Public Health*. 2010; 10:538.doi: 10.1186/1471-2458-10-538 [PubMed: 20825660]
- Murray RL, Lewis SA, Coleman T, Britton J, McNeill A. Unplanned attempts to quit smoking: Missed opportunities for health promotion? *Addiction*. 2009; 104:1901–1909. DOI: 10.1111/j.1360-0443.2009.02647.x [PubMed: 19681806]
- Murray RL, McNeill A, Lewis S, Britton J, Coleman T. Unplanned attempts to quit smoking: A qualitative exploration. *Addiction*. 2010; 105:1299–1302. DOI: 10.1111/j.1360-0443.2010.02980.x [PubMed: 20642512]
- Partos TR, Borland R, Yong HH, Hyland A, Cummings KM. The quitting rollercoaster: How recent quitting history affects future cessation outcomes (data from the International Tobacco Control 4-Country Cohort Study). *Nicotine & Tobacco Research*. 2013; 15:1578–1587. DOI: 10.1093/ntr/ntt025 [PubMed: 23493370]
- Prochaska JO, DiClemente CC, Norcross JC. In search of how people change: Applications to addictive behaviors. *American Psychologist*. 1992; 47:1102–1114. DOI: 10.1037/0003-066X.47.9.1102 [PubMed: 1329589]
- Segan CJ, Borland R, Hannan A, Stillman S. The challenge of embracing a smoke-free lifestyle: a neglected area in smoking cessation programs. *Health Education Research*. 2008; 23:1–9. DOI: 10.1093/her/cyl157 [PubMed: 17182970]
- Sendzik T, McDonald PW, Brown KS, Hammond D, Ferrence R. Planned quit attempts among Ontario smokers: impact on abstinence. *Addiction*. 2011; 106:2005–2013. DOI: 10.1111/j.1360-0443.2011.03498.x [PubMed: 21592249]
- Shiffman S, Stone AA, Hufford MR. Ecological momentary assessment. *Annual Review of Clinical Psychology*. 2008; 4:1–32. DOI: 10.1146/annurev.clinpsy.3.022806.091415

- Thompson ME, Fong GT, Hammond D, Boudreau C, Driezen P, Hyland A, ... Laux FL. Methods of the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control*. 2006; 15(Suppl 3):12–18. DOI: 10.1136/tc.2005.013870
- West R, Sohal T. “Catastrophic” pathways to smoking cessation: Findings from national survey. *British Medical Journal*. 2006; 332:458–460. doi: <http://dx.doi.org/10.1136/bmj.38723.573866.AE>. [PubMed: 16443610]
- Zwar, N., Richmond, R., Borland, R., Peters, M., Litt, J., Bell, J., Caldwell, B., Ferretter, I. Supporting smoking cessation: a guide for health professionals. Melbourne: Royal Australian College of General Practitioners; 2011.

Figure 1.

Relationship between practiced replacement strategies and 1-month abstinence (multivariate estimates controlling for covariates in the regression model), by recent quitting experience.

* $p=0.03$; ** $p=0.01$.

Table 1

Frequency of planning, and inter-correlations between each planning task ($n=1,140$).

Pre-quit	Pre-quit				Post-quit		
	% planned	Practiced not smoking	Practiced replacement strategies	Kept smoking diary	Sought social support	Planned for tempting situations	Practiced coping strategies
Practiced not smoking	46.7	1					
Practiced replacement strategies	41.0	0.38***	1				
Kept smoking diary	12.4	0.18***	0.19***	1			
Sought social support	23.9	0.14***	0.11***	-0.05	1		
Planned for tempting situations	42.9	0.34***	0.35***	0.05	0.25***	1	
Post-quit							
Planned for tempting situations	47.1	0.35***	0.25***	0.12	0.28***	0.41***	1
Practiced coping strategies	32.7	0.29***	0.30***	0.16***	0.24***	0.32***	0.51***
Sought social support	34.2	0.14***	0.16***	0.11***	0.57***	0.30***	0.29***

Note.

p<.001.

Table 2
 Characteristics of the sample ($n=1140$), and their relationship to pre- and post-quit planning.

Characteristic	(%)	Any pre-quit planning (% yes)	OR (95% CI) [#]	Any post-quit planning (% yes)	OR (95% CI) [#]
Demographic					
Gender					
Female	57.6%	74.6%	1	63.8%	1
Male	42.4%	72.9%	0.92 (0.69–1.24)	58.8%	0.80 (0.62–1.03)
Age group					
18–24	4.2%	83.3%	1	56.3%	1
25–39	22.7%	75.7%	0.64 (0.27–1.51)	64.5%	1.47 (0.77–2.81)
40–54	43.3%	73.4%	0.48 (0.21–1.11)	65.3%	1.46 (0.78–2.72)
55+	29.8%	71.8%	0.41 (0.18–0.96)*	55.0%	0.93 (0.49–1.75)
Country					
Canada	25.7%	81.6%	1	63.5%	1
USA	25.0%	79.7%	0.83 (0.53–1.29)	64.9%	1.10 (0.80–1.58)
UK	20.4%	64.0%	0.39 (0.25–0.61)***	56.2%	0.78 (0.54–1.13)
Australia	28.9%	69.0%	0.45 (0.30–0.68)***	61.1%	0.86 (0.61–1.20)
SES					
Low	45.5%	73.4%	1	60.1%	1
Moderate	27.4%	71.5%	0.83 (0.59–1.18)	60.3%	0.93 (0.69–1.26)
High	27.1%	77.0%	1.21 (0.84–1.76)	65.7%	1.21 (0.88–1.65)
Smoking-related					
Nicotine dependence					
Low	27.4%	71.8%	1	63.8%	1
Moderate	46.0%	76.7%	1.09 (0.76–1.56)	60.3%	0.81 (0.60–1.10)
High	26.7%	71.1%	0.95 (0.64–1.42)	61.8%	0.94 (0.66–1.34)
Used stop-smoking medication					
Yes	47.7%	78.7%	1.63 (1.19–2.21)**	64.3%	1.21 (0.93–1.56)
No	52.2%	69.5%	1	59.2%	1
> 1 quit attempt in past year					
Yes	68.2%	76.6%	1.29 (0.94–1.75)	62.0%	0.96 (0.73–1.26)

Characteristic	(%)	Any pre-quit planning (% yes)	OR (95% CI) [#]	Any post-quit planning (% yes)	OR (95% CI) [#]
No	31.8%	68.4%	1	60.9%	1
Cut down prior to quitting					
Yes	67.1%	83.0%	3.50 (2.58–4.74)***	67.2%	2.00 (1.52–2.62)***
No	32.9%	55.2%	1	50.4%	1
When chose quit day					
Same day, stopped immediately	22.4%	58.8%	1	53.7%	1
Same day, smoked first	11.6%	75.0%	1.38 (0.83–2.30)	60.6%	1.09 (0.69–1.70)
Day before	17.8%	75.4%	1.83 (1.17–2.85)**	62.1%	1.28 (0.86–1.89)
> 1 day, < 1 week before	11.5%	80.9%	2.15 (1.24–3.72)**	65.7%	1.32 (0.83–2.10)
At least 1 week before	19.0%	84.8%	2.96 (1.80–4.85)***	70.5%	1.69 (1.12–2.54)*
After having stopped for some other reason	17.7%	74.3%	1.35 (0.87–2.10)	59.9%	1.08 (0.73–1.60)
Log of days since start of QA			1.03 (0.91–1.18)		1.01 (0.91–1.14)

Note:

* p<.05;

** p<.01;

*** p<.001.

[#] All predictors entered simultaneously.

Table 3

The relationship between engagement in planning and the delay between decision and implementation.

Planning task	Same day, stopped immediately (n=255)	Same day, smoked first (n=132)	Day before (n=203)	2–6 days before (n=131)	At least 1 week before (n=217)	After having stopped for some other reason (n=202)	$\chi^2(5)$
Pre-quit							
Practiced not smoking	32.9%	53.8%	47.8%	51.9%	50.7%	50.5%	26.14***
Kept smoking diary	8.6%	15.2%	12.8%	12.2%	18.4%	8.4%	14.55*
Practiced replacement strategies	27.5%	44.7%	43.8%	44.3%	52.1%	38.6%	32.84***
Sought social support	17.3%	21.2%	25.6%	23.7%	33.2%	22.3%	17.63**
Planned for tempting situations	26.7%	37.1%	48.3%	52.7%	57.1%	40.1%	55.35***
Any pre-quit planning	58.8%	75.0%	75.4%	80.9%	84.8%	74.3%	47.02***
Post-quit							
Planned for tempting situations	39.6%	46.2%	49.8%	48.1%	53.9%	46.5%	10.49
Practiced coping strategies	28.2%	29.6%	32.0%	30.5%	42.9%	31.7%	13.49*
Sought social support	27.6%	39.4%	29.6%	35.9%	45.6%	31.2%	22.86***
Any post-quit planning	53.7%	60.6%	62.1%	65.7%	70.5%	59.9%	15.20**

Note:

* p<.05;

** p<.01;

*** p<.001.

Table 4

The relationship between each planning task and 1 month abstinence.

% quit for 1 month (n=1,042)				
	Planned	Did not plan	$\chi^2(1)$	Multivariate prediction of 1-month abstinence
Pre-quit				
Practiced not smoking	31.1%	41.1%	11.28**	0.71 (0.51–1.00)*
Kept smoking diary	32.3%	37.0%	1.06	0.70 (0.44–1.13)
Practiced replacement strategies	33.8%	38.2%	2.09	1.03 (0.74–1.43)
Sought social support	37.1%	36.2%	0.07	1.12 (0.73–1.72)
Planned for tempting situations	34.2%	38.0%	1.65	0.86 (0.61–1.21)
Any pre-quit planning	33.6%	44.2%	9.69**	N/A
Post-quit				
Planned for tempting situations	36.9%	35.9%	0.12	1.16 (0.81–1.67)
Practiced coping strategies	36.9%	36.1%	0.07	1.03 (0.72–1.49)
Sought social support	38.9%	35.1%	1.44	1.22 (0.84–1.79)
Any post-quit planning	36.2%	36.6%	0.02	N/A

Note:

* p<.05;

** p<.01.

The multivariate model includes all planning tasks entered simultaneously, and controls for age, sex, country, SES, nicotine dependence, use of stop-smoking medication, delay, cutting down/abrupt quitting, recent quitting experience, and time since start of quit attempt.

Table 5

Planning by quit success logistic regressions with controls, stratified by recent quitting experience.

	Odds ratios		
	No recent quit experience n=320	Recent quit experience n=722	Interaction with recent experience n=1042
Pre-quit planning tasks			
Practiced not smoking	0.74 (0.40–1.39)	0.68 (0.44–1.04)	1.62 (0.93–2.83)
Kept smoking diary	0.93 (0.39–2.22)	0.64 (0.35–1.14)	1.15 (0.49–2.72)
Practiced replacement strategies	0.37 (0.20–0.67) **	1.57 (1.04–2.39) *	4.01 (2.25–7.15) ***
Sought social support	0.97 (0.44–2.15)	1.33 (0.78–2.27)	1.64 (0.85–3.15)
Planned for tempting situations	1.19 (0.62–2.29)	0.74 (0.48–1.15)	1.53 (0.88–2.66)
Post-quit planning tasks			
Planned for tempting situations	0.67 (0.36–1.26)	1.50 (0.94–2.41)	2.01 (1.16–3.46) *
Practiced coping strategies	1.07 (0.55–2.08)	1.07 (0.68–1.69)	1.66 (0.93–2.96)
Sought social support	1.11 (0.57–2.17)	1.14 (0.70–1.85)	1.31 (0.74–2.32)

* p<.05;

** <.01;

*** <.001.

Note: This analysis excludes participants who quit for less than 1 day. The multivariate model includes all planning tasks entered simultaneously, and controls for age, sex, country, SES, nicotine dependence, use of stop-smoking medication, delay, cutting down/abrupt quitting, and time since start of quit attempt. Interaction models include only main effects and interaction terms.