

BRIEF REPORT

The Theory of Planned Behavior and Smoking Cessation

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A sample of 84 smokers attending health promotion clinics in a primary care setting completed questionnaires that assessed the main constructs of the theory of planned behavior, perceived susceptibility, and past cessation attempts. Regression analyses revealed that intention to quit smoking was primarily predicted by perceived behavioral control and perceived susceptibility. At 6-month follow-up, the making of a quit attempt was predicted by intention and the number of previous quit attempts, whereas the length of the quit attempt was predicted solely by the length of the longest recent quit attempt. The results suggest that interventions should focus on perceptions of susceptibility and control to increase smokers' motivation to quit. However, further work is required to identify the social cognitive variables that ensure that initial quit attempts are translated into longer term abstinence.

Key words: theory of planned behavior, health behavior, health beliefs, smoking

Smoking is closely linked with a range of long-term (e.g., coronary heart disease, cancer) and short-term (e.g., bronchitis, diminished lung capacity) negative health outcomes (Royal College of Physicians, 1983). However, those who quit smoking can substantially reduce their risk for the various smoking-related negative health outcomes, especially if they quit before age 35 years (Doll, Peto, Wheatley, Gray, & Sutherland, 1994). Although recent years have seen an increase in health promotion clinics in primary care in the United Kingdom, aimed at encouraging health-promoting behaviors (e.g., exercise) and reducing health-compromising behaviors (e.g., smoking; Department of Health and Welsh Office, 1989), a fuller understanding of the proximal determinants of smokers' decisions and attempts to quit is likely to lead to more effective interventions.

One social psychological model that may be usefully employed in this context is the theory of planned behavior (TPB; Ajzen, 1988, 1991). According to the TPB, the proximal determinants of behavior are intentions to engage in the behavior and perceived behavioral control over the behavior. Intentions represent a person's motivation to

perform the behavior, and persons with strong intentions are likely to exert more effort to achieve their goal. Perceived behavioral control is a person's perception of the amount of control he or she has over performing the behavior and, to the extent that perceived behavioral control reflects actual control, it is predicted to directly influence behavior. This construct is also seen to have an indirect influence on behavior through behavioral intentions, such that if an individual perceives a lack of control over performing the behavior, then he or she is less likely to intend to perform the behavior. Behavioral intentions are also determined by two other factors: (a) the individual's attitude toward or overall evaluation of the behavior and (b) the perceived social pressure to perform or not perform the behavior (i.e., subjective norm).

Although the TPB has been successfully applied to the prediction of a wide range of health-related behaviors (see Conner & Sparks, 1996), its application to smoking cessation is more limited. Godin, Valois, Lepage, and Desharnais (1992) found that the TPB provided strong predictions of smoking intentions and behavior in two prospective studies. In the first, perceived behavioral control emerged as the strongest predictor of behavioral intentions in a general-population sample of smokers. Behavioral intention was in turn related to smoking behavior 6 months later, although the effect of behavioral intention was removed when perceived behavioral control was added to the regression equation. In the second study, perceived behavioral control was again found to have the strongest relationship with both behavioral intentions and behavior in a sample of pregnant women. Borland, Owen, Hill, and Schofield (1991) used the TPB as a framework to investigate smoking cessation

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following the introduction of worksite smoking bans. Making an attempt to quit in the following 6 months was primarily predicted by desire to quit (i.e., intention) and feelings of self-efficacy, whereas successful cessation was primarily predicted by habit strength.

One of the advantages of the TPB is its relative parsimony; that is, it offers a simple model of the proximal influences on intentions and behavior. However, as Ajzen (1991) conceded, the TPB is open to the inclusion of further variables if they can be shown to add to the predictive utility of the model. Two such variables may be relevant in the present context. First, some authors (e.g., Norman & Conner, 1996; Oliver & Berger, 1979) have commented that the TPB fails to adequately consider perceptions of risk, or susceptibility, which are common in other models of health behavior, such as the health belief model (Becker, 1974) and protection motivation theory (Rogers, 1983). In these models, perceptions of personal susceptibility are seen to motivate individuals to protect themselves. As such, perceived susceptibility may provide the motivating force behind decisions to quit smoking. A number of studies have found perceptions of susceptibility to be linked to reductions in smoking behavior (Giannetti, Reynolds, & Rihen, 1985; Kaufert, Rabkin, Syrotuik, Boyko, & Shane, 1986). Second, the smoker's history of past cessation attempts has also been found to be related to smoking cessation (Cummings, Hellmann, & Emont, 1988; Wilcox, Prochaska, Velicer, & DiClemente, 1985). Ajzen (1988) has argued that although past behavior is the strongest predictor of future behavior in many studies, its effect should be mediated by the TPB, and in particular by the perceived behavioral control component. This is consistent with Bandura's (1986) claim that past behavior provides an important source of information about a person's sense of control. Nevertheless, even when relevant social cognitive variables have been assessed, past behavior is often found to have a small, but independent, effect on future behavior.

Previous applications of the TPB to smoking behavior have been conducted among smokers facing worksite smoking bans (Borland et al., 1991), pregnant women, and the general population (Godin et al., 1992). This article reports an application of the TPB to the prediction of smoking cessation over a 6-month period following attendance at health promotion clinics in a primary care setting. It was hypothesized that the TPB would be able to predict smokers' intentions to quit, the making of a quit attempt, and the success of the quit attempt (i.e., length of abstinence). In addition, it was hypothesized that measures of perceived susceptibility and past cessation attempts would add to the predictive utility of the TPB.

Method

Respondents

Smokers attending health promotion clinics at their general practice were recruited into the study by practice staff. The health promotion clinics focused on a wide range of health-related issues

(e.g., diet, exercise, alcohol), including smoking behavior. Smokers were given information on the benefits of quitting and advised to quit. The health promotion clinics were brief, low-technology interventions typically lasting 30 min. The majority of the clinics were run by practice nurses, although a few were run by general practitioners. Subsequent analyses (not reported here) showed that the effectiveness of the interventions was unrelated to the length of the intervention or the type of health professional running it. At the end of the clinic, smokers were given a questionnaire by the practice nurse or general practitioner to complete after their clinic appointment. Prepaid return envelopes were included so that patients could post their questionnaires directly to us. Completed Time 1 questionnaires were received from 115 patients. Six months later, these patients were sent a second questionnaire to complete and return using a prepaid envelope. Completed Time 2 questionnaires were received from 84 patients. To test for potential biases in this sample, the responses of respondents returning both questionnaires ($n = 84$) were compared with those who returned only the Time 1 questionnaire ($n = 31$). No significant differences were found between the two groups on any of the measures in the Time 1 questionnaire.

Measures

The Time 1 questionnaire contained direct measures of main constructs of the TPB, in line with the methodology suggested by Ajzen (1988) and similar to those used by Godin et al. (1992). Respondents' attitude toward not smoking over the next 6 months was measured using three semantic differential scales (i.e., bad-good, harmful-beneficial, foolish-wise), scored -3 to $+3$ ($\alpha = .91$). Subjective norm, in relation to "people who are important to me," was measured using a single item, scored -3 to $+3$. Perceived behavioral control was measured using three items (e.g., How much control do you feel you have over not smoking over the next 6 months?), scored -3 to $+3$ ($\alpha = .77$). Behavioral intention was measured using four items (e.g., How likely is it that you will not smoke during the next 6 months?), scored -3 to $+3$ ($\alpha = .87$).

The questionnaire also included a measure of perceived susceptibility. Respondents were presented with a list of seven smoking-related health problems (e.g., lung cancer, bronchitis) and asked to answer the question "How likely do you think it might be that you will develop any of the following problems in the future if you continue to smoke?" on 7-point scales, scored -3 to $+3$ ($\alpha = .92$). Finally, respondents were asked to indicate how many times they had attempted to stop smoking during the past 5 years (previous quit attempts) and the length of their longest quit attempt in the past 5 years in days (longest recent quit).

The Time 2 questionnaire asked whether or not they had attempted to stop smoking in the past 6 months (attempt to quit) and, if they had, for how long they had managed to stop (length of abstinence).

Results

The sample consisted of 84 smokers, 38 men and 46 women, age 19 to 69 years ($M = 43.42$, $SD = 12.48$). Overall, 53 (63.0%) of the smokers had made an attempt to quit smoking over the 6-month study period. Of those who had made an attempt to quit, the average period of abstinence was 10.24 weeks ($SD = 14.14$). Only 13 (24.5%) of those who had made an attempt to quit reported that they were nonsmokers at Time 2. The average number of

Table 1
Descriptive Statistics and Correlations Between the TPB Variables, Perceived Susceptibility, Previous Behavior, and Smoking Cessation

Variable	<i>M</i>	<i>SD</i>	Behavioral intention (<i>n</i> = 84)	Attempt to quit ^a (<i>n</i> = 84)	Length of abstinence (<i>n</i> = 53)
Behavioral intention	0.74	1.92	—	.49***	.28*
Attitude	1.81	2.02	.12	.05	.20
Subjective norm	2.58	1.22	-.12	.31**	.10
Perceived behavioral control	-0.48	1.69	.57***	.22*	.32*
Perceived susceptibility	1.44	1.41	.38***	.23*	.28*
Previous quit attempts	2.25	5.60	-.13	.17	-.14
Longest recent quit	41.91	96.32	.23*	-.07	.45**

Note. TPB = theory of planned behavior.

^aPoint-biserial correlations.

p* < .05. *p* < .01. ****p* < .001.

cigarettes smoked per day at the start of the study was 21.54 (*SD* = 9.20). This had decreased to an average of 16.62 (*SD* = 11.10) at Time 2 follow-up, $t(64) = 4.19, p < .001$.

As shown in Table 1, only the perceived behavioral control component of the TPB was found to significantly correlate with behavioral intention, along with perceived susceptibility and the longest recent quit. Behavioral intention, subjective norm, perceived behavioral control, and perceived susceptibility were found to correlate with the attempt to quit. Finally, both behavioral intention and perceived behavioral control were found to correlate with the length of abstinence among those who had attempted to quit, along with perceived susceptibility and the longest recent quit.

A hierarchical linear regression analysis was used to predict intention to quit smoking (see Table 2). The independent variables were entered in three blocks: (a) attitude, subjective norm, and perceived behavioral control; (b)

Table 2
Predicting Intention to Quit Smoking: Hierarchical Linear Regression (*N* = 65)

Variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Attitude	.15	.08	.16
Subjective norm	-.16	.19	-.07
Perceived behavioral control	.85	.11	.69***
Step 2			
Attitude	.16	.08	.17*
Subjective norm	-.37	.19	-.18*
Perceived behavioral control	.72	.11	.59***
Perceived susceptibility	.41	.13	.31**
Step 3			
Attitude	.15	.08	.16
Subjective norm	-.43	.19	-.20*
Perceived behavioral control	.72	.12	.59***
Perceived susceptibility	.42	.12	.32**
Previous quit attempts	.16	.08	.15
Longest recent quit	.00	.00	.02

Note. $R^2 = .49$ for Step 1 ($p < .001$); $\Delta R^2 = .07$ for Step 2 ($p < .01$); $\Delta R^2 = .01$ for Step 3 (*ns*).

p* < .05. *p* < .01. ****p* < .001.

perceived susceptibility; and (c) previous quit attempts and longest recent quit. The TPB was found to explain 49% of the variance in intention to quit smoking, $F(3, 61) = 21.29, p < .001$, with only perceived behavioral control emerging as a significant predictor. The addition of perceived susceptibility led to a significant increase in the amount of variance explained, $\Delta R^2 = .07, \Delta F = 10.90, p < .01$, whereas the addition of the previous behavior variables failed to improve the prediction of intention to quit smoking, $\Delta R^2 = .01, \Delta F = 1.76, ns$. In the final regression equation, the variables under consideration were able to explain 57% of the variance in intention to quit smoking, $F(6, 58) = 15.14, p < .001$. Perceived behavioral control and perceived susceptibility emerged as significant independent predictors along with subjective norm, although the negative beta weight for subjective norm suggests that this finding may be due to a suppressor effect.

Given that the attempt to quit was a dichotomous variable, a hierarchical logistic regression was used in order to predict the making of a quit attempt. The independent variables were entered in three blocks: (a) behavioral intention and perceived behavioral control; (b) perceived vulnerability; and (c) previous quit attempts and longest recent quit. The beta coefficients and corresponding Wald significance test results for each step are shown in Table 3. The initial -2 log likelihood value for the constant-only model was 77.98. The addition of the TPB variables led to a significant improvement in the -2 log likelihood value, $\chi^2(2, N = 60) = 12.71, p < .01$, with behavioral intention emerging as a significant predictor. The addition of perceived susceptibility failed to improve the model, $\chi^2(1, N = 60) = 0.84, ns$. The addition of the previous behavior variables led to an improvement in the prediction of an attempt to quit, $\chi^2(2, N = 60) = 15.41, p < .001$. Behavioral intention and the number of previous quit attempts were the only significant predictors of an attempt to quit in the final model.

A hierarchical linear regression analysis was used to predict the length of abstinence among those respondents who had made an attempt to quit smoking ($n = 53$). The independent variables were entered in three blocks, as in the

Table 3
Predicting Attempt to Quit Smoking: Hierarchical Logistic Regression (N = 60)

Variable	B	SE B	Wald test
Step 1			
Behavioral intention	.65	.22	8.70**
Perceived behavioral control	.30	.28	1.18
Step 2			
Behavioral intention	.60	.23	7.12**
Perceived behavioral control	.35	.29	1.49
Perceived susceptibility	.22	.24	0.86
Step 3			
Behavioral intention	.69	.28	6.09*
Perceived behavioral control	.26	.35	0.57
Perceived susceptibility	.27	.26	1.06
Previous quit attempts	.88	.32	7.67**
Longest recent quit	-.01	.00	2.65

* $p < .05$. ** $p < .01$.

analysis of a quit attempt (see Table 4). Behavioral intention and perceived behavioral control were able to explain only a nonsignificant 8% of the variance in the length of abstinence, $F(2, 46) = 3.18$, *ns*. The addition of perceived susceptibility failed to increase the amount of variance explained, $\Delta R^2 = .01$, $\Delta F = 1.47$, *ns*. The addition of the previous behavior variables led to a significant improvement in the prediction of length of abstinence, $\Delta R^2 = .16$, $\Delta F = 5.71$, $p < .01$. Overall, the variables under consideration were able to explain 25% of the variance in the length of abstinence, $F(5, 43) = 4.19$, $p < .01$, with the length of the longest quit attempt in the past 5 years emerging as the only significant independent predictor in the final regression equation.

Finally, to assess the impact of potential confounder variables, age and gender were correlated with the outcome variables. For each outcome variable, the correlations were nonsignificant: intention ($r_s = -.01$, $.04$, for age and gender, respectively), attempt to quit ($r_s = .04$, $-.02$), and

Table 4
Predicting Length of Abstinence Attempt: Hierarchical Linear Regression (N = 49)

Variable	B	SE B	β
Step 1			
Behavioral intention	1.52	1.57	.17
Perceived behavioral control	2.20	1.77	.22
Step 2			
Behavioral intention	1.00	1.62	.11
Perceived behavioral control	1.95	1.77	.19
Perceived susceptibility	1.88	1.56	.18
Step 3			
Behavioral intention	0.32	1.60	.03
Perceived behavioral control	1.69	1.64	.17
Perceived susceptibility	2.03	1.42	.20
Previous quit attempts	-0.15	0.27	-.07
Longest recent quit	0.10	0.03	.42**

Note. $R^2 = .08$ for Step 1 (*ns*); $\Delta R^2 = .01$ for Step 2 (*ns*); $\Delta R^2 = .16$ for Step 3 ($p < .01$).

** $p < .01$.

length of abstinence ($r_s = .01$, $.13$). Moreover, there was no substantive effect on the predictive power of the other variables under consideration when age and gender were entered into the regression equations before the other variables.

Discussion

This study sought to apply the TPB to the prediction of smoking intentions and behavior among a sample of smokers following attendance at health promotion clinics in a primary care setting. The TPB was found to be highly predictive of smokers' intentions to quit, explaining almost 50% of the variance in behavioral intentions. In line with the findings of Godin et al. (1992), the perceived behavioral control component emerged as the most important predictor. The TPB was also found to be predictive of smokers' attempts to quit smoking over the following 6 months, with behavioral intention, but not perceived behavioral control, emerging as a significant independent predictor of the making of an attempt to quit. Finally, the TPB was unable to predict the length of abstinence among those smokers who had made an attempt to quit. The results reflect those reported by Borland et al. (1991), who found intentions to have a strong role in the prediction of making an attempt to quit following the introduction of worksite smoking bans but a weak role in the prediction of cessation success.

This study also assessed the role of perceived susceptibility within the TPB. The addition of perceived susceptibility only increased the predictive utility of the model in relation to intention to quit. Perceived susceptibility was therefore found to have a specific motivating role to play in the decision to quit, suggesting that there may be some merit in including perceived susceptibility as an additional predictor of intention in the TPB when predicting health-related decisions (Norman & Conner, 1996; Oliver & Berger, 1979). Such a conclusion is consistent with the view that perceptions of susceptibility may have only a distal influence on the performance of health behavior (Schwarzer, 1992; Weinstein, 1988), merely motivating the individual to start deliberating over performing a health-related behavior rather than guiding its performance.

The addition of the past behavior variables in the present study led to an increase in the predictive utility of the model in relation to the making of an attempt to quit and the period of abstinence following the quit attempt. Making an attempt to quit following the health promotion clinics was predicted by the number of attempts to quit in the past, whereas the success of the quit attempt was predicted by the length of the longest quit attempt in the previous 5 years. The present results are consistent with previous studies in which past behavior has been found to be a strong predictor of future behavior (Ajzen, 1991), including those focusing on smoking behavior (Godin et al., 1992), and are in contrast to Ajzen's (1988) position that the effects of past behavior should be mediated by the TPB. In the present context, it is possible that smokers who had made previous attempts to

quit smoking may have acquired skills and strategies (e.g., dealing with high-risk relapse situations) to increase the likelihood of another quit attempt being successful. This effect may be independent of the strength of the motivation to quit and perceptions of control as measured by the TPB.

These results have a number of theoretical implications. First, as argued earlier, the TPB may benefit from the inclusion of a measure of perceived susceptibility for predicting intentions in health-related contexts. Second, these results revealed that the TPB was able to predict the decision to quit and the initial attempt to quit but not the success of the quit attempt. As Bagozzi (1993) argued, this suggests that the variables contained in the TPB are necessary, but not sufficient, determinants of behavior. This conclusion is consistent with the view that there may be a number of qualitatively different stages in the initiation and maintenance of health behavior (e.g., Prochaska & DiClemente, 1984; Weinstein, 1988) and that different cognitions may be important at different stages (Sandman & Weinstein, 1993). For example, in the earlier stages information about the costs and benefits of performing a behavior may be processed, whereas in the later stages cognitions may become more focused on the development of plans of action to initiate and support the maintenance of a behavior. Clearly, a detailed analysis of the social cognitive variables important in translating intentions into action is required to provide a fuller understanding of the determinants of health behavior (e.g., Bagozzi, 1993; Kuhl, 1985; Weinstein, 1988).

This study has a number of limitations, which means that the foregoing conclusions need to be treated with some caution. First, as no record was made of the number of smokers declining to participate in the study, it is not possible to fully evaluate participation biases. Second, as measures of the TPB were not taken prior to the health promotion clinics, it is not possible to assess the extent to which the clinics changed smokers' beliefs. Third, the small number of smokers who indicated that they were nonsmokers at 6-month follow-up ($n = 13$) precluded analysis of smoking-point prevalence as an outcome. Nevertheless, there are a number of practical implications that can be drawn from the present study. Interventions should target perceptions of susceptibility and behavioral control in order to increase smokers' intentions to quit, which in the present study were found to predict the making of an attempt to quit. In relation to perceived susceptibility, previous work by Maddux and Rogers (1983) has demonstrated that successfully manipulating perceptions of susceptibility can influence intentions to quit smoking. Considering perceptions of control, Bandura (1986) has outlined four main ways in which perceptions of control over a behavior can be enhanced: experiencing personal mastery by setting and achieving subgoals (e.g., not smoking in certain contexts), observing others' success, using standard persuasive techniques, and using relaxation techniques (e.g., to control feelings of arousal or anxiety). The present results also indicated that it may be necessary to identify the social cognitive variables that ensure that initial quit attempts are

translated into longer term abstinence. This may inform the development of more focused, or stage-specific, interventions.

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