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Psychosocial factors associated with non-smoking adolescents' intentions to smoke

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Abstract

Smoking is the most preventable cause of death in the United States. Most adult smokers began smoking during adolescence, making youth tobacco prevention an especially important public health goal. Guided by an extension of the theory of planned behavior (TPB), this study examined the role of psychosocial factors in accounting for adolescents' smoking intentions. Participants from three high schools (n = 785) were surveyed to assess smoking-related characteristics and behaviors as part of a statewide evaluation of tobacco prevention programming. Attitudes, subjective norms (and other normative factors) and perceived behavioral control were all associated with non-smokers' intentions to smoke. Having more favorable attitudes toward remaining tobacco free and perceiving that friends would not be supportive of smoking were both associated with decreased likelihood of intending to smoke. Normative influence and peer use were significant factors, such that having more friends who smoke was associated with increased odds of intent to smoke. Lastly, perceived difficulty to quit was related to smoking intentions, with higher confidence to quit significantly associated with intentions to smoke. Findings are consistent with the TPB—attitudes, normative factors and perceived behavioral control each helped account for non-smoking adolescents' intentions to smoke. Implications for theory and intervention building are discussed.

Introduction

Tobacco use is cited as the leading preventable cause of death in the United States, making tobacco prevention an essential health priority. Given that most adult smokers began smoking as adolescents, it is necessary to understand and reduce tobacco use and initiation among youth. According to the Surgeon General's 1994 report, short-term consequences of smoking include decreased respiratory functioning, compromised physical fitness performance, increased resting heart rate, shortness of breath and an increased likelihood of alcohol and other drug abuse [1]. Long-term consequences are even more saturnine, with cigarette smoking being strongly linked to heart disease, lung cancer and decreased life expectancy [1]. In the United States, 28.5% of high school students currently smoke cigarettes and 13.8% are frequent smokers, defined as having smoked on at least 20 of the last 30 days [2]. Further, each day close to 4400 adolescents try smoking for the first time, and 2000 youth between the ages of 12 and 17 years become regular cigarette smokers [3]. Thus, it is imperative to identify factors that may be related to non-smoking adolescents' intentions to try smoking. The focus of the present research is to examine the association

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between psychosocial factors and intentions to smoke among high school students.

Several strong predictors of smoking among middle and high school aged youth have emerged in the literature, including intentions to smoke, knowledge about smoking, pro-smoking beliefs, refusal skills self-efficacy, friends smoking, friends' approval of smoking, parent smoking, parents' approval of smoking and perceived prevalence of peer smoking [4–10]. These factors have been found to predict smoking status as well as transition from trial to experimental and experimental to regular smoking [7, 9]. The pro-smoking environment, in particular, is extremely influential in predicting smoking and transition between levels of smoking among youth [5, 8–10]. An investigation of early initiation of smoking among sixth- to eighth-grade students revealed that high perceived prevalence of peer smoking predicted recent smoking, defined as smoking within the past 30 days [8]. Flay *et al.* [5] found that perceived friend approval of smoking predicted experimental as well as regular smoking, and that refusal skills' self-efficacy was associated with experimental use but not trying or regular use. Primary foci of the present investigation include further examination of relationships between normative and perceived behavioral control factors and smoking intentions among high school youth not already smoking.

It is well known that psychosocial factors have much utility in explaining intentions to engage in health behaviors. Among the most widely researched and applied theories is Fishbein and Ajzen's [11] theory of reasoned action (TRA), later extended and named the theory of planned behavior (TPB) [12], which argues that the most immediate influence on a behavior is the decision-maker's 'intention'. The models further posit that behavioral intentions arise from two psychosocial predictors: (i) 'attitudes' toward performing a specific behavior and (ii) 'subjective norms' concerning the behavior.

Additionally, according to the TPB, it is necessary to take into account 'perceived behavioral control' over the target behavior, as individuals who feel that they do not have control over the practice of a particular action might not intend to perform the behavior or may not follow through on an intention to perform that behavior. Moreover, studies have indicated that perceived behavioral control, as it has been conceptualized and measured, may actually represent two different constructs—'perceived control' over the behavior and 'perceived difficulty' of performing the behavior [13–15]. By differentially impacting perceived control and perceived difficulty, Trafimow *et al.* [13] found evidence in favor of partitioning the perceived behavioral control construct into two separate antecedents of intentions and behaviors. Additionally, in a meta-analysis, they [13] were able to further demonstrate that there is a distinction between perceived control and difficulty, with each predicting behavioral intentions independently. It was also found that of the two aspects of control, perceived difficulty seemed to be the higher caliber predictor, accounting for more variance in both intentions and behaviors across studies.

The TRA and TPB have been applied successfully to numerous behavioral contexts. In the area of health behaviors alone, the theories have been applied with much success to better understanding of behaviors involving mammography participation [16], healthy eating [17], testicular self-examination [18], the practice of acquired immunodeficiency syndrome-preventive behaviors [19] and adolescent alcohol use [20]. In terms of applications to smoking, the TPB constructs have been shown to be predictive of adult smokers' intentions to continue smoking [21], stages of smoking acquisition [22], as well as smokers' quitting success [23]. Indeed, perceived behavioral control, attitudes and subjective norms have been shown to help explain smoking intentions [21] as well as smokers' intentions to quit [24]. The present research was conducted to further examine the social and psychosocial contexts of smoking among youth; specifically, we aimed to investigate perceived behavioral control as well as perceived difficulty of quitting smoking if initiated among non-smoking adolescents. To this end, we examined the utility of these psychosocial factors, as well as constructs related to attitudes, subjective norms and behavioral

intentions regarding smoking, in explaining non-smoking adolescents' intentions to try smoking.

Methods

Participants

Self-administered, in-class surveys were completed by 90% of the eligible participants (1002/1117) from three high schools in rural Virginia. However, missing data on the surveys left 785 eligible for this analysis (70% of eligible participants). The missing data were likely due, at least in large part, to questionnaire fatigue, in that some of the items of interest for this investigation fell toward the end of a comprehensive 16-page assessment of tobacco-related behaviors and risk factors. Only those participants who responded to all of the items used in the analyses are included. Differences between the full sample (n = 1002) and the non-missing sample (n = 785) were modest, with no differences >2% points on the participant characteristics or outcome variables assessed. See Table I for demographic characteristics of participants included in the present analysis.

Table I. *Sample characteristics (*n = *785)*

Variable	Frequency	%
Grade in school		
9th	180	22.9
10th	169	21.5
11th	233	29.7
12th	203	25.9
Sex		
Girl	422	53.8
Boy	363	46.2
Ethnicity		
African–American	112	14.3
Caucasian	628	80.0
Hispanic/other	45	5.7
6-month intentions to smoke		
No	592	75.4
Yes	78	9.9
30-day intentions to smoke		
No	611	77.8
Yes	59	7.5
Already smokes	115	14.6

Measures

A survey was developed using previously validated and reliable items to measure study variables in a middle school/high school age population. Many of the items were adapted from the Youth Risk Behavior Surveillance Survey (YRBSS), a national survey implemented by the Centers for Disease Control [25]. Additionally, the items used in this analysis to assess attitudes toward remaining tobacco free and prevalence of smoking in the participants' age group were adapted from the Goals for Health Survey [26]. Other sources include the National Longitudinal Study of Adolescent Health [27] as well as basic demographic information.

Outcome variables: intentions to try smoking

Participants' intentions to try smoking were assessed using responses to the following statement: 'Do you think that you might try smoking within the next 6 months [30 days]?' Participants responded by circling either 'no', 'yes' or 'already smoke'. Participants indicating that they already smoke were not included in the models, as the focus was to examine psychosocial factors associated with intentions to try smoking among youth not already smoking.

Smoking status

For descriptive purposes, we assessed participants' current smoking status using the question 'During the past month, on how many days did you smoke cigarettes?' Responses were dichotomized such that participants who indicated that they did not smoke or did not smoke in the past 30 days were considered non-smokers, and participants who reported smoking at least one cigarette in the past 30 days were coded as smokers.

Independent variables

The following variables were assessed as factors associated with intentions to try smoking: (i) 'attitudes toward remaining tobacco free', (ii) 'perceived risks of tobacco use' (i.e., long-term consequences), (iii) 'subjective norms', (iv) 'peer

tobacco use', (v) 'perceived prevalence of smoking among age group', (vi) 'perceived behavioral control to avoid smoking' and (vii) 'perceived difficulty to quit smoking' (if one were to initiate).

Attitudes toward remaining tobacco free

These were assessed by averaging participant responses to seven items regarding consequences of avoiding tobacco. Items were presented as follows: 'If I stay tobacco-free ...' 'I will be healthier', 'I can become better at sports', 'I will become prettier or better looking', 'I will live longer', 'my hair and skin will be healthy', 'I will gain weight' and 'I will be less popular', the latter two of which were reverse coded. Response choices were on a five-point continuum ranging from 'strongly disagree' to 'strongly agree'. Participants were given the same response choices for the following three items used to assess perceived risks of tobacco use: 'Smoking cigarettes causes cancer', 'Smoking cigarettes causes heart disease' and 'Cigarettes and other tobacco products are addictive'. Responses to the items were averaged to create the attitudes and perceived risks indices. For both constructs, mean scale scores were calculated based on the items with non-missing data. If an adolescent was missing some of the items, the mean value was based only on those items with responses. Cronbach's alphas for our measures of attitudes and perceived risks showed good internal consistency, with scores of 0.70 and 0.77, respectively.

Single-item indicators were used to measure the normative constructs. Subjective norms were assessed with the item 'My friends think I should not smoke cigarettes'. Response options were on a five-point continuum ranging from strongly disagree to strongly agree. Peer tobacco use was assessed by having participants indicate how many of their friends smoke. Response options provided were none, few, half, most and all. Using these same response choices, participants indicated the 'perceived prevalence of smoking among their age group' with the item 'In your community, how many people your age do you think have had a cigarette in the last 30 days?'

The final two explanatory variables in the study involved two dimensions of perceived behavioral control, and were also assessed using single-item indicators. 'Perceived control to avoid smoking' was measured by presenting participants with the following item: 'If I decided not to smoke, I am sure I could avoid smoking'. Finally, to assess perceived difficulty to quit smoking (if one were to become a smoker), the following item was presented: 'If I smoked regularly, I'm sure that it would be easy for me to quit'. Responses to this item were reverse coded, as perceiving that it would be easy to quit would be indicative of lower perceived difficulty. Response choices for both of these items were on a five-point continuum ranging from strongly disagree to strongly agree.

Covariates

The following covariates were included due to being potential mediators or moderators of relationships between psychosocial correlates and behavioral intentions: grade in school (9th, 10th, 11th, 12th), ethnicity (African–American, Caucasian, other), sex, whether or not a mother or female guardian is present in the household (yes/no) and whether or not a father or male guardian is present in the household (yes/no). Other potential covariates including parental smoking, sibling smoking and measures of socioeconomic status were not included in the final models presented. When these variables were included in the analyses, the odds ratios (ORs) of the main variables of interest remained similar, but the sample size was further reduced because of additional missing data on these variables. It was decided that the added value was not worth the loss of additional observations.

Procedure

These data are part of a comprehensive outcome evaluation, Virginia Commonwealth University's Youth Tobacco Evaluation Project (YTEP). YTEP developed and implemented a statewide evaluation of youth tobacco prevention programming. These methods have been described in a previous publication [28].

Data for the current study were collected at baseline from three rural high schools. Approximately 2 weeks prior to administration of the baseline questionnaire, letters informing parents of the survey were sent to participants' homes. Letters included contact information for both the agency running the program and YTEP at Virginia Commonwealth University. Waiver of parental consent was deemed appropriate for this study, as the purpose was to evaluate the tobacco prevention programs already in place, and no identifying information beyond an anonymous linking scheme was included. Surveys were administered just before the beginning of tobacco-related programs. Instructors began by reading a short statement designed to standardize the instructions for all participants, which explained the purpose of the survey and stated that responses would be anonymous. Participants were then given the questionnaire, which took ~25 to 35 min to complete. Upon completion of the survey, participants were asked to place their survey in a blank envelope provided and to then seal the envelope prior to submitting their survey to the instructor. This procedure was implemented to further assure the participants of the confidentiality of their responses. Once the surveys had been collected, instructors returned them in their sealed envelopes to YTEP. The study was approved by the Institutional Review Board of Virginia Commonwealth University.

Correlation analyses and multivariate logistic regression analyses are presented. These were undertaken in SPSS version 13.0. The inclusion of three schools in this sample would suggest the use of a nested analysis to control for within-school correlations. Unfortunately, we could not track which surveys were returned from each separate school, and thus, nested analyses were not possible with the available data.

Results

Our results indicated that 21.2% of our sample reported smoking in the past 30 days (not shown). This is similar to the prevalence of recent smoking at the national level found in the 2003 YRBSS at 21.9% [29]. Means and standard deviations of all covariates and study variables are presented in Table I. The sample was divided nearly equally by grade with about a quarter in each grade. There were more female (53%) than male youth, and participants were primarily Caucasian (80%), with smaller percentages of African–Americans (14%) and individuals of other ethnic groups (6%).

In Table II, psychosocial characteristics are presented for the whole sample, as well as stratified by the following groups: behavioral intentions to try smoking in the next 6 months and 30 days (yes and no, for each) and participants indicating that they already smoke. Analysis of variance with Tukey *post hoc* comparisons showed significant differences between those reporting intentions to smoke, those not reporting intentions and those who already smoke for all of the psychosocial variables. For example, those not intending to smoke in the next 6 months had significantly more favorable attitudes toward remaining tobacco free (M = 4.17) and perceived greater risk (M = 4.50) than those with intentions (M = 3.69, 4.12, respectively) and those who already smoke (M = 3.57, 4.16, respectively).

Table III indicates moderate to strong correlations between attitudes and four other independent variables—perceived risks ($r = 0.55$, $P < 0.001$), subjective norms ($r = 0.38$, $P < 0.001$), peer tobacco use ($r = 0.33$, $P < 0.001$) and perceived behavioral control to avoid smoking ($r = 0.41$, $P < 0.001$). Peer tobacco use was also correlated with subjective norms ($r = 0.46$, $P < 0.001$) and perceived prevalence of smoking among community age group ($r = 0.47$, $P < 0.001$). All remaining correlations were <0.33.

Table IV presents the logistic regression ORs of intentions to try smoking in the next 6 months and 30 days, respectively. Again, participants indicating that they already smoke were not included in the logistic models. The two dependent variables were modeled separately, with each model including all of the psychosocial and control variables entered simultaneously. Results indicated that the likelihood of having intentions to try smoking in the next

Table II. *Means and standard deviations for independent variable indicators: whole sample and stratified by intention to try smoking in 6 months and 30 days*

Variables	Sample		No (6 months)		Yes (6 months)		No (30 days)		Yes (30 days)		Already smokes	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Attitudes	4.03	0.67	4.17	0.60	3.69	0.73	4.16	0.60	3.61	0.79	3.57	0.67
Healthier	4.49	0.84	4.64	0.68	4.05	0.95	4.64	0.67	3.88	1.04	3.97	1.14
Better at sports	4.23	1.00	4.39	0.89	3.77	1.02	4.37	0.90	3.78	1.08	3.70	1.24
Better looking	3.49	1.22	3.68	1.19	3.13	1.07	3.67	1.12	3.05	1.17	2.77	1.18
Live longer	4.25	0.93	4.38	0.85	4.01	0.92	4.38	0.84	3.90	1.05	3.75	1.10
Healthier skin	4.08	0.98	4.28	0.87	3.59	0.93	4.26	0.86	3.53	1.06	3.43	1.14
Gain weight	2.42	0.96	2.37	0.96	2.62	0.84	2.38	0.94	2.66	0.96	2.56	1.02
Less popular	1.88	0.91	1.81	0.87	2.14	1.03	1.81	0.87	2.19	1.07	2.04	0.98
Perceived risks	4.41	0.67	4.50	0.64	4.12	0.74	4.49	0.64	4.07	0.75	4.16	0.69
Cancer	4.5	0.74	4.56	0.73	4.36	0.68	4.56	0.73	4.29	0.67	4.30	0.81
Heart disease	4.32	0.83	4.41	0.80	4.06	0.80	4.40	0.80	4.05	0.84	1.06	0.92
Addictive	4.42	0.87	4.53	0.76	3.95	1.12	4.52	0.77	3.88	1.16	4.12	1.02
Subjective norms	3.69	1.12	3.92	1.11	3.29	0.93	3.92	1.10	3.08	0.95	2.78	1.11
Peer use	1.36	1.03	1.10	0.89	1.78	0.98	1.09	0.86	2.15	1.01	2.37	1.00
Perceived prevalence	2.01	0.96	1.89	0.95	2.22	0.89	1.87	0.93	2.56	0.93	2.50	0.87
PC to avoid	4.31	0.94	4.48	0.80	4.04	1.03	4.47	0.80	3.97	1.07	3.64	1.20
PD to quit	3.59	1.08	3.67	1.02	3.12	1.21	3.65	1.03	3.15	1.27	3.54	1.23

Significant differences were found among those reporting intentions to smoke (in 6 months and 30 days), those not reporting intentions and those indicating that they already smoke for all of the psychosocial predictors above (attitudes toward remaining tobacco free, perceived risks, subjective norms, perceived prevalence in age group, perceived behavioral control to avoid smoking and perceived difficulty to quit, if initiated).
PC = perceived control; PD = perceived difficulty.

Table III. *Inter-correlations among independent variables for multiple logistic regression analyses*

Variables	1	2	3	4	5	6	7
1. Attitudes	—	0.55***	0.38***	0.33***	−0.08*	0.41***	0.16***
2. Perceived risks		—	0.3***	−0.2***	−0.05	0.31***	0.2***
3. Subjective norms			—	0.46***	0.23***	0.22***	0.04
4. Peer tobacco use				—	0.47***	0.24***	−0.14***
5. Perceived prevalence					—	−0.06	−0.07*
6. PC to avoid smoking						—	0.04
7. PD to quit smoking							—

PC = perceived control; PD = perceived difficulty.
*$P < 0.05$; ***$P < 0.001$.

6 months significantly decreased with more positive attitudes toward remaining tobacco free (OR = 0.56, $P < 0.05$) and increased levels of perceived difficulty to quit, if initiated (OR = 0.67, $P < 0.001$), and significantly increased with more peer smoking (OR = 1.42, $P < 0.05$). Perceiving stronger subjective norms from peers discouraging smoking were marginally significant (OR = 0.78, $P < 0.10$), with such norms being associated with decreased intentions to try smoking.

With regard to behavioral intentions in the next 30 days, positive attitudes toward remaining tobacco free (OR = 0.53, $P < 0.05$), perceiving stronger subjective norms discouraging smoking (OR = 0.73, $P < 0.05$) and increased perceived difficulty to quit smoking (OR = 0.74, $P < 0.05$)

Table IV. *ORs (CI) from logistic regressions examining psychosocial influences on 30-day and 6-month intentions to smoke among non-smoking adolescents (*n = *670)*

Variables	6-month intentions		30-day intentions	
	OR	(95% CI)	OR	(95% CI)
Gender				
Boy	1.16	(0.67–2.0)	1.41	(0.73–2.72)
Girl (ref)	—	—	—	—
Ethnicity				
African–American	0.90	(0.44–1.82)	1.00	(0.42–2.37)
Other			0.40	(0.20–1.91)
Caucasian (ref)	—	—	—	—
Grade				
9th (ref)	—	—	—	—
10th	1.30	(0.57–2.96)	1.76	(0.63–4.88)
11th	1.58	(0.74–3.36)	1.68	(0.70–4.02)
12th	0.73	(0.35–1.49)	1.01	(0.43–2.39)
Father in household	0.24	(0.08–0.76)*	0.24	(0.07–0.84)*
Mother in household	0.34	(0.03–3.41)	0.28	(0.03–2.42)
Attitudes	0.56	(0.34–0.92)*	0.53	(0.29–0.96)*
Perceived risks	0.85	(0.54–1.33)	0.85	(0.50–1.46)
Subjective norms	0.78	(0.60–1.02)	0.73	(0.53–1.00)
Peer tobacco use	1.42	(1.04–1.95)*	1.78	(1.25–2.54)**
Perceived prevalence	1.13	(0.83–1.54)	1.62	(1.10–2.37)*
Perceived control	0.80	(0.59–1.10)	0.79	(0.54–1.15)
Perceived difficulty to quit	0.67	(0.52–0.85)**	0.74	(0.56–0.99)*

Adjusted analyses; those who do not intend to smoke are the referent (ref) category. Youth who already smoke are not included in analyses. Covariates include age, grade, ethnicity and presence of female and/or male guardian in household. ORs ≥ 1.0 indicate that those who intend to smoke are more likely to endorse the psychosocial variable.
*$P < 0.05$; **$P < 0.01$.

were all associated with decreased intentions to try smoking. Here again, the likelihood of having intentions to try smoking was found to increase with greater levels of peer smoking (OR = 1.78, $P < 0.001$). Greater perceived prevalence among community age group (OR = 1.62, $P < 0.05$) was also associated with increased intentions to try smoking in the next 30 days.

Perceived risks regarding long-term consequences of tobacco use were not associated with tobacco use intentions in either the 6-month or the 30-day models. Because of its moderately strong correlation with attitudes toward remaining tobacco free, a model without attitudes was run in order to rule out multicollinearity as explaining the lack of an effect of perceived risks on behavioral intentions. While the OR for risks did increase (as expected) in this test model, it did not reach significance at the $P < 0.05$ level.

Discussion

Consistent with predictions guided by an expanded TPB, support was found for the roles of attitudes, normative factors and perceived behavioral control as correlates of adolescents' intentions regarding smoking. Among self-identified non-smokers, having more favorable attitudes toward remaining tobacco free, perceiving norms discouraging cigarette use, having fewer friends who smoke and perceiving quitting to be difficult (if smoking were initiated) were all associated with decreased odds of intending to try smoking cigarettes in the next 30 days and 6 months. Also supporting predictions was the finding that attitudes, perceptions of risks, peer behaviors and normative expectations regarding tobacco use were all significantly related to one another.

While psychosocial factors do generally represent valuable predictors of future behavior, some actions do not live up to attitudes or even intentions, which is one reason why people are not as healthy as they perceive themselves to be. Taking additional factors into account is an important step in understanding health behaviors. It is for this reason that perceived behavioral control is included in the TPB, an addition that strengthens the model's explanatory power [30, 31]. However, while perceiving control in a given domain can facilitate the likelihood of following through with an efficacious health intention, having self-confidence in some contexts (e.g. perceiving little difficulty to quit smoking) may also lead to adverse health consequences. Consistent with recent research [13] and hypotheses, perceived difficulty was found to be a stronger correlate than perceived control—non-smoking high school youth who perceived it would be easier to quit if they started were more likely to report intentions to try smoking in the near future.

Thus, while it may be beneficial for current smokers to have confidence in their ability to stop smoking, having similarly positive perceived levels of control to quit may augment intentions to experiment among youth not already using tobacco. It is important to note, however, that the two factors of perceived behavioral control were measured in different contexts—namely, avoiding smoking and being able to quit. As such, we cannot say for sure whether it was the type of perceived behavioral control (perceived control versus perceived difficulty) or the contexts (avoiding smoking versus quitting smoking) that drove the finding. Interestingly, the present findings indicate that control perceptions regarding avoiding smoking and quitting smoking may not necessarily be strongly tied among youth, though further investigation is warranted.

The present research is not without methodological limitations, which should be considered. We relied on self-report measures, which raise the issue of honesty (e.g., with intentions to try cigarettes). Steps were taken, however, to ensure the confidentiality of responses, which should have reduced evaluation apprehension among participants. Further, while we report findings involving behavioral intentions and not actual behaviors, the theories of reasoned action/planned behavior, as well as research guided by the models, indicate that intentions are good predictors of behavior. Using correlational techniques prevent us from drawing any cause-and-effect conclusions; and our having collected data at a single time point prevent us from being able to attribute temporal priority to one variable over another. While we cannot infer, for example, that peer use intensifies non-smoking adolescents' intentions to try smoking cigarettes, we can say that there is a robust relationship between the two variables. Finally, while 14.6% of youth in this sample indicated that they already smoke when asked about intentions to smoke, in a separate question, 21.1% indicated that they had smoked on at least one of the past 30 days. Because this analysis focused on intentions to smoke in the future, the ones who said they 'already smoke' were dropped. If the additional youth who reported that they smoked in the last month were also dropped, this would have reduced the sample further. We decided not to drop youth based on their smoking in the last month given that those youth who do not consider themselves smokers may be different than those who do consider themselves smokers.

The present study was conducted to assess the roles of various psychosocial factors in predicting non-smoking adolescents' intentions to start smoking. Indeed, by identifying variables that may be important in the initial decision to try (or not to try) smoking, intervention efforts to combat smoking initiation among youth may be better armed. The results discussed herein support the utility of important psychosocial factors, namely, those defined in an expanded TPB, in explaining non-smoking adolescents' intentions to try smoking cigarettes and have potentially important implications for the TPB as well as intervention building. Attitudes, subjective norms and one of the two perceived behavioral control factors (i.e., perceived difficulty) were all significantly associated with intentions in at least one of the two outcome scenarios—having intentions to try smoking in the next 6 months or 30 days—in the large sample of adolescents studied. Other constructs assessed included peer use, perceived prevalence of smoking among community age group and perceived risks, which were also examined in an attempt to build on the TPB constructs. Of these three variables, two were found to have a significant relationship with adolescents' intentions to try smoking—peer use and perceived prevalence of smoking among community age group. Long-term risks were not associated with behavioral intentions in this sample. The present findings support the utility of going beyond the TPB's subjective norms construct and incorporating other important normative antecedents of health behavior.

A primary focus of the present study was to further assess the roles and implications of normative and perceived control factors involved in non-smoking adolescents' intentions to try smoking in order to make recommendations regarding health interventions. Few, if any, extant studies have investigated the role of perceived difficulty to quit

smoking among non-smoking adolescents' intentions to start smoking, and these results underscore the importance of being cognizant of the potential recipients of health messages and interventions designed to facilitate healthy behavior. Confidence regarding having the means to control one's behavior is related to behavioral intentions, regardless of whether the action in question is associated with health or disease. With regard to advising tobacco prevention interventions, efforts could be made to empower non-smoking adolescents with the self-efficacy to avoid smoking, but also remind them of the powerful addictive properties of nicotine.

Understanding the social environment in which health-related behaviors transpire is of paramount importance. Program efforts that take into consideration normative factors (e.g., the degree to which smoking is the 'norm' in a given adolescent population) will be better armed to combat tobacco use than those programs that ignore peer influence. The findings of the present research provide further evidence of the importance of the social contexts of risk behaviors—adolescents' perceptions of what their friends think they should do, as well as their perceptions of what other similarly aged peers are doing were significantly related to intentions to try smoking. People in social groups often come to share the same assessment of a given behavior's benefits and costs; thus, we should expect to find strong associations among beliefs about remaining tobacco free, peer smoking behaviors, subjective norms regarding tobacco use and behavioral intentions to try smoking among youth. As such, education programs alone may not be enough to prevent smoking initiation [32]. It seems likely that intervention efforts that take the social contexts of health behaviors into account are likely to yield more auspicious outcomes than those that ignore factors, such as normative influence, shared beliefs and the relationships between these important factors.

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Conflict of interest statement

None declared.

References

1. Center for Disease Control and Prevention. *Preventing Tobacco Use among Young People—a Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, CDC, National Center for Chronic Disease Prevention and Health Promotion, 1994.
2. Center for Disease Control and Prevention. Trends in cigarette smoking among high school students—United States, 1991–2001. *Morb Mortal Wkly Rep* 2002; **51**: 409–28.
3. Substance Abuse and Mental Health Administration. *2001 National Household Survey on Drug Abuse: Trends in Initiation of Substance Abuse*. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2003.
4. Conrad K, Flay B, Hill D. Why children start smoking cigarettes: predictors of onset. *Br J Addict* 1992; **87**: 1711–24.
5. Flay B, Hu F, Richardson J. Psychosocial predictors of different stages of cigarette smoking among high school students. *Prev Med* 1998; **27**: A9–18.
6. Griffin KW, Botvin GJ, Scheirer LM *et al.* Common predictors of cigarette smoking, alcohol use, aggression, and delinquency among inner-city minority youth. *Addict Behav* 1999; **28**: 1141–8.
7. Pederson L, Koval J, O'Connor K. Are psychosocial factors related to smoking in grade-6 students? *Addict Behav* 1997; **22**: 169–81.
8. Simons-Morton B, Crump A, Haynie D *et al.* Psychosocial, school, and parent factors associated with recent smoking among early-adolescent boys and girls. *Prev Med* 1999; **28**: 138–48.
9. Tucker J, Ellickson P, Klein D. Predictors of the transition to regular smoking during adolescence and young adulthood. *J Adolesc Health* 2003; **32**: 314–24.
10. Unger J, Yan L, Shakib S *et al.* Peer influences and access to cigarettes as correlates of adolescent smoking: a cross-

cultural comparison of Wuhan, China and California. *Prev Med* 2002; **34**: 476–84.
11. Fishbein M, Ajzen I. *Belief, Attitude, Intention, and Behavior: an Introduction to Theory and Research*. Reading, MA: Addison-Wesley, 1975.
12. Ajzen I. From intentions to actions: a theory of planned behavior. In: Kuhl J, Beckmann J (eds). *Action Control: from Cognition to Behavior*. Heidelberg, Germany: Springer, 1985, 11–39.
13. Trafimow D, Sheeran P, Conner M *et al*. Evidence that perceived behavioural control is a multidimensional construct: perceived control and perceived difficulty. *Br J Soc Psychol* 2002; **41**: 101–21.
14. Terry DJ, O'Leary JE. The theory of planned behaviour: the effects of perceived behavioural control and self-efficacy. *Br J Soc Psychol* 1995; **34**: 199–220.
15. White KM, Terry DJ, Hogg MA. Safer sex behavior: the role of attitudes, norms, and control factors. *J Appl Soc Psychol* 1994; **24**: 2164–92.
16. Montano D, Taplin S. A test of an expanded theory of reasoned action to predict mammography participation. *Soc Sci Med* 1991; **32**: 733–41.
17. Conner M, Norman P, Bell R. The theory of planned behavior and healthy eating. *Health Psychol* 2002; **21**: 194–201.
18. Brubaker R, Wickersham D. Encouraging the practice of testicular self-examination: a field application of the theory of reasoned action. *Health Psychol* 1990; **9**: 154–63.
19. Smith B, Stasson M. A comparison of health behavior constructs: social psychological predictors of AIDS-preventive behavioral intentions. *J Appl Soc Psychol* 2000; **30**: 443–62.
20. Marcoux B, Shope J. Application of the theory of planned behavior to adolescent use and misuse of alcohol. *Health Educ Res* 1997; **12**: 323–31.
21. Godin G, Valois P, Lepage L *et al*. Predictors of smoking behaviour: an application of Ajzen's theory of planned behaviour. *Br J Addict* 1993; **87**: 1335–43.
22. Hill AJ, Boudreau F, Amyot E *et al*. Predicting the stages of smoking acquisition according to the theory of planned behavior. *J Adolesc Health* 1997; **21**: 107–15.
23. Norman P, Conner M, Bell R. The theory of planned behavior and smoking cessation. *Health Psychol* 1999; **18**: 89–94.
24. Babrow AS, Black DR, Tiffany ST. Beliefs, attitudes, intentions, and a smoking-cessation program: a planned behavior analysis of communication campaign development. *Health Commun* 1990; **2**: 145–63.
25. Center for Disease Control and Prevention. *1999 National School Based Youth Risk Behavior Survey*. Atlanta, GA: Center for Disease Control and Prevention, 2000.
26. Meyer A, Nicholson R, Danish S *et al*. A model to measure program integrity of peer-led health promotion programs in rural middle schools: assessing the implementation of the sixth grade goals for health program. *J Educ Psychol Consult* 2000; **11**: 223–52.
27. Resnick MD, Bearman P, Blum RW *et al*. Protecting adolescents from harm: findings from the national longitudinal study of adolescent health. *J Am Med Assoc* 1997; **278**: 823–32.
28. Wilson DB, Smith BN, Speizer IS *et al*. Differences in food intake and exercise by smoking status in adolescents. *Prev Med* 2005; **40**: 872–9.
29. Centers for Disease Control and Prevention. *Youth Risk Behavior Surveillance Survey*. Available at: http://apps.nccd.cdc.gov/yrbss/QuestYearTable.asp?path=byHT&ByVar=CI&cat=2&quest=Q30&year=2003&loc=XX. Accessed: 8 February 2006.
30. Madden TJ, Ellen PS, Ajzen I. A comparison of the theory of planned behaviour and the theory of reasoned action. *Pers Soc Psychol Bull* 1992; **18**: 3–9.
31. Netemeyer RG, Burton S, Johnson M. A comparison of two models for the prediction of volitional and goal-directed behaviours: a confirmatory analysis approach. *Soc Psychol Q* 1991; **54**: 87–100.
32. Wiehe SE, Garrison MM, Christakis DA *et al*. A systematic review of school-based smoking prevention trials with long-term follow up. *J Adolesc Health* 2005; **36**: 162–9.

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