

# Intention to start cigarette smoking among Iranian male adolescents: usefulness of an extended version of the theory of planned behaviour

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## ABSTRACT

**Background** Smoking is one of the risk behaviours that begin in adolescence, and therefore identifying predictors of smoking is necessary for planning prevention programmes.

**Objectives** To examine the ability of the extended theory of planned behaviour (TPB) to predict the intention to smoke.

**Methods** This was a cross-sectional study carried out in Iran, 2011. The data were collected by a self-administered questionnaire which included items on demographics, smoking behaviour, components of the TPB model (attitude, subjective norms, perceived behaviour control and intention) and an added construct on smoking self-identity. Data were analysed using descriptive, correlation and linear regression statistics.

**Results** 365 male high school students with a mean age of 16.5 (SD=1.2) years were studied. Fifty-five (15.1%) of the students surveyed were current smokers. All components of the TPB model and smoking self identity were statistically significantly related to intention to smoke ( $p<0.001$ ). The TPB constructs with and without smoking self-identity accounted for 58.5% (adjusted  $R^2$ ) and 54.8% of the variance observed for intention to smoke, respectively. Result also revealed the highest weights for perceived behaviour control ( $\beta=-0.35$ ).

**Conclusions** The extended model of the TPB predicted 'intention to smoke' better than the original TPB. The findings of this study might be used as a framework in designing heart disease prevention programmes. Thus the findings have implications for both health promotion specialists and cardiologists. They could place an emphasis on perceived behaviour control, specifying that individuals who do not smoke should not start and if they are smokers it is possible to stop smoking.

## INTRODUCTION

In both industrialised and developing countries, cardiovascular diseases are the major causes of death.<sup>1</sup> Tobacco smoke may increase the risk of coronary heart disease (CHD) through mechanisms that can involve increased platelet aggregation, damage to the arterial endothelium, coronary spasm, reduced high-density lipoprotein cholesterol and oxidative stress.<sup>2</sup> The morbidity and mortality associated with tobacco use is moving from the developed world to developing countries.<sup>3</sup> In the Islamic Republic of Iran it is estimated that about 26 million people are aged <15 years, indicating a large group highly susceptible to tobacco use and, in turn, its complications.<sup>4</sup> The risk of CHD increases with the number of cigarettes smoked daily and with the duration of smoking. It has been found that the

earlier the age of starting to smoke, the greater risk the risk of developing heart disease.<sup>5</sup>

In recent years a growing body of research has applied the theory of planned behaviour (TPB) to smoking. According to the TPB, adolescents with a positive attitude towards smoking, a low perceived behavioural control (PBC) to refrain from smoking and adolescents perceiving a subjective norm approving of smoking will have a stronger intention to start smoking and, in turn, are more likely to take up smoking.<sup>6,7</sup>

Several meta-analyses have shown that behavioural intention is predictable from the three components of the TPB.<sup>8,9</sup> However, the level of prediction is far from perfect. The variance explained in intention ranges from 28% to 40%. This has led several researchers to challenge the assumption that the TPB can adequately capture all theoretical determinants of intention. However, when Ajzen developed the TPB, it was stated that the TPB is, in principle, open to inclusion of additional predictors as long as they increase the explained variance in behavioural intentions.<sup>8</sup>

This study used the TPB with an additional construct—namely, smoking self-identity as an additional determinant of behavioural intentions. 'Smoking identities' (ie, self-identification as a non-smoker or regular smoker) characterise commonly employed psychosocial understandings of how tobacco users and non-users perceive themselves in relation to their cigarette smoking behaviour.<sup>10</sup> Self-identity reflects the extent to which behavioural performance is embedded in the self-concept.<sup>11</sup> However, the history of the role of self-identity in the TPB is controversial. Some studies have observed that self-identity has a unique effect on behavioural intentions apart from TPB components, whereas other studies have not shown an independent effect of self-identity on behavioural intentions.<sup>8</sup>

Previous research on adolescent smoking in Iran has focused mainly on providing prevalence data and information about the determinants of adolescents' smoking, such as access/availability, price and knowledge.<sup>12–14</sup> Yet, no study has tested the TPB in relation to adolescent smoking in Iran. Therefore, the purpose of this study was to determine the intention to smoke cigarettes among high school male adolescents in Iran, in the context of the extended TPB.

## SUBJECTS AND METHODS

### Subjects

This was a cross-sectional study carried out in Zarandieh, Iran. The study used the extended TPB

as the conceptual framework to investigate the predictive power of the TPB constructs (attitude towards smoking, subjective norms and PBC) on the intention to smoke within 3 months. The additional construct was smoking self-identity. A sample of male students was included in the study. The sample size was calculated based on an expected current smoking prevalence of 9%,<sup>15</sup> with absolute precision of 3%. Sample selection was carried out by multistage sampling as follows: (i) all seven high schools were selected from the city; (ii) the quota of male students selected from each school was proportional to the number of students in the school; (iii) the quota included from any class was based on the number of students in each grade (1–3); (iv) students from each class were randomly included in the study based on their identification number.

## Measures

A self-designed questionnaire derived from the literature was developed to collect data. It contained 60 items and consisted of six parts:

1. *Demographic characteristics*: 20 items were included in the questionnaire to elicit personal information on age, level of study, family members' smoking habits, smoking history, friends' smoking status, age of first use and current smoking status.
2. *Attitude*: 15 items on attitude to cigarette smoking, derived from the available literature,<sup>4 10 13</sup> were included, which were scored using a five-point Likert differential scale. The scores for each item ranged from 0 (strongly agree) to four (strongly disagree).
3. *Subjective norms*: six items were used to assess the influence of students' important persons (parents, friends, teachers, etc) on their opinion about smoking. These were scored on a five-point Likert differential scale, with scores ranging from 0 (strongly agree) to 4 (strongly disagree). Selection of these items was carried out by a panel of scientists affiliated to the medicine and health department of the College of Psychology.
4. *PBC to avoid smoking*: seven items were used to assess the students' perceptions about smoking. They were asked to indicate whether it was easy or difficult to smoke. Answers were rated on a five-point Likert differential scale, ranging from 0 (very difficult) to 4 (very easy for me). PBC questions were derived from published reports.<sup>7 14</sup>
5. *Smoking self identity*: the participants were asked to define themselves according to their smoking behaviour, with five options offered: 'I am a non-smoker', 'I am an occasional smoker', 'I am an irregular smoker', 'I am a regular smoker' and 'I am an ex-smoker'. The selections of smoking self-identity items were based on a previous study by Niknami *et al*, in which adolescents were asked to define themselves in terms of their smoking behaviour.<sup>4</sup> Answers were rated on a five-point scale, ranging from 0 (strongly agree) to 4 (strongly disagree).
6. *Intention*: this section of the questionnaire was derived from the available literature.<sup>7 16</sup> Seven items were included to assess the students' intention or need to smoke cigarettes. For example, it was asked 'At any time during the next 3 months do you think you will smoke a cigarette?' or 'If one of your best friends offered you a cigarette, would you smoke it?' Answers were rated on a five-point Likert differential scale, ranging from 4 (very likely) to 0 (very unlikely). Students' smoking habits and smoking history were investigated as follows: a record of the students' current level of

smoking (smoking for  $\geq 1$  day during the past 30 days), past cigarette smoking experience, even one or two puffs (ex-smoker) and non-smoker (students who had never smoked).<sup>14</sup>

The investigator constructed the questionnaires based on the elicitation results, and the content validity of the instruments was assessed by 10 experts. Next, a confirmatory factor analysis was used to assess the construct validity of the instruments. The model's fit was confirmed for all scales (goodness-of-fit index 0.95–0.97). The reliability of the questionnaire was assessed by a group of 30 students. Cronbach's  $\alpha$  coefficients were moderately high (attitude=0.94; PBC=0.87; subjective norms=0.85; smoking self-identity=0.79 and intention=0.87).

## Statistical analysis

Data were analysed using the statistical package for the social sciences (SPSS V.16.0.). Statistical significance was determined at the  $p < 0.05$  level throughout. Descriptive variables are expressed as frequency, mean and overall range (minimum and maximum). Scores for constructs of the TPB model, including perceived behaviour control, attitude, subjective norms and smoking self-identity, were also compared among current smokers, ex-smokers and non-smokers using one-way analysis of variance (ANOVA). A two-step multiple linear regression analysis was conducted to determine whether self-identity enhances the prediction power of intentions to smoke beyond that obtained by the TPB alone. The components of the TPB were included in the first step and self-identity was entered in the second step. The normality of data was tested using the Kolmogorov–Smirnov test, the histogram and normality of residuals.

## Ethics

The ethics committee of Tarbiat Modares University approved the study. Students gave verbal informed consent. To ensure data privacy, teachers were not present during completion of the questionnaire.

## RESULTS

A total of 365 students, with a mean age of  $16.5 \pm 1.2$  years (range 14–19), were included in the study. Fifty-five (15.1%) of the students surveyed were current smokers. About 44% of students considered themselves to be 'non-smokers'. Almost one-third (33%) of current smokers reported that they had smoked 1–2 cigarettes a day during the past 30 days (1 month), while more than 12.6% of current smokers reported that they had smoked cigarettes on  $\geq 20$  days. Nineteen per cent of current smokers reported attractiveness of smoking as the main reason for cigarette use and the majority (54%) reported that smoking helped them to relax.

Almost one-third of the students—29.6% (108/365)—reported lifetime smoking (have you ever tried smoking?). Of these, about 34% (37/108) reported that they might smoke during the next 12 months, whereas for non-smokers this rate was 12% (25/202). Almost four of every 10 students (37.8%) stated that their parents were smokers. Similarly, 40.7% of students stated that they had friends who were smokers.

As table 1 illustrates, the mean scores of attitude, perceived behaviour control, subjective norms and smoking self-identity for non-smokers were higher than for ex-smoker and current smoker groups, whereas the mean score of intention for the current and ex-smokers was higher than for non-smokers. One-way ANOVA indicated that there were significant differences among current, ex-smokers and non-smokers in all

**Table 1** Comparison of attitude, perceived behaviour control, subjective norms, intention and smoking self-identity scores among current smoker, ex-smoker and non-smoker groups

	All (n=365)	Current smoker (n=55)	Ex-smoker (n=108)	Non-smoker (n=202)	p Value
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
Attitude	36.7 (10)	28.1 (7.0)	36.2 (12.0)	42.5 (8.0)	<0.001
Perceived behaviour control	22.3 (6.4)	12.2 (5.9)	22.4 (5.5)	24.9 (3.9)	<0.001
Subjective norms	19.6 (3.7)	16.6 (3.5)	19.4 (3.8)	20.5 (3.2)	<0.001
Intention	17.2 (4.7)	19.0 (3.1)	17.4 (3.3)	10.2 (5.5)	<0.001
Self-identity	16.9 (3.3)	12.6 (4.4)	17.1 (2.5)	18.0 (2.1)	<0.001

constructs of the TPB (attitude, perceived behaviour control, subjective norms, intention) and smoking self-identity.

As shown in table 2, stepwise multiple linear regression analyses were used to predict adolescents' intentions to smoke. In first model, attitude, subjective norms and perceived behaviour control were considered to be predictors. The findings showed that PBC ( $\beta = -0.38$ ,  $p < 0.001$ ) was the strongest predictor of intentions, followed by attitude ( $\beta = -0.36$ ,  $p < 0.001$ ) and subjective norm ( $\beta = -0.25$ ,  $p < 0.001$ ). The components of the TPB (attitude, perceived behaviour control and subjective norm) accounted for 54.8% (adjusted  $R^2$ ) of the variance of intentions to smoke. In step 2, smoking self-identity scale was added to the model. The results showed that TPB constructs and smoking self-identity accounted for 58.5% (adjusted  $R^2$ ) of the variance—3.7% higher than the first model. The highest weight for  $\beta$  ( $\beta = -0.35$ ) was found for perceived behaviour control, showing that PBC was the strongest determinant of intention to smoke.

## DISCUSSION

In this study, we examined an extended model of the TPB and found that it predicted intention to smoke better than the original TPB. This study provided empirical support for the idea that the TPB might benefit from being combined with self-identity in predicting intentions.

Smoking self-identity is a construct that indicates whether one identifies himself or herself as smoker or non-smoker. Our findings indicated that 44% of current smokers did consider

themselves to be 'non-smokers'. Similarly, Harris *et al*<sup>17</sup> indicated that young current 'cigarette users' do not necessarily identify themselves as smokers. However, when adolescents are becoming adults, they struggle to develop an individual sense of identity and smoking may be part of developing that new identity. Such results suggest that smoking prevention strategies may be unsuitably targeted towards, or not designed for, adolescent tobacco users who may identify themselves as non-smokers and point to the need for specific smoking prevention and intervention programmes, targeted to these smoker subtypes.<sup>10</sup>

Previous documents show that<sup>8 17</sup> one acts in accordance with one's self-identity for self-verification reasons. Thus, people are motivated to retain and affirm the sense of self and identity. People act to be consistent with their perceived identity. Accordingly, when the social categorisation including the identity is activated, the person behaves to be consistent with this self-image.

In this study, regression analysis suggested that PBC was the strongest predictor of intention, followed by attitude, self-identity and subjective norms. However, previous studies showed the relative impact of the TPB components on intentions. Ajzen<sup>18</sup> suggested that the impact of the TPB variables may differ in different target populations and situations.<sup>11</sup> For instance, consistent with our findings, a study by Nehl *et al* in African-American and Caucasian college students showed that PBC was the strongest predictor of smoking cessation.<sup>19</sup> Similarly, Harakeh *et al*<sup>6</sup> reported that PBC was the strongest predictor of intention to start smoking. In contrast, in a study by Rise *et al* among daily smoker students at the University of Oslo, attitude and descriptive norms emerged as the strongest predictors of intention to smoke.<sup>20</sup> In a meta-analysis of 185 TPB studies,<sup>9</sup> subjective norm was the least predictive construct. In addition, Godin and Kok<sup>21</sup> reviewed 76 health-related studies that used TPB as a theoretical framework. The researchers found that PBC was a significant predictor in 65 of 76 analyses, attitudes were significant in 62 of 76 and subjective norms were significant in 36 of 76 analyses.

The results of this study demonstrated stronger negative attitudes about smoking were associated with lower intention to smoking. On the other hand, the mean score of attitude among non-smoker students was higher than that of current and ex-smoker groups ( $p < 0.001$ ). Similar findings also were reported in previous studies where a positive attitude towards smoking predicted an increased risk of adolescents smoking.<sup>3 11</sup> A study by Islam and Johnson<sup>3</sup> in Egypt showed that adolescents who were ex-smokers had greater positive beliefs about smoking, and also were at a higher risk of engaging in any smoking behaviour. Similarly, a study by Baska *et al*<sup>22</sup> in Slovakia showed that attitudes towards tobacco use among adolescents were closely related to their smoking status—that is, current smokers more frequently reported positive attitudes. Studies have shown that in industrialised countries, adolescents who smoke are usually less knowledgeable about the health risks involved, do not believe that smoking will affect them personally or feel that the short-term benefits outweigh any health risks.<sup>23</sup> Considering the above-mentioned findings, planning and implementation of educational programmes seem necessary in order to correct the attitude of students toward smoking.

In this study, the mean score of subjective norm among non-smoker students was higher than that of ex- and current smoker groups. On the other hand, adolescents who were non-smokers experienced higher social pressure about not smoking.

**Table 2** Results obtained from multiple linear regression analyses (n=365)

	Unstandardised coefficients			
	B	SE	Standardised $\beta$	p Value
Step 1				
Attitude	0.16	0.01	−0.36	<0.001
PBC	0.35	0.03	−0.38	<0.001
Subjective norms	0.26	0.04	−0.25	<0.001
Model R <sup>2</sup> =54.8%				<0.001
Step 2				
Attitude	0.13	0.01	−0.30	<0.001
PBC	0.32	0.03	−0.35	<0.001
Subjective norms	0.19	0.04	−0.17	<0.001
Self-identity	0.33	0.05	−0.23	<0.001
Model R <sup>2</sup> =58.5%				<0.001

PBC, perceived behavioural control.



Previous research<sup>4</sup> indicated that smoking was a dynamic phenomenon and the influence of well-regarded other people may vary across stages of initiation and escalation. Additionally, the influence on adolescents of the smoking behaviour of such people has been suggested to vary by gender, ethnicity and age.<sup>24</sup> It is argued that one advantage of the TPB is in its explicit incorporation of social influence (subjective norms) on smoking initiation and cessation.<sup>24 25</sup>

Adolescents who experiment with cigarettes had a higher intention to start smoking. This is in line with a Global Youth Tobacco Survey in more than 150 countries, which reported that about 10% of 13–15-year-olds are current smokers and another 19% intend to start smoking during the next 12 months.<sup>14</sup> This finding is important because a study by Yao<sup>26</sup> in China showed that students who intended to smoke were 3.73–5.48 times more likely to become smokers. Furthermore, The TPB states that behavioural intentions are the best predictors of behaviour.<sup>18</sup>

The short-term and long-term consequences of smoking include decreased respiratory functioning, compromised physical fitness, increased resting heart rate, shortness of breath and an increased likelihood of alcohol and other drug abuse and also even more threatening, with cigarette smoking being strongly linked to heart disease, lung cancer and decreased life expectancy.<sup>2 16</sup> The results of the study might play an important role in the prevention of these complications. Of these, it is well known that heart diseases are the main killer of people both in developed and developing countries. Indeed, cigarette smoking is among the main preventable causes of untimely death, and morbidity and mortality due to heart diseases.<sup>27</sup>

A few important limitations should be taken into account while interpreting the findings from this study. First, the analysis was based on cross-sectional data, thus causal relationships cannot be inferred. Secondly, it relies on self-completion of the questionnaires and thus reporting might be biased. However, self-report questionnaires are frequently used to measure smoking behaviour among adolescents and have been found to be as reliable as a more objective method such as biochemical verification.<sup>6</sup> Future studies are needed to test whether interventions based on extended TPB are valuable for the prevention of smoking among Iranian adolescents.

## CONCLUSIONS

A primary focus of this study was to further assess the role and implications of the extended TPB in adolescents' intentions to smoke in order to make recommendations about future health interventions. The overall results support the extension of the TPB through smoking self-identity. This extension appeared to provide a more powerful explanation of intention to begin cigarette smoking. The findings of this study have implications for both health promotion specialists and cardiologists. They could place their emphasis on perceived behaviour control and tell non-smokers to avoid smoking and smokers that they can quit 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 adolescent may be better targeted. This might enable cardiologists and health personnel to develop a tailored intervention programme for promoting healthy behaviours among adolescents.

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**Competing interests** None.

**Patient consent** Obtained.

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