RESEARCH PAPER

Personal, interpersonal, and cultural predictors of stages of cigarette smoking among adolescents in Johannesburg, South Africa

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Objective: This study examined the personal, parental, peer, and cultural predictors of stage of smoking among South African urban adolescents.

Design: A cross-sectional design was employed. A stratified random approach based on census data was used to obtain the sample. Analyses were conducted using logistic regression.

Setting: The study took place in communities in and around Johannesburg, South Africa.

Subjects: Participants consisted of 731 adolescents in the age range of 12–17 years old. The sample was 47% male and 53% female, and contained four ethnic classifications: white, black, Indian, and "coloured" (a South African term for mixed ancestry).

Methods: A structured, in-person interview was administered to each participant in private by a trained interviewer, after obtaining consent.

Main outcome measures: The dependent variables consisted of three stages of smoking: non-smoking, experimental smoking, and regular smoking. The independent measures were drawn from four domains: personal attributes, parental, peer, and cultural influences.

Results: Factors in all four domains significantly predicted three different stages of smoking. Personal attributes (internalising and externalising) distinguished among the three stages. Parental factors (for example, affection) reduced the odds of being a regular smoker compared with an experimental smoker or non-smoker, but did not differentiate experimental smokers from non-smokers. Findings from the peer domain (for example, peer substance use) predicted an increase in the risk of being a regular smoker compared with an experimental smoker or non-smoker. In the cultural domain, ethnic identification predicted a decrease in the risk of being a regular smoker compared with an experimental smoker, whereas discrimination and victimisation predicted an increase in the risk of being an experimental smoker compared with a non-smoker.

Conclusions: All the domains were important for all four ethnic groups. Four psychosocial domains are important in distinguishing among the three stages of smoking studied. Some predictors differentiated all stages of smoking, others between some of the stages of smoking. Therefore, intervention and prevention programmes which are culturally and linguistically sensitive and appropriate should consider the individual's stage of smoking.

Cigarette smoking represents a significant global health problem and has been identified as a leading preventable cause of disease and premature death in the world. Most of the research examining smoking among adolescents in South Africa has focused on prevalence.[1] [2] In the few cases where psychosocial predictor variables have been examined, the factors that independently relate to experimental smoking or to the progression to regular smoking have not yet been fully explored.[1] [3] [4] Because of the current lack of adequate psychosocial data, the information necessary to design extremely effective programmes is not yet available.

To our knowledge, this is the first investigation in South Africa designed to examine both internal factors (personal attributes) and external influences from peers, family, and the surrounding culture, to see how they influence smoking initiation, and to assess the progression from experimental smoking to regular smoking.[5] Knowledge of the relative influence of these internal and external factors upon smoking behaviour in adolescents will greatly aid policymakers and contribute to the design of effective prevention and intervention programmes.

Adolescent personal attributes

Research conducted in the United States has repeatedly found that externalising behaviours are related to both initiation and persistent smoking in adolescents. Thus, impulsivity, sensation seeking, and conduct disorder predict smoking onset,[6] [7] and more frequent smoking.[8] This may be due to adolescents being more likely to engage in risky behaviours including smoking, and less likely to consider the long-term consequences of their actions.[9]

Several investigators have reported that characteristics associated with internalising disorders (for example, depression, interpersonal difficulty, low ego integration), are related to initiation of smoking and to increased levels of smoking behaviour.[7] [10–12] Although the relationship between internalising and externalising behaviours and stage of smoking has not yet been examined in a South African cohort, we hypothesise that similar relationships to those listed above will emerge in the present sample of adolescents from Johannesburg.

Parental influences

According to Family Interactional Theory, a mutual parent-child relationship characterised by affection, little conflict, availability, and structure is associated with conventional behaviour which insulates the adolescent from smoking.[13–15] Parental influences are operative at different stages of smoking.[5] [10] Several studies have found that parental smoking is linked to an increased risk for smoking in adolescent

offspring.[5] [16–18] Finally, being raised in a single-parent household, often characterised by the absence of a biological father, has been associated with an increased likelihood of smoking.[1] In light of these findings, we hypothesise that positive child-rearing factors will be associated with a reduced risk of smoking in South African adolescents. Additionally, we expect that parental smoking will be associated both with smoking initiation as well as with regular adolescent smoking.

Peer influences

Having peers who are delinquent or who drink alcohol, use drugs, and smoke cigarettes, is strongly related to adolescent smoking behaviour, both initiation and regular smoking.[3] [5] [19–22] We hypothesise that associating with delinquent and substance-using peers will be strongly related to experimentation with cigarettes, and to the progression to regular smoking.[15] [23–25]

Cultural influences

According to Family Interactional Theory, we hypothesise that some cultural factors (for example, ethnic discrimination) increase the likelihood of smoking while other cultural factors (for example, ethnic identification) serve as protective factors which insulate the adolescent from smoking. As regards the risk factors, ethnic discrimination and victimisation directed at certain ethnic groups has been associated with smoking as well as poor health outcomes among adolescents.[26] [27] As regards protective factors, both a secure sense of identification with one's ethnic group and having cultural norms prohibiting smoking, insulate the adolescent from smoking.[5] [28] We also hypothesise that adolescents who report greater cultural taboos against smoking will be less likely to either initiate smoking or progress to regular smoking.

To our knowledge, this is the first study to distinguish among stages of smoking behaviour as related to intrapersonal, interpersonal (that is, family, and peer), and cultural factors among adolescents living in South Africa. This investigation is also unique as it focuses on black, coloured, Indian, and white adolescents living in such diverse areas as Sandton (known for its wealth) and Soweto (a well-known black township) in Johannesburg, South Africa.

METHOD
Participants

We interviewed 731 adolescents, 47% male and 53% female, drawn from communities in and around Johannesburg, South Africa. They ranged in age from 12–17 years, with a mean age of 14.5 years (SD 1.68). At the time of the interviews 96% of the adolescents reported being in school, and the mean educational level was 8th grade. The ethnic breakdown of the sample was 35.4% black (n = 59), 30.4% "coloured" (a South African term for mixed ancestry; n = 222), 26.5% Indian (n = 194), and 7.7% white (n = 56). In addition, 55% of the participants reported living with their biological fathers, and 80% with their biological mothers. The number of amenities present in the home (for example, television, telephone, computer, car) was used as a proxy for socioeconomic status (SES). Out of a possible score of 12 amenities present, an average of 9.2 (2.46) amenities was reported.

Procedure

A stratified, random sampling approach based on the 1996 population census was used to obtain the sample. Census enumerator areas were stratified by race and SES as determined through employment rates listed for the head of household. The respondents were recruited from households within the selected census enumerator areas. A starting point was designated randomly for each area, and every 10th household was visited to determine if an eligible adolescent resided there. Eligible adolescents were defined as those between the ages of 12 and 17 years, inclusive. When more than one adolescent in a household qualified for the study, a random selection procedure was used to determine which one was included.

The instrument and consent forms were translated from English into three languages—Afrikaans, SeSotho, and IsiZulu. In order to guarantee that the questions retained their meaning after translation, all instruments were translated back into English and checked against the original English version. All discrepancies were corrected.

Individual, in-person interviews were conducted by trained interviewers after obtaining informed consent from a parent or guardian followed by assent in writing from the adolescent. After obtaining consent, a private location was found to administer the questionnaire. Whenever possible, interviewers and participants were matched on gender and ethnicity, and participants were administered the questionnaire in their language of choice.

Since smoking is illegal for children and adolescents under 16 years of age in South Africa, when answering questions regarding tobacco use participants were given the instrument and requested to record the answers themselves. The questionnaire took approximately one hour to complete. All procedures and consent forms were approved by both the University of Pretoria Faculty of Health Sciences Research Ethics Committee and the New York University School of Medicine's Institutional Review Board.

Measures

The questionnaires administered to the participants included measures assessing the adolescents' personal attributes, aspects of parental behaviours such as smoking, aspects of the peer group including smoking behaviour, cultural factors such as ethnic identification, and demographic factors. The instrument was adapted mainly from measures that have proven to be predictive of tobacco use, drug use, delinquency, and psychopathology in previous studies conducted in South Africa,[4] [29] in the USA,[30] [31] and in Colombia, South America.[32] [33] Instrument development was based on findings that emerged in focus groups and on a pretest of an early version of the questionnaire. Both were conducted in South Africa in order to ensure that the adapted measures were appropriate for use among adolescents in that country.

The dependent variables used in the analysis consisted of a question regarding lifetime smoking frequency. Smoking frequency was assessed with the following item: "How many cigarettes do you smoke?" Responses to the question ranged from 1 ("none") to 6 ("more than a pack a day"). The responses to this item were then categorised into three groups representing stages of smoking behaviour: *non-smokers* who have never tried smoking (56%), *experimental smokers* who have tried at least a few puffs of a cigarette but smoke less than a few cigarettes a week (23%), and *regular smokers* who at some point during their adolescence had smoked from a few cigarettes a week to more than a pack a day (21%).

Measures from four domains were used as independent variables for this study: (1) personal attributes, (2) parental characteristics, (3) peer attributes and, (4) cultural and ethnic factors. Table 1 presents the scale names, sample questions, and Cronbach's alphas for all the measures.[34–40]

In the personal attributes domain a measure of internalising behaviour was constructed by summing three validated measures: interpersonal difficulty, depressive symptoms, and low ego-integration. Also, an externalising behaviour

Table 1 Psychosocial measures by domain: sources, reliabilities, and sample items

Measure	Sample item	Source (ref)	Cronbach's α*
Personal attributes domain			
Internalising behaviour	Over the past few years, on average, how much were you bothered by feeling hopeless about the future?	34, 35†	0.81
Externalising behaviour	How often have you taken something not belonging to you worth more than R35?	36, 37†	0.71
Family domain			
Parental current smoking	How many cigarettes does your mother/father usually smoke?	Original	–
Parental rules	Does your mother/father have definite rules about homework?	Original	0.78
Parental affection/child-centeredness	Your mother/father frequently shows love for you.	38	0.72
Parental time-spent	Your mother/father spends almost every day teaching you what is right and what is wrong.	38	0.75
Parent-child conflictual relations	You seldom follow your mother's/father's advice unless he/she keeps after you.	Original	0.79
Biological father in home	Does your biological father live with you?	Original	–
Peer domain			
Peer deviance	How many of your friends have cheated on an exam?	39	0.79
Peer substance use	How many of your friends smoke cigarettes on a regular basis?	Original	0.83
Cultural domain			
Cultural norms against smoking	How wrong is it for a younger woman to smoke cigarettes?	Original	0.80
Ethnic identification/affirmation and belonging	You have spent time trying to find out more about your history, traditions, and customs.	40	0.73
Discrimination/victimisation	How much have you experienced discrimination in the shops or in the streets?	Original	0.71

*There are no alphas for single item scales.
†Combined scales have multiple sources.

measure was formed by summing measures of self-deviance and tolerance of deviance. The parental domain consisted of six measures including questions regarding the adolescents' relationships with their mothers and fathers characterised by affection (a combined measure of parental affection and parental child-centeredness), conflict (a measure of parental conflictual relations), availability (a measure of parent time-spent), and structure (a measure of parental rules), a question regarding parental current smoking, and a question regarding having a biological father in the home. The parental measures were combined using the mean of the maternal and paternal score for each attribute, and represent the overall parental influence for each measure. The 20% and 45% of respondents who did not live with their biological mother or father, respectively, still answered questions about their biological father or mother if they were still in contact with them; if not still in contact with them, they answered the questions about a primary female or male caregiver or guardian. The peer domain consisted of measures of peer deviance and peer substance use (a combined measure of peer tobacco, alcohol, marijuana, and other illegal drug use). The cultural domain consisted of both cultural risk (a combined measure of discrimination and victimisation) and cultural protective factors (a combined measure of ethnic identification and ethnic affirmation and belonging), and cultural norms against smoking.

Demographic characteristics included age, gender, ethnicity (black, white, "coloured", and Indian), and amenities (which included items tapping the presence or absence of 12 durable goods such as electricity, radio, and television) in the household. We included an amenities index to assess the respondents' SES because measuring the assets, commodities or amenities of households is more valid for South Africa and its apartheid legacy than are methods that rely on household income, expenditure, and/or education of heads of household.[41][42]

Statistical analysis

We conducted a series of logistic regression analyses to assess the strength of each risk or protective factor in predicting group membership. These analyses were performed in a pairwise fashion, first comparing the non-smokers to the experimental smokers, then comparing the experimental

smokers to the regular smokers, and finally comparing the non-smokers to all the smokers (experimental smokers or regular smokers). Odds ratios and 95% confidence intervals were computed for each factor within each of the four psychosocial domains. All of the predictor variables were standardised so that the magnitudes of the odds ratios could be compared directly. These analyses controlled for gender, age, ethnicity, and household amenities. In addition, a final set of Hausman's χ^2 tests[43] was conducted to compare the magnitude of the odds ratios for each psychosocial predictor contrasting non-smokers, experimental smokers, and regular smokers.

We conducted a power analysis to assess whether the "n" was sufficient for the logistical regression analyses. For example, in order to achieve sufficient power of at least 0.80 (two-tailed test at $\alpha = 0.05$), the sample size should be at least 550, when the overall event rate is 0.30 and the odds ratio is 1.3 (the lowest projected event rate and odds ratio for the sample used for the comparison between experimental smokers and non-smokers). This finding indicated that we did have sufficient power, using our sample sizes, for the statistical tests to compare experimental smokers and non-smokers. In a similar fashion, we conducted power analyses for the comparisons of regular smokers versus experimental smokers and smokers versus non-smokers. Once again, the results indicated sufficient power for these comparisons.

RESULTS

Three of the demographic measures had a significant relationship with smoking group membership: namely, age ($\chi^2 = 111.6$, df = 1, p < 0.001), ethnicity ($\chi^2 = 43.9$, df = 6, p < 0.001), and gender ($\chi^2 = 15.5$, df = 2, p < 0.01). Younger adolescents, females, and blacks were more likely to be non-smokers. We ran each of the demographic variables (that is, gender, age, ethnicity, and SES) in interaction with each of the independent variables. The dependent variables were the dichotomous variables representing the comparisons between experimenters versus non-smokers, regular smokers versus experimenters, and smokers versus non-smokers. The purpose of these analyses was to determine quantitatively whether we needed to control for the demographic variables in our analyses. We controlled for SES and age as they interacted with the

independent variables. We controlled for gender and ethnicity because they were main effects. Thus, the demographic measures were controlled for in the analyses so that the results could be generalised across all of the subgroups included in the study.

Next, odds ratios were computed to examine the relation of each of the standardised predictors in the domains of personality attributes, parental factors, peer attributes, and cultural factors, to the stage of smoking behaviour. In addition, the results of the Hausman's χ^2 tests were also conducted. Table 2 presents the findings from these analyses.

Findings from the personal attributes domain show that both internalising and externalising attitudes and behaviours increased the odds of being an experimental smoker over a non-smoker and being a regular smoker over an experimental smoker.

It is important to note that, in the parental domain, having a biological father in the home was significantly related to a reduced risk for being a regular smoker over an experimental smoker. All of the other protective parent-child relational factors, including parental rules, affection, and time-spent with the child, significantly reduced the odds of being a regular smoker compared with an experimental smoker or non-smoker. In contrast, parental current smoking and conflictual adolescent-parent relations significantly predicted an increase in the risk for being an experimental smoker versus a non-smoker.

Findings from the peer domain show that peer deviance and substance use predicted the smoking behaviour of South African adolescents. Both of the peer risk factors significantly increased the odds of smoking initiation; that is, being an experimental smoker as compared to a non-smoker. In addition, peer substance use significantly increased the odds of being a regular smoker as opposed to an experimental smoker.

In the cultural domain, only perceptions of cultural norms about smoking significantly reduced both the odds of being an experimental smoker over a non-smoker, and a regular smoker over an experimental smoker. The cultural protective factors (identification and affirmation and belonging) significantly reduced the odds of being a regular smoker as opposed to an experimental smoker. In contrast, the cultural risk factors (that is, discrimination and victimisation)

significantly increased the odds of being an experimental smoker as opposed to a non-smoker.

DISCUSSION

The findings of the present study supported our hypotheses that psychosocial factors predicted the three smoking groups: namely, non-smokers, experimental smokers, and regular smokers. First, personal attributes (both internalising and externalising behaviours) were important for predicting experimental smoking as compared with non-smoking, and regular smoking as compared with experimental smoking. In general, parental protective factors reduced the odds of regular over experimental smoking, but not experimental over non-smoking; in contrast, parental risk factors increased the odds of experimental over non-smoking, but not regular over experimental smoking. For the most part, peer substance use predicted experimental smoking as compared with non-smoking and regular smoking as compared with experimental smoking. In the cultural domain, the cultural risk factors (discrimination and victimisation) increased the odds of experimental smoking over non-smoking, but the cultural protective factors (affirmation and belonging and ethnic identity) insulated the adolescent from regular smoking. To our knowledge, this is the first time that these psychosocial factors have been examined together in one study to determine how they relate to stage of smoking in an urban sample of adolescents living in South Africa.

With two exceptions (that is, parental rules and ethnic identification), the remainder of the dimensions in each of the domains were associated with the probability of being a smoker (experimental or regular smoker) versus a non-smoker. The most powerful predictors of smoking were externalising behaviour in the personal attribute domain, conflictual parent–child relations in the family domain, peer substance use in the peer domain, and weak cultural norms against smoking in the cultural domain.

The relationships between the predictors and smoking group membership were consistent for each of the four ethnic groups.[44] In the personal attributes domain, externalising behaviour, assessed by tolerance of deviance and deviant behaviour, is associated with a considerable increase in the odds of being an experimental smoker as compared with a non-smoker and an even larger increase in the odds of being

Table 2 Smoking group comparisons: odds ratios and 95% confidence interval

Measure	Experimenters (n = 167) v non-smokers (n = 412)	Regular smokers (n = 151) v experimenters (n = 167)	Smokers (n = 318) v non-smokers (n = 412)
Personal attributes domain			
Internalising behaviour	1.28* (1.04 to 1.57)	1.54*** (1.19 to 2.00)	1.56*** (1.31 to 1.87)
Externalising behaviour	1.38** (1.10 to 1.73)	1.79*** (1.39 to 2.31)	1.78*** (1.44 to 2.19)
Parental domain			
Parental current smoking	1.27* (1.03 to 1.57)	1.13 (0.89 to 1.43)	1.32** (1.09 to 1.56)
Parental rules†	1.11 (0.90 to 1.38)	0.55*** (0.41 to 0.73)	0.86 (0.72 to 1.03)
Parental affection†	0.94 (0.76 to 1.15)	0.61*** (0.47 to 0.79)	0.77** (0.65 to 0.92)
Parental time-spent†	0.95 (0.78 to 1.16)	0.62*** (0.48 to 0.80)	0.80* (0.68 to 0.95)
Parent-child conflictual relations†	1.60*** (1.31 to 1.96)	1.09 (0.84 to 1.39)	1.70*** (1.42 to 2.02)
Biological father in home†	0.92 (0.61 to 1.39)	0.44** (0.26 to 0.76)	0.66* (0.46 to 0.94)
Peer domain			
Peer deviance	1.55*** (1.25 to 1.93)	1.26 (0.99 to 1.59)	1.68*** (1.40 to 2.03)
Peer legal/illegal drug use	1.72*** (1.38 to 2.16)	1.53*** (1.19 to 1.96)	2.13*** (1.73 to 2.62)
Cultural domain			
Cultural norms against smoking	0.74** (0.60 to 0.91)	0.59*** (0.46 to 0.76)	0.62*** (0.52 to 0.74)
Ethnic identification†	1.10 (0.90 to 1.36)	0.70** (0.54 to 0.90)	0.94 (0.79 to 1.11)
Discrimination and victimisation	1.41** (1.14 to 1.75)	1.04 (0.84 to 1.29)	1.46*** (1.21 to 1.75)

*p<0.05, **p<0.01, ***p<0.001.
†Hausman's χ^2 test indicates a significant difference between the odds ratio of the non-smokers versus the experimental smokers and the odds ratio of the experimental smokers versus the regular smokers (at $\alpha<0.05$ level).
All measures have been standardised.
These analyses control for gender, age, ethnicity, and socioeconomic status.

a regular smoker as opposed to a experimental smoker. This finding is in line with our hypothesis of externalising behaviour, as well as with previous studies in the United States which have shown that delinquency, poor self-control, and antisocial behaviour are all related to an increased risk for cigarette smoking and substance use.[6–8] This finding provides further support for Problem Behavior Theory,[36] as rebelliousness and acting-out behaviours are observed to cluster with other problem behaviours such as cigarette smoking.

The results of the present study also show that internalising behaviours, as assessed by symptoms of interpersonal difficulty, depression, and low ego integration among South African adolescents, are related to an increased risk of being an experimental smoker over a non-smoker, and a regular smoker over an experimental smoker. One possible explanation for these findings is that South African adolescents smoke in order to cope with internal distress.[45] Biological mechanisms may also be operative. According to Parrott,[46] smokers are overall more anxious than non-smokers and heavy smokers experience a greater number of mood fluctuations throughout the day as a result of the rapid onset of withdrawal. Kassel et al[47] postulated that nicotine has an impact on the opioid mechanisms or dopaminergic reinforcement pathways, resulting in effects that in turn are related to reduced negative effect.

The results from the parental domain show that most of the parental protective factors significantly predicted the transition from experimental smoking to regular smoking but not from non-smoking to experimental smoking. In accord with Family Interactional Theory,[13] a positive parent–child relationship appears to be protective against problem behaviours such as progressing from experimentation with cigarettes to regular smoking. With regard to experimental smoking, significant factors are having parents who currently smoke or have a conflictual relationship with their child. It may be that the adolescents imitate their parents' smoking behaviour. Also, children who have a conflictual relationship with their parents are more likely to rebel, and therefore may experiment with smoking.

Peer substance use and deviance were related to smoking behaviour among South African adolescents. Adolescents tend to share similar beliefs as their peer group, or may be influenced by their peers through imitation or modelling, and thus often have similar behaviours.[10 36 48–50]

The final domain, the cultural domain, contained a risk factor (discrimination and victimisation) and two protective factors (ethnic identification/affirmation and belonging, and cultural norms against smoking). It seems that when overt or covert aggression is directed at the adolescent, the reaction may be increased stress coupled with an increased likelihood of trying smoking. Self-medicating with tobacco in this manner is recognised and has been studied both in South Africa[2] and in the United States.[45] As regards the cultural factors, these factors predicted the transition from experimental smoking to regular smoking, but were not related to the initiation of experimentation with cigarettes. Identifying with and having a sense of belonging to one's own ethnic group has been shown to be protective against both legal and illegal drug use in multiple studies.[28 51] Adolescents who identify with their own group and feel connected are more likely to internalise the group's norms, possibly including those regarding problem behaviours (for example, regular smoking).[52 53] These protective factors most likely work in concert insulating the adolescent from smoking. Our findings highlight the importance of examining cultural factors when studying the predictors of different stages of tobacco use.

What this paper adds

Psychosocial risk factors from the domains of personal attributes, childrearing practices, peers, and culture/ethnicity have been shown to play a significant role in the initiation and maintenance of smoking in adolescents in studies in the United States. There are little data on the role played by these variables in smoking among South African adolescents. In addition, most of the research examining smoking among adolescents in South Africa has focused on prevalence.

This study represents the first attempt to examine these factors regarding stages of smoking in an urban cohort of South African adolescents. The results indicate that factors from each of the four psychosocial domains distinguished between non-smokers, experimental smokers, and regular smokers. For, example, internalising and externalising behaviours differentiated among all the stages. Parental factors were particularly important for differentiating between experimental and regular smokers. In the cultural domain, ethnic identification and affirmation and belonging distinguished regular smokers from experimental smokers, while discrimination and victimisation distinguished experimental smokers from non-smokers. The findings have important implications for the design of smoking prevention and intervention programmes for South African adolescents.

Limitations

Since the study is cross-sectional, we are limited in discussing the causal nature of the relationships that have emerged. In addition, our data on adolescent tobacco use is based on self-reports, rather than independent biochemical verification of the adolescents' smoking behaviour. In addition, since the sample for this study was collected exclusively in Johannesburg, South Africa, we cannot safely generalise the results to adolescents living in other cities or rural areas in South Africa, or to adolescents in other locations around the world. Nevertheless, studies conducted in other parts of the world, including the United States, Australia, England, Canada, and New Zealand, have identified similar predictors of different stages of cigarette smoking.[5] There are theoretical reasons to predict interactive effects among the four domains. Future research would benefit from examining the interactions among these domains.

Conclusion

There are several points we would like to highlight. First, both experimental and regular smoking are multi-determined. Second, there are similarities among the different ethnic groups in the risk and protective factors for predictors of experimental and regular smoking. Programmes designed to intervene in adolescent smoking do not need to be unique for particular ethnic groups, but should consider factors unique to each ethnic group. Third, there are common factors that differentiate among all of the stages of cigarette smoking and those which are unique to particular stages. Programmes designed to prevent the movement from both non-smoking to experimental smoking, and experimental smoking to regular smoking, should include a focus on the following: personal attributes (for example, internalising and externalising behaviours), parental smoking in the family domain, peer deviance and smoking in the peer domain, and cultural norms and victimisation in the cultural domain. Fourth, in preventing the transition from experimental smoking to regular smoking, attention should be paid to developing family programmes that highlight the importance of a nurturant parent–child relationship, parental rules, and parental availability. Finally, prevention programmes should

enhance feelings of ethnic identification and affirmation and belonging since these cultural factors seem to protect the adolescent from becoming more heavily involved in smoking.

Our findings clearly demonstrate that prevention and treatment programmes need to be multifaceted and consider the particular stage of smoking of the target group of adolescents. Of course, such programmes do need to be culturally relevant and linguistically appropriate.

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