A culture-based study of personal and social influences of adolescent smoking

Bettina F. Piko1, Aleksandra Luszczynska2, Frederick X. Gibbons3, Mert Teközel4

Background: A range of factors have been found to influence the onset and maintenance of smoking among adolescents. The aim was to explore interrelationships among adolescent smoking and certain personal influences (academic achievement, life satisfaction and future-orientedness) and social influences (hostility, social comparison and perceived friends' smoking) using a cultural perspective.

Methods: The study surveyed high school students aged 13–20, a total sample of 2387 adolescents from randomly selected classes in urban and metropolitan areas from Szeged (Hungary), Lublin and Warsaw (Poland), Izmir (Turkey) and Ames, Iowa (USA). The self-administered questionnaire contained items on smoking, sociodemographics, life satisfaction, future-orientedness, academic achievement, hostility, social comparison and perceived friends' smoking. Results: The frequency of smoking proved to be the highest among Hungarian (58.7%) and Polish (57.6%) adolescents, while the occurrence was 22.1% among US and 23.6% among Turkish adolescents. Across the countries, high life satisfaction, academic achievement, future orientedness and social comparison were related to lower rates of smoking. Perceived friends' smoking was a strong influence of adolescent smoking in all samples. Only paths from academic achievement and perceived peers' smoking differed across the countries. Conclusion: Findings suggest that interrelationships between adolescents' smoking and its social and personal influences are similar across all countries as a part of the developmental processes of adolescence. These findings point to the importance of both personal and social influences of adolescent smoking, which interact in a complex model, regardless of culture or smoking rates.

Keywords: adolescents, smoking, personal and social influence, cross-country study

Smoking is a serious public health problem in Eastern Europe. The East–West difference in health status may primarily be associated with differences in health behaviours such as smoking. Although morbidity and mortality rates are relatively favourable in youth, smoking usually begins during adolescence, which may contribute to deterioration of health in later adulthood. Among teenagers, the prevalence of smoking across Europe is approximately 30% with no significant signs of a decrease. In Canada and the USA, where the prevalence of smoking in the general population has declined over the past several decades, the reduction has not been significant among adolescents.

A range of factors have been found to influence the onset and maintenance of adolescent smoking. Literature suggests that we need to develop more complete models that include the different contexts in which smoking occurs and the complicated interrelationships among variables at different levels. The research proposed in this paper includes variables at two levels, that is, personal and social factors influencing adolescent smoking. We hypothesised, based on literature review below, a model of interrelationships among adolescent smoking and certain personal influences (e.g., academic achievement, life satisfaction and future-orientedness) and social influences (e.g., hostility, social comparison and perceived friends' smoking).

At the social level, peer effects have been found to be the most important determinants of adolescent smoking. Adolescents who are highly embedded in substance-using peer networks show a much greater risk for substance use. Adolescents' estimates of their peers' smoking prevalence can influence their own smoking behaviour. As they are motivated to conform to peer norms, this tendency to overestimate the prevalence of peers' smoking represents a high-risk factor for adolescents.

Adolescents often observe and learn new behavioural patterns through the process of social comparison that helps them adjust to peer norms and behaviours. Not surprisingly, social comparison tendencies may play an important role in adolescent smoking where adolescents tend to use peers as a basis of comparison rather than the general population. On the other hand, social comparison might also lead to reduced smoking for those whose peers do not smoke.

While social comparison tendencies represent a social orientation in terms of adjustment to similar others, hostility is often defined as a rather stable attitude of negative evaluation of people and events. Hostility may be a risk factor for poor health among adults, e.g. coronary heart disease, in part through poorer health habits such as smoking. Social relationships, that often involve social comparison, could sometimes lead to social strain and conflicts. These interactions might complicate the simple interrelationships among social comparison, hostility and smoking.

At the personal level, personal competence skills, life and value orientations, and high academic competence have been found to have a protective role in adolescent substance use. Students who possess high academic achievement have a significantly lower tendency to smoke and smoking status has been found to be consistently related to school performance, educational aspirations and commitment to school.

Life orientations, such as life satisfaction or future-orientedness, are important aspects of quality of life. Whereas satisfaction with life represents the current perception of one's life, future-orientedness involves a positive belief in one's future developments. Both are subjective measures of well-being and are strongly associated with adolescent adjustment and substance use. As a mechanism, this may be crucial in

1 University of Szeged, Department of Psychiatry, Division of Behavioural Sciences, Szeged, Hungary
2 Warsaw University, Faculty of Psychology, Warsaw, Poland
3 Iowa State University, Department of Psychology, Ames, IA, USA
4 Ege University, Department of Psychology, Izmir, Turkey
Correspondence: Dr Bettina F. Piko, Department of Psychiatry, Division of Behavioural Sciences, University of Szeged, 6722 Szeged, Szentháromság u. 5, Hungary, e-mail: piko Bettina@yahoo.com
determining the relation between smoking, regular alcohol and drug use and adolescents' reduced life satisfaction.\textsuperscript{22} Furthermore, future-oriented ways of thinking may reflect a strong value orientation for the future that may promote preventive health behaviours.\textsuperscript{23}

Among factors affecting smoking, cultural norms may influence not only the prevalence of smoking and drug use but also the ways in which personal and social variables interact with substance use.\textsuperscript{24} Therefore, samples of youths from four different nations were involved in the study: Hungary, Poland (that is, Eastern European countries), Turkey and the USA. Beyond two post-socialist nations with similar historical roots and economic development, Turkey is also experiencing growing westernisation and social change, although certain cultural characteristics (e.g. strong parental control and religious affiliation) may be serving as a protection against adolescent smoking.\textsuperscript{25} A sample of American youth served as a basis for making comparisons between European and non-European adolescents. Previous research indicated that the smoking rate is much higher among Eastern European youth than among American youth.\textsuperscript{26} We hypothesise that cross-country differences will emerge not only in the frequencies of smoking but also in the personal and social influences of adolescent smoking.

**Methods**

**Participants and procedures**

A total sample of 2387 high school students (age range, 13–20; mean, 16.7; SD, 1.1; 46% males), from randomly selected schools and classes in urban and metropolitan areas, participated in the study. Although these samples are not representative of their country, they do represent youth living in the region they come from.

**Hungary**

The Hungarian sample comprised 560 students from four public high schools in Szeged (a major metropolitan center of the south-eastern region). Health behaviour data of the present Hungarian sample are similar to previous data from Szeged studies\textsuperscript{9,26} and those from national representative statistics.

**Poland**

The Polish sample (n = 662) came from two high schools situated in the urban area of Warsaw, and four high schools (60.6% of the sample) in Lublin, in the south-eastern region of Poland. This dual sampling technique was used in order to get a representative picture of youth lifestyles in urban (and not only the capital) areas. Health behaviour data of the sample are quite similar to those from previous research\textsuperscript{27} and representative statistics in Poland.

**Turkey**

The sample of Turkish youth (n = 626) was recruited from seven different high schools in Izmir (the town and its metropolitan area). The health behaviour characteristics were similar to other metropolitan areas in Turkey.\textsuperscript{25}

**USA**

The American sample (n = 539) consisted of students from two high schools in or around Ames, Iowa. Because of the large university population, the socio-economic status (SES) of the sample, as well as the parents' education levels are higher than in comparable high schools in other small cities. As a results, Ames students smoke and use drugs a little less frequently than others, but they drink at about the national norm level, and their level of sexual activity is comparable to national statistics and other samples at this age.\textsuperscript{26} The group is almost all white, and mostly (northern) European-Americans, which provides a good basis for comparison with the European samples.

The data for each sample were collected during the Spring and Autumn semesters of 2001. The survey was translated from English into Hungarian/Polish/Turkish and back-translated by bilingual translators. The questionnaires were self-administered under close supervision of research team members. Students filled out questionnaires during the class period. The questionnaires took approximately 30–40 min to complete. Before data collection, written parental consent was obtained. Research team members were responsible for ensuring confidentiality, and for providing information and responding to students' questions. The response rates across all countries was >90%. In addition to some students who returned letters to not participate, the remaining students likely consisted of youth who were absent.

**Measures**

Smoking was measured by the following question: ‘How many times in the last three months have you smoked cigarettes?’ Responses were rated as follows: 1 = not at all; 2 = a few times every month; 3 = several times a week; 4 = regularly, 1–2 a day; 5 = regularly, 3–10 a day; 6 = regularly, 11–20 a day; and 7 = regularly, more than 20 a day.

Satisfaction with life was measured by The Life Satisfaction Scale.\textsuperscript{28} The scale consists of five statements, such as ‘In most ways my life is close to ideal.’ The participants indicated how strongly they agreed with each item from 1 (strongly disagree) to 7 (strongly agree). The final scale had a range of 5–35 with the following values of Cronbach’s alpha: 0.80 (Hungarian), 0.81 (Polish), 0.88 (American) and 0.84 (Turkish).

Future-orientatedness was measured by a shortened version (six items) of The Consideration of Future Consequences scale.\textsuperscript{29} The scale consists of six statements such as ‘I am willing to sacrifice my immediate happiness or well-being in order to achieve future outcomes’. The final results were coded from 6 to 30. The responses were rated from 1 to 5. Cronbach's alpha coefficients varied from 0.47 (Polish), 0.55 (Hungarian), 0.70 (Turkish) and 0.81 (American).

The academic achievement variable was a self-report measure that asked: ‘What grades do you usually get in school?’ ranging from 1 = mostly A to 7 = mostly Ds and Fs.

Hostility was assessed with the eight-item subscale of The Aggression Questionnaire.\textsuperscript{30} The scale consists of negative evaluations of others and life in general, e.g. ‘When people are especially nice, I wonder what they want?’. The responses were rated with a five-point scale from 1 (extremely uncharacteristic) to 5 (extremely characteristic). The final scale was coded from 8–40 with the following values of Cronbach's alpha: 0.75 (Hungarian), 0.77 (Polish), 0.82 (American) and 0.73 (Turkish).

The Iowa Netherlands Comparison Orientation Measure (INCOM)\textsuperscript{11} was used to measure social comparison tendencies. The scale includes 11 items (e.g. ‘I always pay a lot of attention to how I do things compared with how others do things’) and the scores ranged from 11 to 55 (using a five-point response scale). The reliability coefficients were as follows: 0.68 (Hungarian), 0.77 (Polish), 0.81 (American) and 0.79 (Turkish).

The estimate of the number of friends who are smokers provided a measure of peer smoking.\textsuperscript{9} This variable was measured by the following question: ‘How many of your friends smoke regularly?’ The response categories were: 1 = none; 2 = some; 3 = half of them; 4 = most; and 5 = all.

**Data analyses**

In order to determine whether the predictors included in the study are related to smoking, path analysis with maximum likelihood estimation was performed. Specifically, a four-group
model, with the four countries separated, was analysed using AMOS 4.0. The full information maximum likelihood method was used to impute missing data. The hypothesized model consisted of six variables (see figure 1). Across the countries, life satisfaction, future-orientation, academic achievement, hostility, social comparison tendencies and perceived peers’ smoking were all specified as predictors of smoking. Academic achievement was also specified as a predictor of future orientation and perceived peers’ smoking. Hostility was specified as a predictor of life satisfaction. Social comparison tendency was specified as a predictor of other social influences such as hostility and perceived peers’ smoking. All variables were measured with the indicators mentioned in the Measures section.

The first aim of the analysis was to evaluate whether the hypothesised four-group model fit the data well. To test whether the particular paths are different across the countries, a set of nested models was designed. Each of the nested models differed from a hypothesised model in only one respect: one of the paths was constrained to be equal in all nation groups (e.g. a path from social comparison tendency to smoking was constrained to be equal across the nations). Then the fitness indices of the hypothesised model and a particular nested model were compared. The lack of significant differences between the hypothesised and the nested model means that the nested model can be accepted (i.e. there are no significant differences across cultures). This procedure allows for the construction of the final model, in which all paths found to be equal across the nations in the nested models were constrained to be equal across the countries in one model.

Evaluation of model-data fitness was based on recommended indices: CFI (comparative fit index), TLI (Tucker–Lewis index), RMSEA (root mean square error of approximation). For TLI and CFI, values ranged from 0.90 to 1, indicating a good fit of the model to the data. A RMSEA value of 0.05 or less also indicates a close fit of the model.

Results

Table 1 shows descriptive statistics for smoking, and social and personal influences in the samples. The frequency of smoking proved to be the highest among Hungarian (58.7%) and Polish (57.6%) adolescents, while the occurrence was 22.1% among US and 23.6% among Turkish adolescents. Among US and Turkish adolescents the rates of abstention were above 70%, in the Hungarian and Polish samples the rates were around 40%.

The results of path analysis showed that the fit between hypothesised model and the data was acceptable, $\chi^2 = 221.74, df = 32, P < 0.001$, NFI = 0.99, CFI = 0.99, TLI = 0.98, RMSEA = 0.05. Most of the paths in the model remained significant (figure 1). All the predictors included in the hypothesised model together explained 37% (US sample), 22% (Hungarian sample), 22% (Polish sample) and 23% (Turkish sample) of the variance in tobacco use. The relations between smoking and its predictors in the hypothesised model are displayed in figure 1. Perceived friends’ smoking and academic achievement were related to smoking across the countries. Life satisfaction was directly or indirectly related to smoking in all countries but the USA. Although the relations between smoking and its predictors seem to vary across the countries in the hypothesised model, it should be tested whether the differences between these coefficients are significant. Therefore, the hypothesised model was compared with a series of nested models, in which paths from a predictor to smoking were constrained to be equal across the countries. Results of the comparisons between the hypothesised model and the nested models showed that seven out of twelve paths can be constrained to be equal (see table 2). The final model was constructed with seven paths constrained to be equal across the countries. This final model fit the data well: $\chi^2 = 248.88, df = 53, P < 0.001$, NFI = 0.99, CFI = 0.99, TLI = 0.99, RMSEA = 0.04; it did not differ significantly from the hypothesised model (table 2).

In the final model, the paths from life satisfaction to future-orientedness and to smoking were indifferent across the four countries (see table 2). The relation between future-orientedness and smoking did not differ across the countries. The paths from social comparison orientation to perceived peers’ smoking and to smoking were indifferent across the countries. The paths from hostility to smoking and from academic achievement to future-orientedness were not different in the four groups. Regarding direct relations between smoking and its predictors, only the paths from academic achievement and estimated peers’ smoking differed across the countries.

![Figure 1 H Hypothetical model of adolescent smoking: path coefficients for four countries. Note: U.S., American sample; H, Hungarian sample; PL, Polish sample; T, Turkish sample. Bold font style used for significant path coefficients ($P < 0.05$).](image-url)
In the final model, high life satisfaction, future-orientedness and social comparison orientation were related to lower rates of smoking across the countries. Youth with higher grades used tobacco less often. This relationship was also different in the four countries, with the strongest association among Polish youth and the weakest among American youth. Persons who perceived that fewer of their peers smoked, smoked tobacco less often themselves. The strength of this relation varied across the countries, with the strongest effects in the US sample and the weakest in the Polish sample. Only two paths in the model remained non-significant, that is, the paths from hostility to smoking and from social comparison tendency to perceived peers' smoking. The lack of significant associations was found across the countries.

Regarding cigarette smoking, the strongest direct effect was found in terms of academic achievement and perceived peers' smoking.
smoking. The direct relations between smoking and predictors like life satisfaction, future-orientedness and social comparison were significant, but weak. In the final model, all the predictors explained 36% (US sample), 21% (Hungarian sample), 21% (Polish sample) and 22% (Turkish sample) of the variance in tobacco use.

Discussion

Previous studies have identified a large number of factors that are associated with adolescent smoking.5,6 Findings have consistently documented the importance of peer influence on adolescent smoking.7,8 Our findings are consistent with those reported in previous studies, that adolescents’ estimates of their peers’ smoking is closely connected with their own smoking.9,10 In fact, this relationship proved to be the strongest influence across all four countries, though the coefficient was the strongest among US adolescents.

Among social influences, social comparison showed a significant but limited effect in all samples. Previous studies suggested that social comparison might induce a withdrawal from smoking based on peers’ avoidance of smoking.11 Although perceived peers’ smoking was the most important predictor in adolescent smoking in our study, there was no significant relationship between social comparison and perceived peers’ smoking. This suggests that the perception and the usual overestimation of peers’ smoking is a tendency among adolescents that cannot be explained only on the basis of social comparison. Hostility did not play a direct role in adolescent smoking in our study. One explanation for this may be that this relationship, to date, has been detected mainly in adult studies; the relation may be different in adolescents.12 Another explanation may be the indirect effect that hostility has, through its lowering of life satisfaction. However, the strong positive relationship between social comparison and hostility would suggest that hostility might serve as a withdrawal from an adjustment to certain norms and behaviours, e.g. smoking. The relationship between social comparison and hostility was the strongest among Hungarian youth and weakest among Turkish youth.

Among personal influences, academic achievement had the strongest influence on smoking which is consistent with previous results.5,6,19 Moreover, good academic achievement was also related to perceived friends’ smoking. This finding supports the friend selection hypothesis described by Fisher and Bauman.13 This relationship was the strongest among US youth and much weaker among European youth suggesting that good grades may provide a more important protection for American adolescents, in terms of friend selection, whether smoking or not. It means that smokers not only tend to receive lower grades in school but also tend to choose friends who are also smokers with poor grades which help them reinforce their own behaviours.

Students who are satisfied with their life and who are more future-oriented, tend to smoke less. In addition, current perception of one’s own life is connected with a positive belief in one’s future development, which, in turn, is also related to academic achievement in school. These self-concepts and value preferences may promote preventive health behaviours such as avoidance of smoking.14 In addition, another link between personal and social factors is the strong negative relationship between hostility and life satisfaction. This relationship was the strongest among US youth. Although the pathways did not show any significant cross-country differences, the strengths of certain relationships were different across the four countries. Among American youth, academic achievement showed the weakest relationship with smoking and also with the perception of smoking friends. This difference may be explained by the relatively lower rate of smoking but also certain differences in the grading systems in the USA and Europe. The strongest negative relationship between hostility and life satisfaction could also be detected among US youth. The positive relationship between social comparison and hostility was the weakest among Turkish youth. However, all these connections did not lead to differences in the pathways to smoking.

Taken together, these findings suggest that interrelationships between adolescents’ smoking and its social and personal influences do not reflect cultural patterns. Similar to previous reviews,7,8 social influences are the most significant determinants of smoking. Certain personal influences have a similar role, moreover, the variables of different levels interact. Our findings support the role of these variables except for the direct effect of hostility.

These findings point to the importance of both personal and social influences on adolescent smoking, which interact in a complex model. Despite the cross-sectional nature of our study, our findings add to the literature on adolescent smoking and hopefully help us better understand the background of adolescent smoking. The benefits of this type of knowledge, such as the smoking habits of peers and the individual’s attitudes toward his/her own future affect smoking habits among adolescents, are valuable in that it gives health care systems increased opportunities to influence the choices and habits of adolescents, which in the long term would improve their health and perspectives. Adolescent smoking prevention programs, beyond information giving, should include general competence skills training.

Acknowledgements

The Hungarian part of the study was supported by the OTKA T 042490, the ETT T 005 grants and a Bolyai Research Fellowship of the Hungarian Academy of Sciences. Data collection in Poland was supported by grant BW 1536/5. The Turkish part of the study was supported by Ege University Research Projects Fund 2001EDB002.

Key points

- This study explores interrelationships among adolescent smoking and certain personal and social influences using a cultural perspective
- Personal influences included academic achievement, life satisfaction and future-orientatedness, and social influences included hostility, social comparison and perceived friends’ smoking
- High life satisfaction, academic achievement, future orientatedness and social comparison were related to lower rates of smoking across the countries
- Perceived friends’ smoking was a strong influence of adolescent smoking regardless culture
- Results emphasize the importance of complex models in health education programmes on adolescent smoking

References


