Evaluation of a peer-led smoking prevention programme for Romanian adolescents

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Abstract

The goal of this study was to assess the effects of a school-based smoking prevention programme that used both a video and peer-led discussion groups among Romanian junior high school students aged 13–14 years. The programme embraced the social influence approach and concentrated on enhancing self-efficacy and the acquisition of cigarette refusal skills. Twenty schools were randomly assigned to the control and experimental conditions, resulting in 55 participating classes from the seventh grade (28 in the control group and 27 in the experimental group). Pretest and 9 months follow-up data on weekly smoking initiation and psychosocial variables were collected from 1071 students. Multilevel logistic regression analyses demonstrated a significant effect of the programme on adolescents’ smoking behaviour after 9 months. At post-test, weekly smoking onset was 4.5% in the experimental group versus 9.5% in the control group. Furthermore, the programme had significant effects on smoking-related beliefs. In the experimental group, this resulted in a more negative attitude towards smoking, increased social self-efficacy levels and a more negative intention towards smoking. These findings show that short-term effects of the smoking prevention programme can be realized in Romania. More studies are needed to analyse how to maintain these effects over time.

Introduction

Smoking among Romanian adolescents represents an important public health problem [1, 2]. In 2003, 56.7% of 13- to 17-year-old school students had smoked cigarettes at least once during their lifetime and 23.2% had smoked cigarettes at least once in the past month [3].

During the past 20 years, smoking prevention education programmes for adolescents in Romania contained many weaknesses: (i) most programmes focused only on knowledge transfer regarding the dangers of smoking; (ii) most programmes were implemented irregularly and for a short period of time and (iii) programme evaluations were absent [4]. These findings imply the need for effective prevention programmes for Romanian adolescents. In many countries, schools are used as an important gateway to access youngsters for smoking prevention since schools can reach wide audience, health education is often part of the school curriculum, there are opportunities for interpersonal communications and the school setting is optimal for evaluation studies [5, 6].

Yet, evidence-based programmes on smoking prevention in Romania have not been developed. This paper describes the results of a school-based
peer-led smoking prevention programme on video for Romanian junior high school students aged 13–14 years. The main goal was to prevent regular smoking onset, defined as smoking at least one cigarette a week.

Romanian studies revealed—as did earlier international studies [7–11]—that low self-efficacy to refrain from smoking and the influences of smoking peers were important predictors of smoking onset among Romanian adolescents [12]. An important goal of the Romanian programme therefore consisted of skills training to resist pressure to start smoking and on increasing cigarette refusal skill self-efficacy. Additional goals were to reinforce positive attitudes concerning non-smoking. Short-term effects of similar programmes using principles of the social influence approach are also documented by several other studies [7, 8, 13–16]. Earlier results reveal that these programmes can account for smoking prevention between 5 and 30% (with the upper range given as the highest estimate of programme performance under ‘optimal’ conditions only) [7]. Although long-term effects have been found to be more difficult to realize [17], intermediate effects [18–21] and long-term effects [22–24] have been realized as well.

The content of the Romanian programme was based on a Dutch programme [25, 26] whose theoretical model draws from social cognitive theory [27, 28], the Integrated Model of Change (I-Change Model) [29] and principles of the social influence approach [30, 31]. Although peer-led methods are not always effective [32], we used peers to explain the content of the programme on video as well as to lead the small group activities since peer-led teaching methods can increase the programme’s attractiveness and comprehensibility and peer leaders can be effective models for learning new social skills [33, 34]. In the Dutch programme, information was presented on video and discussed in the activities that were led by peer leaders, a method that was appreciated by pupils, peer leaders and teachers [35].

Based on the results achieved by the Dutch smoking prevention programme [25] and other programmes using social influences approach and peer education [15, 16, 20, 21], two hypotheses were formulated and tested. In comparison with adolescents of the control group (i) onset of regular smoking in participants of the experimental group will be significantly lower and (ii) participants in the experimental group will have more positive attitudes towards non-smoking and have higher self-efficacy not to smoke. Furthermore, we will describe the results of the process evaluation of the programme.

**Method**

**Design and sample**

Approval for the implementation of the programme in schools was received from the Romanian Ministry of Education. In the autumn of 2005, schools from Cluj-Napoca, a city with approximately 330 000 inhabitants situated in the northwest Romania, were approached with the help of the Romanian National Agency against Drugs (an authority governmental agency involved in smoking prevention activities) regarding participation in the project.

Twenty-five school principals were informed about the programme during one of their administrative meetings, where the local school inspectorate, which pertains to the Romanian Ministry of Education, convoked their participation. They received information about the content of the programme, its method and the study design implying that participation would involve random allocation to either the experimental or the control group. In Romania, the principals of the schools are entitled to decide whether or not their students would participate in educational programmes.

Twenty of the 25 school principals agreed to participate with their schools in the project and provided the number of the seventh grade classes that could participate (between 75 and 100% of the classes from each school); the number of the participating classes depended on the number of teachers that could implement the programme. The research team randomly assigned 10 schools to the experimental condition and 10 to the control condition. All names of the schools were put into a box and an independent person picked out names one by one.
until 10 schools were out of the box. These first 10 schools were assigned to the first group and the remainder of the schools were assigned to the second group. Then, by tossing a coin, the two groups were randomly assigned to the experimental or control group. The experimental group consisted of 27 classes. The control group comprised 28 classes. All students from these classes were included in the study.

Power calculations were run, applying a significance level of 0.05 and power of 0.95 and hypothesizing differences between the probabilities of success in preventing smoking onset in both conditions of 10% (expected smoking onset of 10% in the control condition and of 20% in the experimental condition). Power calculations indicated a recommended sample size of at least $2 \times 348$ non-smokers. Based on the estimation of the regular smoking prevalence among the adolescents aged 13–14 years of 15% and an estimated dropout rate of 15%, the chosen sample size resulted in the selection of a baseline sample of at least $2 \times 483 = 966$ students. The study sample consisted of 1071 students: 523 in the experimental group and 548 in the control group.

**Procedure**

The pretest was in January to February 2006, programme implementation took place during March and April and the follow-up was conducted in October to November 2006.

The research team administered the pretest and post-test questionnaires. Classroom completion of the questionnaire took approximately 50 min. Consent to participate was obtained from the school principal, which is the standard procedure in Romania. Next, before the administration of the pretest questionnaires, students were invited to participate in the project by reading an introductory letter. The letter described that the researchers would treat their questionnaires confidentially and that they could refuse to participate by leaving the questionnaire blank. Students were asked not to write their names on questionnaires, but to put the questionnaire in an envelope, to close it and to write their name on the envelope. The questionnaire was administered by the research team simulating examination-like conditions to prevent peers from viewing their answers. The teachers were present in the classroom during data collection, but they stayed in the front of the class and were not involved in questionnaire collection. No refusals were recorded; non-participation was exclusively due to absence of students on the day of assessment.

In May 2006, at the end of the programme, students in the experimental conditions completed a process evaluation questionnaire, which was included in the manual of the programme and was collected by the research team.

**Questionnaires**

**Outcome measurement for students**

The pretest and post-test questionnaires were based on previous versions used for OCTOPUS, a European three-country study [6], and for the European Smoking Prevention Framework Approach (ESFA), a collaboration of six European countries [16]. It was designed and tested to be sensitive to changes in smoking levels in junior and senior high school settings and has shown satisfactory scale reliability and item homogeneity [6, 16, 19, 20].

The primary outcome measured by the questionnaire concerned students’ smoking behaviour, which was assessed by a combination of five questions that were cross-validated. Adolescents were categorized as non-smokers (never having smoked; having experimented with smoking, but had quit experimenting; experimenting with smoking, but not smoking weekly and those who had quit) or as regular smokers (smoking at least once a week). Self-reports were cross-validated by the adolescents’ responses to questions about current smoking and lifetime smoking. In the case of incongruent answers, the adolescent was allocated the most unfavourable response. For instance, if an adolescent reported being an experimental smoker on the first question, but indicated having smoked more than 100 cigarettes in his life, the respondent was classified as a regular smoker [16, 36].
Secondary outcomes in the study were motivational factors regarding smoking: attitudes regarding smoking, social influences, self-efficacy in refraining from smoking in several situations and intention to smoke in the next year. Attitudes were measured on a seven-point scale using 12 items assessing the pros of smoking (six items, $\alpha = 0.67$) and cons of smoking (six items, $\alpha = 0.61$). The pros of smoking referred to expected positive outcomes of smoking (e.g. ‘It helps to calm my nerves’). The cons of smoking refer to negative outcomes of smoking (e.g. ‘It is bad for my health’). Answering categories ranged from ‘I totally disagree’ (=–3) to ‘I totally agree’ (=+3). Two scales were created for the attitudes with respect to the pros and cons of smoking using the mean of the scale items.

At the same time, three components of social influence were also assessed with regard to parental influence, siblings’ influence and peer influence: perceived social norm, perceived social pressure and perceived smoking behaviour (social modelling). Social norms were measured by a seven-point scale assessing adolescents’ perceptions of whether their parents (father and mother; $\alpha = 0.81$ at T1), siblings (sister and brother; $\alpha = 0.67$ at T1) and peers (best friend, friends in general and people in the same school year; $\alpha = 0.72$ at T1) think they should smoke or not [e.g. my best friend thinks I definitely should smoke (+3) to definitely should not smoke (–3)]. Social pressure was assessed using items with five answering categories on perceived pressure from parents (father and mother; $\alpha = 0.74$ at T1), siblings (sister and brother; $\alpha = 0.75$ at T1) and peers (best friend, friends and people in the same school year; $\alpha = 0.77$) (e.g. have you ever felt pressure from your mother to smoke?; never = 0 to very often = 4). For each scale of the social influences, we calculated the mean of the scale items. Perceived behaviour was measured by asking whether mother, father, sister(s), bother(s) and best friend smoked or not as well as how many friends and people in the same school year smoked, with five possibilities of answer ranging from everybody to nobody. Because these behaviours are not assumed to be one dimensional, this concept was not treated as a scale; perceived behaviour was analysed separately for each measured person in the social environment.

Self-efficacy was measured by 12 questions on a seven-point scale. Four items assessed beliefs with regard to refraining from cigarettes in social situations such as when friends offer them a cigarette (social self-efficacy; $\alpha = 0.93$). Other four questions measured the adolescents’ perception of their ability to refrain from smoking when under emotional strains (e.g. when they feel upset) (emotional/stress self-efficacy, $\alpha = 0.92$). The last questions referred to the adolescents’ perception of their ability to refrain from smoking in different routine situations, such as when they are watching TV (situational self-efficacy; $\alpha = 0.90$). Answering categories ranged from ‘I am sure I will smoke’ (= –3) to ‘I am sure I won’t smoke’ (= +3). The three scales for self-efficacy were created using the mean of the scale items.

Intention was measured by one question on a seven-point scale and measured adolescents’ intention to smoke in the next year (+3 = definitely; –3 = definitely not).

Other questions assessed age, gender, family structure [living with mother, father, brother(s) and sister(s)], alcohol use and truancy (0 = never, 1 = sometime, 2 = less than once a month, 3 = not weekly, but at least once per month, and 4 = at least once per week), perceived school performance in the previous year (0 = in the bottom third of their class, 1 = in the middle third of their class and 2 = in the top third of their class) and pocket money spent per month by students. Previous studies showed that smoking was statistically significant more frequent among Romanian adolescents spending more than €15 per month than among those who spent less money [37]. Analyses were carried out using a dichotomous variable: spending less than €15 per month (0) and using at least €15 per month (1). We furthermore assessed places where adolescents spend more frequently their leisure time (home, friends’ houses, street, shops, bars/discos/parties, sport clubs, youth clubs and working place; each student had to choose three places where they spent more frequently their leisure time) [38]. In order to be able to conduct multilevel analyses, information
regarding the respondents’ class and school was also recorded. More information about the content of the questionnaire can be found somewhere else (the questionnaire can be obtained on request from the first author) [37].

Programme evaluation

Students were asked to evaluate the programme on a five-point scale (−2 = negative evaluation; +2 = positive evaluation), using 10 questions to assess overall evaluation, the lessons on videos, watching videos, the home activities, the activities during the lessons, the manual, working in groups, having a peer leader, assistance by the peer leader and assistance by the teacher [35].

Intervention

The programme consisted of five weekly sessions of 45 min each and was translated from an effective Dutch programme [25, 26]. This programme used a video-peer-led strategy and was adapted to the Romanian situation and culture by using different cartoons and recording scenes for the video that matched the Romanian context of 13- to 14-year-old adolescents. All items were piloted and revised when needed.

The structure and content of each session, presented by adolescents on video, can be summarized as follows: (i) introduction of the theme in a class on video, (ii) activities in small groups, peer-led, (iii) return to one group and continuation of the lesson on video, (iv) activities in small groups, peer-led and (v) (sometimes) home activities.

The video consisted of an introduction by three adolescents, real-life situations played by adolescents, interviews with adolescents and an introduction to the activities by a young person. The activities, focusing on the theme of the lessons, were realized in groups of four or five students and were led by a peer leader. The peer leaders were students from the same class as the students and served as chairmen of the small activity groups. They summarized the activities, stimulated the group to work and presented the outcomes of group activities. The content of the group discussions was guided by giving specific indications to the peer leaders in their manual about the content that had to be addressed during the activities. Additionally, all students received feedback on video after the performance of each activity, with the purpose to address the main items of the preceding activity.

The teachers coordinated the lessons, assisted the peer leaders and stimulated the students to participate. Both teachers and peer leaders received 1-hour information session before the beginning of the activities, which provided information about the content and the characteristics of the programme. Students, peer leaders and teachers had their own manuals, summarizing content of the video by cartoons, as well as the activities and instructions for the achievement of the activities.

Table I summarizes the main themes and activities of the programme.

Analyses

An identification code was used in the data file for each questionnaire for data connection; researchers replaced the names of students before the data were entered.

The missing values in the items on motivational factors were coded as neutral (similar to those answered with ‘I don’t know’); the cases with missing values for health-risk behaviours such as school achievement, alcohol use and truancy were excluded from the analyses.

A logistic regression analysis was used to compare participating subjects and dropouts (those not participating in the second measurement) with dropout as dependent variable and data of the first measurement as predictors of dropout.

Data analysis included basic descriptive statistics of the respondents with regard to socio-demographics and health-risk behaviours at T1; chi-square tests were used in order to compare treatment conditions. Mean age was also calculated for the sample and independent sample T-test was used in order to compare treatment conditions.

In order to assess effects of the programme on smoking behaviour, differences in regular smoking onset at T2 between the control and experimental groups were analysed using logistic regression; the
Table I. Description of the programme

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Items presented on video</th>
<th>Activities</th>
<th>Home assignment*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1</td>
<td>General introduction</td>
<td>Discussing in groups about reasons of young people for starting or not starting to smoke as well as about pressure to smoke and ways of refusing a cigarette</td>
<td>Questionnaire to assess smoking-related attitudes and behaviours of one or more family members (preferably parents)</td>
</tr>
<tr>
<td></td>
<td>Reasons why people do or do not smoke</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>General introduction to direct and indirect pressure to smoke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson 2</td>
<td>Short-term and long-term effects of smoking</td>
<td></td>
<td>Questionnaire to assess family members’ opinions regarding the effects of smoking on health</td>
</tr>
<tr>
<td></td>
<td>Dangers of experimentation with smoking</td>
<td>Discussions in groups about the effects of active and passive smoking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Passive smoking</td>
<td>Discussions about how to react when bothered by smoking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Addiction</td>
<td>Discussion of home assignment from Lesson 1</td>
<td></td>
</tr>
<tr>
<td>Lesson 3</td>
<td>Peer pressure and acquiring skills to resist it</td>
<td>Role-play in small groups in order to enhance self-efficacy and the acquisition of cigarette refusal skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussion of home assignment from Lesson 2</td>
<td></td>
</tr>
<tr>
<td>Lesson 4</td>
<td>Indirect pressure from advertisements and adults</td>
<td>Discussions about indirect pressure to smoke, how to identify and resist it</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussions in small groups about alternatives to smoking</td>
<td></td>
</tr>
<tr>
<td>Lesson 5</td>
<td>Summary of all the relevant issues presented during the previous lessons</td>
<td>Role-play and discussions centred on cigarette refusal skills and decision-making</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To increase commitment, students were asked to make a non-smoking contract and to write their name on a non-smoking poster that could be clearly seen in the classroom</td>
<td></td>
</tr>
</tbody>
</table>

*The programme was mainly a school-based programme. Nevertheless, it contained two home activities in order to facilitate the dialogue between the students and their family with respect to smoking prevention and the smoking prevention programme and to help adolescents to better understand the social support for non-smoking received from their family.

Analysis included only students who were non-smokers at T1. The covariates were age, gender, family structure, spending more than €15 per month, health-risk behaviours (school achievements, alcohol use and playing truant from school on monthly bases, spending frequently their free time in bars/discos), adolescents’ attitudes, social norms, social modelling and pressure as well as self-efficacy and intention scores at T1. The inclusion of covariates occurred to correct for potential baseline differences, to increase power; previous research showed the (potential) relationship of these covariates with smoking and the treatment condition [6, 16]. Non-significant predictors were deleted backwards.

In order to investigate the effects of the programme on motivational factors differences at post-test between the conditions on attitudes, self-efficacy and intention were analysed using covariance analysis. The covariates, included as fixed factors, were the relevant motivational factors as measured at T1, smoking behaviour at the first wave and the gender. Similar to other studies [16, 25], social influences were excluded from the analysis because the outcomes are not assumed to change as a result of the intervention.

Several studies [6, 16, 39] have shown that when students are nested within classes and schools, multilevel analyses should be used in order to check if the programme effects differ by school or class...
level. Consequently, the final models were rerun using a multilevel analysis (multilevel linear regression analyses for assessing the programme effect on motivational factors and a multilevel logistic regression analysis for assessing the programme effect on smoking behaviour with schools as Level 3 units, classes as Level 2 units and students as Level 1 units) to account for the clustering effect of the programme among students in classes and schools.

Students’ evaluation of the programme was assessed by calculating the mean and standard deviation for the variables regarding students’ opinions on the programme. Independent sample T-tests were used in order to compare boys and girls, respectively smokers and non-smokers, with regard to these variables.

Data analysis was performed with the SPSS-12 statistics programme. Significant results were reported at $P < 0.05$. The multilevel analysis was performed by using MLWIN programme [40].

### Results

#### Response

At T1, the sample consisted of 1196 students and at T2 the number of respondents was 1187. The final sample consisted of 1071 students (523 in the experimental group and 548 in the control group) who participated in both measurements. The dropout rates were similar ($P > 0.05$) in both conditions (11% in the experimental group and 9.8% in the control group); dropouts were caused by absenteeism and change of schools by some students. The results of the logistic regression analyses show that the dropouts did not differ from the remaining sample with regard to demographic variables (gender and family structure), smoking-related motivational factors (attitudes, self-efficacy and intention), smoking behaviour or other risk behaviours such as alcohol use or playing truant from school on monthly bases.

#### Sample description

The mean age of the sample was 13.7 (SD = 0.3) years and did not differ significantly between the experimental and control groups. The conditions also did not differ significantly regarding their gender distribution (50.9% girls in the experimental group versus 51.5% in the control group). No significant differences were found between the experimental and control groups with respect to the prevalence of health-risk behaviours, such as playing truant from school at least once per month (7.2 versus 5.6%), using alcohol on monthly bases (12.4 versus 11.9%), spending frequently time in bars/discos (5.9 versus 7.4%) or bad school achievements in the previous year (6.1 versus 8.4%). In both conditions, similar percentages of students (8.9% in the experimental group and 8.3% in the control group) declared that they spend more than €15 per month.

At baseline, 7.7% of the students were already weekly smokers. The prevalence of weekly smoking was similar in the experimental (7.5%) and control groups (8.0%).

#### Regular smoking onset

The programme resulted in significant preventive effects on smoking behaviour. At T2, there were 4.5% new regular smokers in the experimental group, whereas 9.5% of the non-smokers at T1 become regular smokers at T2 in the control group.

The results of the logistic regression analysis (see Table II) show that the risks of non-smokers from the control group to become regular smokers were twice as high as those from the experimental condition. Other predictors of regular smoking onset were low social self-efficacy and high intention to smoke in the future. For all the predictors, the effect size was small, ranging from 0.01 to 0.14.

The logistic regression model was reanalysed using multilevel analysis using MLWIN since pupils were nested in classes and schools. No differential effects of the programme were found that differed by level (intraclass correlation coefficient for class and school level was 0.05 and 0.00, respectively). No level effect was found for the impact of the other predictors of smoking onset either (intraclass correlation coefficients varied between 0.00 and 0.03).

#### Effects on attitudes, self-efficacy and intention

Table III shows the results of the covariance analyses that present differences at post-test found
between both conditions regarding the motivational variables controlling for baseline scores. At post-test, students in the experimental group were significantly less convinced of the advantages of smoking than students from the control group. Adolescents in the experimental group also reported significantly higher levels of social self-efficacy and more negative intentions to smoke than those from the control group. The effect sizes for these differences were small, ranging from 0.01 to 0.18. No significant differences were found between the conditions with regard to perceived disadvantages of smoking, emotional and situational self-efficacies.

The data were reanalysed using multilevel linear regression analyses using MLWIN since pupils were nested in classes and schools. The multilevel analyses confirmed the effects described above. These analyses furthermore showed that the effects were independent of school or class level of the students (intraclass correlation coefficient varied between 0.00 and 0.05).

**Process evaluation**

The process evaluation questionnaire was returned by 532 students; the response rate was 83%. Table IV shows that students rated the programme positively, as well as its activities and materials, such as the video and the manual with cartoons. Working in groups was also positively evaluated. The peer-led approach and the assistance received from their group leader, as well as the help received from the teachers got positive scores from the students.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>P value</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pros of smoking</td>
<td>0.09</td>
<td>&lt;0.01</td>
<td>0.07</td>
</tr>
<tr>
<td>Cons of smoking</td>
<td>-0.01</td>
<td>0.01</td>
<td>NS</td>
</tr>
<tr>
<td>Self-efficacy social</td>
<td>0.07</td>
<td>&lt;0.05</td>
<td>0.07</td>
</tr>
<tr>
<td>Self-efficacy emotional</td>
<td>0.06</td>
<td>NS</td>
<td>0.05</td>
</tr>
<tr>
<td>Self-efficacy situational</td>
<td>0.05</td>
<td>NS</td>
<td>0.05</td>
</tr>
<tr>
<td>Intention to smoke</td>
<td>-0.06</td>
<td>&lt;0.05</td>
<td>-0.06</td>
</tr>
</tbody>
</table>

NS, non-significant; ES, effect size.

Girls evaluated the programme more positively than the boys did, in particular, the activities, working in groups and having a peer leader. Pretest smokers evaluated the programme less positively than non-smokers. They were less positive about the evaluation of the manual, about having a peer leader and appreciated less the assistance received from the peer leader and the teacher.

**Discussion**

The evaluation of the Romanian peer-led smoking prevention programme reveals that 9 months after the initiation of the study, the programme resulted in a significant effect: regular weekly smoking onset was 4.5% in the experimental group compared with 9.5% in the control group. The risk of students from the control group to become smokers was two times higher than those of students from the experimental group. Additional baseline predictors of smoking were a positive intention towards smoking and low self-efficacy in refraining from smoking in several social situations. The previously tested Dutch programme found similar results among its 13- to 14-year-old students from vocational schools (they prepare students for special vocations); regular weekly smoking increased by 7.1% in the
experimental group, as compared with 14.1% in the control group (odds ratio = 2.24; confidence interval = 1.30–3.90) [25]. Our findings indicate that adopting existing effective prevention programmes in Romania can be a beneficial strategy for school health promotion, although cultural adaptations are still required.

Furthermore, significant effects of the programme on motivational factors were also observed. In the experimental group, this resulted in a more negative attitude towards smoking, increased social self-efficacy levels and a more negative intention towards smoking. Our results can be interpreted in two ways, either as support for the assumption that realizing shifts in attitude, self-efficacy and intention may help adolescents to refrain from smoking or as that remaining a non-smoker may strengthen a person’s attitude, self-efficacy and intention not to smoke. Ideally, one needs three measurements and a cross-lagged design [44] in order to be able to better analyse causal patterns.

Although our effect sizes were small, public health effects of these types of interventions can be significant [45, 46]. Similar effects of programmes based on the social influence approach are also documented by several other reviews [7, 8, 13, 24]. Effect sizes of many public health interventions range between small and medium [41, 47]. Yet, when implemented on a larger scale, overall public impact (effect size) of interventions with small effect size can be significant [48–50].

We used the social influence approach and focused on enhancing self-efficacy and the acquisition of refusal skills, a quite new approach for Romania that traditionally used knowledge-based prevention programmes. This programme was also the first peer-led smoking prevention programme in Romania. Romanian students liked this approach, the content and the structure of the programme. Different studies suggest that peer-led use may be important for the enhancement of programme effects [33, 34], although the results are still inconclusive [32]. Our findings underline that the peer-led approach, although not used before in Romania, was well accepted by students, which may facilitate the adoption of the programme in the future.

### Table IV. Mean and standard deviation of the items regarding students’ opinions on the programme

<table>
<thead>
<tr>
<th>Item</th>
<th>Total sample</th>
<th>Girls</th>
<th>Boys</th>
<th>Non-smokers</th>
<th>Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme (−2 to +2)d</td>
<td>1.10 (0.91)</td>
<td>1.21 (0.81)**</td>
<td>0.98 (0.99)</td>
<td>1.15 (0.89)*</td>
<td>0.85 (0.94)</td>
</tr>
<tr>
<td>Watching the videos (−2 to +2)d</td>
<td>1.36 (0.94)</td>
<td>1.39 (0.94)</td>
<td>1.34 (0.93)</td>
<td>1.41 (0.88)</td>
<td>1.25 (1.17)</td>
</tr>
<tr>
<td>Lessons on video (−2 to +2)d</td>
<td>1.15 (1.00)</td>
<td>1.17 (1.00)</td>
<td>1.13 (1.01)</td>
<td>1.19 (0.97)</td>
<td>0.94 (1.3)</td>
</tr>
<tr>
<td>Manual (−2 to +2)d</td>
<td>1.23 (0.94)</td>
<td>1.26 (0.89)</td>
<td>1.19 (1.00)</td>
<td>1.27 (0.90)*</td>
<td>0.88 (1.15)</td>
</tr>
<tr>
<td>Activities during lessons (−2 to +2)d</td>
<td>1.24 (0.90)</td>
<td>1.31 (0.82)*</td>
<td>1.16 (0.97)</td>
<td>1.29 (0.85)</td>
<td>1.00 (1.25)</td>
</tr>
<tr>
<td>Home activities (−2 to +2)d</td>
<td>1.03 (1.10)</td>
<td>1.09 (1.06)</td>
<td>0.95 (1.14)</td>
<td>1.08 (1.07)</td>
<td>0.88 (1.25)</td>
</tr>
<tr>
<td>Working in groups (−2 to +2)d</td>
<td>1.39 (0.89)</td>
<td>1.43 (0.79)*</td>
<td>1.34 (0.99)</td>
<td>1.41 (0.87)</td>
<td>1.20 (1.13)</td>
</tr>
<tr>
<td>Having a peer leader (−2 to +2)d</td>
<td>1.33 (1.00)</td>
<td>1.51 (0.82)***</td>
<td>1.15 (1.13)</td>
<td>1.40 (0.91)*</td>
<td>0.77 (1.43)</td>
</tr>
<tr>
<td>Assistance by peer leader (−2 to +2)d</td>
<td>1.29 (1.03)</td>
<td>1.37 (0.94)</td>
<td>1.20 (1.12)</td>
<td>1.33 (1.00)*</td>
<td>0.85 (1.37)</td>
</tr>
<tr>
<td>Assistance by teacher (−2 to +2)d</td>
<td>1.35 (0.91)</td>
<td>1.35 (1.04)</td>
<td>1.35 (1.03)</td>
<td>1.42 (0.93)***</td>
<td>0.48 (1.59)</td>
</tr>
</tbody>
</table>

*aComparisons are made between boys and girls using Student’s t-tests; the results with statistically significant differences are given in bold. *bComparisons are made between non-smokers and smokers using Student’s t-tests; the results with statistically significant differences are given in bold. cInformation about smoking behaviour at T1 was available only for 481 students of those who filled in the process evaluation questionnaire. d(−2) negative evaluation to (+2) positive evaluation. eP < 0.1, *P < 0.05, **P < 0.01, ***P < 0.001.
This study is subject to limitations. Firstly, self-reports on smoking could not be biologically validated because of logistical and financial constraints. The validity of self-reported smoking by adolescents has been shown to be good and in high concordance with biological indicators when measurements are carried out under optimal conditions assuring confidentiality [51] (as it was in our study). Second, the results discussed in this study are based on short-term assessment. Smoking prevention programmes using the social influence approach can be effective. However, effects have been shown to diminish over time [5, 52]. On the other hand, sometimes programmes, which did not show short-term effects, showed long-term effects [19]. Therefore, future research should also include a long-term evaluation of the programme to see whether the results persist, decrease or increase over time.

In conclusion, our short-term results showed significant and promising effects of the smoking prevention programme, which recommends its diffusion in Romania. Yet, maintenance of these effects over time is important. It is therefore needed to further test how this can be accomplished, for instance, by using booster sessions [26], the utilization of computer-tailored methods [6], and by using a more integral approach that also targets the broader social environment of the adolescent [19, 22, 24]. Furthermore, preventive activities should also include policy interventions such as price policies [53] and measures to reduce access to cigarettes and possibilities to smoke in public places [7, 54].

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References

Smoking prevention among Romanian adolescents


