
Gender-Specific Effectiveness of the Unplugged Prevention Intervention in Reducing Substance Use among Czech Adolescents*

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Abstract: Impact evaluations of the school-based Unplugged prevention intervention have shown it to have a measurably positive preventive effect on the Czech school population, but only limited data are available to identify its effectiveness in gender-specific terms. This article seeks to determine the gender-specific effectiveness of this drug prevention programme. The authors conducted a randomised trial of the programme on a total of 1874 children (with a mean age of 11.8 years). They collected data using a questionnaire from the European School Survey Project on Alcohol and Other Drugs. Baseline testing was conducted among sixth-grade students immediately prior to the programme's implementation, and five follow-up tests were carried out 9, 12, 21, 24, and 33 months after the baseline testing. Gender-specific effectiveness was tested using three indicators: the 30-day prevalence of any tobacco or cannabis use and the 30-day prevalence of any drunkenness. The results comparing the experimental and control groups provide evidence of statistically significant effects for any drunkenness among boys and any tobacco use among girls in the 30 days prior to testing. The programme was found to have positive effects on both genders' cannabis use, with girls showing lower levels of cannabis use even 33 months after the baseline test. Given the gender equality approach to drug prevention, differences in outcome may be overcome by adding gender-specific elements to the intervention programme's curriculum.

Keywords: adolescence, equality in results, gender, psychoactive substances, school-based prevention

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Introduction

Adolescent boys and girls experience different developmental problems and use different sociological and psychological resources to deal with them [Lerner 1985]. The probability of substance use increases during adolescence [Van Ryzin, Fosco and Dishion 2012], culminates in young adulthood, and then begins to decline [Voelkl and Frone 2000]. The literature provides thorough accounts of major differences concerning their substance use, including gender-specific risk factors, age at the onset of drug use, patterns of use, and access to treatment and its effectiveness [EMCDDA 2006]. The area of gender-specific primary prevention is still little explored [Vigna-Taglianti et al. 2009]. Few studies pay any attention to this important aspect, although evidence shows that interventions are more effective when gender is taken into account [Schinke 1994]. Gender and age are major factors that determine the patterns of use, including the drug of choice [Morgan and Grube 1994]. Boys constitute a very important target group for primary prevention, as they are more susceptible to social influence [Szalay, Inn and Doherty 1996], have a higher threshold for seeking help [Schmidt 2001], and are at a greater risk of adopting negative patterns in their social environment [Sale et al. 2005]. While girls generally show a lower risk of substance use than boys, this risk increases dramatically during adolescence. A significant risk factor among girls is contact with older boys in high-risk groups with risky lifestyles [Orosová et al. 2007]. While the majority of gender-specific preventive interventions tend to be centred on girls [Butters 2004], boys are at much greater risk in epidemiological terms, particularly with regard to illicit drug use [Hibell et al. 2012]. In order to obtain an accurate picture of the effectiveness of prevention programmes, they also need to be analysed in terms of their respective impacts on both genders [Kumpfer, Smith and Summerhays 2008]. While each intervention should take account of its gender-specific preventive potential, effectiveness studies often yield different outcomes for boys and girls [Vigna-Taglianti et al. 2009]. There may be multiple reasons for differences in effectiveness. The behaviours of boys and girls are influenced by a number of factors which ensue from each child's individual personality as well as from the interpersonal context of the social environment in which the child lives. While some of these factors may have a protective effect, others may exacerbate the risk of substance use [Miovský et al. 2010; Orosová et al. 2007].

Out of more than 30 European countries currently involved in the European School Survey Project on Alcohol and Other Drugs (ESPAD), adolescents in the Czech Republic show the highest prevalence rates of the use of alcohol, tobacco, and cannabis. Boys have generally been found to display higher substance use prevalence rates [Hibell et al. 2004, 2009, 2012]. The ESPAD survey suggests that two-thirds of students in the participating countries have drunk alcohol at least once in their life, with the average approaching 90%. Over 60% of children reported having drunk alcohol in the 30 days prior to the survey. Beer was found to be the most common alcoholic beverage among boys, while spirits

predominated among girls in the majority of reporting countries. And 47% of the students in the ESPAD countries admitted to having been drunk at least once in the month before the survey. The lifetime prevalence of tobacco smoking reached 54% in the participating countries, and 42% of students in the Czech Republic reported having smoked tobacco in the past 30 days [Hibell et al. 2012]. Best et al. [2000] have reported a positive correlation between cigarette smoking and illicit substance use, and this phenomenon was also confirmed in the Czech Republic [Csémy and Nešpor 2002]. The lifetime prevalence of cannabis use is 44% and the 30-day prevalence, which can be regarded as a more reliable epidemiological indicator of current use, is 19% [Csémy, Lejčková and Sadílek 2007]. Besides being an addictive substance and a risk factor for social and academic problems, alcohol can be the cause of various health problems, including physical injuries, psychological disorders, and other illnesses. In most cases, the health risk correlates with consumption levels, and the more alcohol consumed the greater the risk [Anderson and Baumberg 2006]. There is extensive evidence documenting the causal relationship between smoking and cancer. Lung and bronchial cancers are the predominant conditions [Hecht 1999]. In the Czech Republic [Mravčík et al. 2012] and the European Union as a whole [EMCDDA 2012], cannabis is still the most common illicit drug in terms of production and dealing. Research has suggested that cannabis use may provoke latent psychotic conditions, including pathological affective disorders [Horáček 2008], has negative effects on cognitive functions [Miovská, Miovský and Šulcová 2008], and may also be associated with somatic risks [Krménčík 2008].

One of the best strategies for addressing substance use [UNICRI 2003] and other types of risk behaviour is school-based prevention. The first intervention on the EU level, called Unplugged and aimed at reducing substance use in the adolescent school population, was developed in close collaboration between several EU countries (Italy, Spain, Sweden, Belgium, Greece, Austria, and Germany) [e.g. Faggiano et al. 2008]. The programme's effectiveness in reducing substance use in the adolescent population was evaluated as positive/negative in a large-scale European study [Faggiano et al. 2010]. Since no effective intervention aimed at preventing substance use existed in the Czech Republic, Unplugged was implemented and an independent prevention trial was conducted on the national level [Gabrhelík et al. 2012a]. The project was carried out and evaluated by an international multidisciplinary group of experts formed specifically for this purpose. Joining the EU-Dap 2 project in 2007, the Czech Republic implemented the programme in 'basic' schools.¹ Unplugged was adapted to local circumstances as it was assumed that even a programme created in other European countries may not fully reflect the needs and experience of Czech students.

¹ In the Czech Republic, these comprise nine grades and are attended by children aged 6–15.

When viewed from educational, sociological, and gender perspectives, school-based preventive intervention can be considered part of the curriculum and should be based on the principles of gender equality in education. Neither gender should be disadvantaged in favour of the other. However, the present gender-sensitive approach to education may raise the question as to whether applying the same method of education to different groups of children perhaps results in or deepens inequalities between them [Smetáčková 2009]. In this respect, it is necessary to fully understand and apply knowledge about traditional gender differences, which are shaped by family upbringing in pre-school years and often grow stronger when the child enters school [Jarkovská 2009; Vojtíšková 2011]. Boys and girls do not have the same baseline conditions and the rigid application of a single gender-equal approach may put one group at a strong disadvantage [Klein 1991]. Many prevention programmes exhibit gender-specific differences in effectiveness [e.g. Blake et al. 2001; Vigna-Taglianti et al. 2009; Share, Quinn and Ryan 2004], in spite of or perhaps due to the fact that their preventive intervention makes absolutely no distinction between genders. Using an identical approach may not necessarily equate with the notion of equity [Smetáčková 2009]. In the future, we should consider placing emphasis more on the outcomes of preventive interventions that show no significant gender-specific differences in effectiveness than on gender-equal conditions for their implementation.

The key objective of the study was to test the gender-specific effectiveness of the Unplugged programme in the Czech school environment. This was done in the following steps: the effect of Unplugged on the 30-day prevalence of drunkenness, cannabis use, and cigarette smoking was tested for each gender respectively, the sustainability of the effect achieved over time was examined (using follow-up testing), and differences in the gender-specific effectiveness of Unplugged with respect to individual substances was compared. A secondary objective was to design strategies with which to suitably adjust the preventive intervention curriculum so that it meets the needs of both girls and boys and does not create less favourable conditions for one gender or the other that could later manifest themselves as gender-specific differences in the effectiveness of intervention in relation to specific types of substances.

Methodology

Unplugged

The methodology underpinning the Unplugged prevention programme is based on the Comprehensive Social Influence model [Sussman et al. 2004] and consists of twelve 45-minute lessons for children in basic schools. In addition to its key preventive effect, the programme also seeks to divert children from risky behaviour they already engage in, including experimental and regular drug use. Its

effectiveness is enhanced by its comprehensiveness, which it achieves by making integrated use of various prevention methods [Thomas and Perera 2006; Josendal et al. 2005; Flay 2009; Tobler et al. 2000]. Various theories of problem behaviour [Jessor et al. 2003] suggest that prevention strategies should address risk behaviour in its full scope. Programmes based only on the provision of information are considered insufficient for the prevention of substance use. Such activities need to be complemented with interactive components focused on the development of social skills [Gabrhelík 2010]. The methodology and theoretical background of Unplugged are thoroughly described in van der Kreeft et al. [2009]. While the structure and content of this intervention programme cover a wide range of addictive substances, it is primarily centred on prevention of the use of tobacco, alcohol, and cannabis. The intervention programme is comprehensively structured, with individual lessons designed to build upon each other and to promote an encouraging and informal environment, as well as to stimulate the group dynamics of the class. For a better theoretical understanding of its structure, we can look at the intervention curriculum as divided into three components. The first four lessons deal mainly with adolescents' knowledge and attitudes towards addictive substances. The second component of the programme, lessons 5–8, focuses on interpersonal skills (the activities focus on group expectations, exploring norms, role-playing, establishing contacts, and developing the ability to accept feedback, etc.). At this stage in the intervention programme, it is crucial that children be presented with accurate prevalence data on their age group in place of their perceptions of drug use, which feed false normative beliefs. This initiates the very important process of undoing the normalisation of drug use that is founded on false generalisations of several visible peer cases and from ungrounded information about the frequency of such usage. The final component of the programme addresses intrapersonal skills. Students practise refusal strategies and assertive behaviour and learn effective coping strategies. Emphasis is also placed on planning skills and distinguishing between short- and long-term goals. Each lesson has a standard structure, including a time frame, topic, specific objectives, learning materials, tips for introductory activities, a detailed description of key activities, a conclusion, a group summary, and a lesson evaluation.

The implementation and delivery of this intervention methodology in selected Czech schools took place in the 2007/2008 academic year. The intervention programme was implemented by specially trained teachers and its implementation was guided and supervised by regional prevention coordinators (mostly recruited from local non-governmental organisations) throughout the school year. Support from the school's administration was necessary for the successful implementation of the programme [Jurystová, Gabrhelik and Miovský 2009]. Evaluation of the programme's implementation process helped in the design of a new model to coordinate and monitor the quality of prevention programmes at the regional level [Jurystová, Gabrhelik and Miovský 2009; Jurystová and Miovský 2010].

Study design and sample description

For the purpose of our trial we formulated several hypotheses based on the objectives set by the programme and on the results of the all-European study of the effectiveness of the Unplugged intervention [Vigna-Taglianti et al. 2009], which found a reduction in the programme's preventive effect on drunkenness among boys to be its most pronounced gender-specific effect. We also took into account other major studies of the gender-specific effectiveness of interventions aimed at smoking that often report the positive effects of interventions on girls only [e.g. Blake et al. 2001; Kumpfer, Smith and Summerhays 2008], and an extensive study of a cannabis prevention programme that proved to be effective regardless of gender [Ariza et al. 2013]. Our hypotheses are:

H1 The intervention programme will be observed to have a statistically significant ($p = 0.05$) positive effect on the indicator of the 30-day prevalence of drunkenness in the trial group of boys only.

H2 The intervention programme will be observed to have a statistically significant ($p = 0.05$) positive effect on the indicator of the 30-day prevalence of smoking tobacco in the trial group of girls only.

H3 The intervention programme will be observed to have a statistically significant ($p = 0.05$) positive effect on the indicator of the 30-day prevalence of smoking cannabis among both genders in the trial group, and the effect will be sustained for two years following the intervention.

A prospective, randomised controlled trial was chosen to study the effect of the Unplugged intervention programme on the population of Czech sixth-grade schoolchildren. Stratified random sampling based on the number of inhabitants in the school district was used to randomly select eligible basic schools from three regions in the Czech Republic in 2007. Schools for children with special needs and six- and eight-year grammar schools were not included in the sampling procedure. The schools that were selected were then assigned to one of the two trial arms, each consisting of 40 randomly selected schools. Five schools randomised to the control group (6.3%) withdrew from the survey at short notice and the lack of time made it impossible to replace them. Baseline testing was conducted at the beginning of the academic year in September 2007 prior to the implementation of the programme. The first follow-up testing took place immediately after the last lesson in the intervention programme. There were four subsequent follow-ups, carried out at the beginning and the end of the following academic years (6/2008, 9/2008, 6/2009, 9/2009, and 6/2010). A total of 1874 sixth-graders (mean age 11.8 years; males accounting for 50.8%; 1022 experimental, 852 control; 69.3% assessed their family income level as moderate) completed the baseline testing. In the final follow-up, data were collected from 914 students in the experimental

arm and 839 controls, accounting for 89.43% and 98.5% of the initial sample, respectively [Gabrhelik et al. 2012a]. The different numbers of subjects participating in the follow-ups were due to students' temporary absences from school on the data collection days. In order to check the interchangeability of both groups, we compared their general socio-demographic indicators, which take account of the gender distribution, school results, family economic situation, and peer relationships. No statistically significant differences between the groups were observed during the baseline testing (see Table 1). In view of its negligible influence on the previous studies at the general school population level [Miovská 2005] and the low representation of children of a nationality other than Czech in the sample, the ethnic and nationality perspective was not considered in the research, as it appears to have no significant effect on the results. In comparison to Faggiano et al. [2008, 2010], the upper age range was lowered to 12 years [Gómez Cruz et al. 2009] in consideration of the early onset of substance use among the population of Czech children [Csémy and Nešpor 2002] and of the increase this brings in the effectiveness of the intervention programme. Written parental consent was obtained for nearly all the children participating in the survey and taking part in the intervention programme (consent was granted by 98.7% of the parents). The study was approved by the Ethics Committee of the General University Hospital in Prague.

The study data and demographic information were collected using the Czech version [Csémy, Lejčková and Sadílek 2007] of the standardised ESPAD questionnaire [Hibell et al. 2009], which covers the use of both legal and illegal drugs among the school population. The questionnaire also enquires about general socio-demographic data. The data are gender-differentiated. The questionnaire is intended for mass testing, particularly in the school environment. As the

Table 1. Baseline comparison of control and experimental groups

Socio-demographic variables	Experimental group	Control group	Pearson chi-square, df = 1	p-value
Boys	48.57%	50.07%		
Girls	51.43%	49.93%	0.343	0.558
Good school results	89.43%	88.08%		
Poor school results	10.57%	11.92%	0.671	0.413
Family in a good economic situation	93.71%	94.44%		
Family in a poor economic situation	6.29%	5.56%	0.358	0.549
Satisfactory peer relationships	98.47%	98.93%		
Unsatisfactory peer relationships	1.53%	1.07%	0.580	0.446

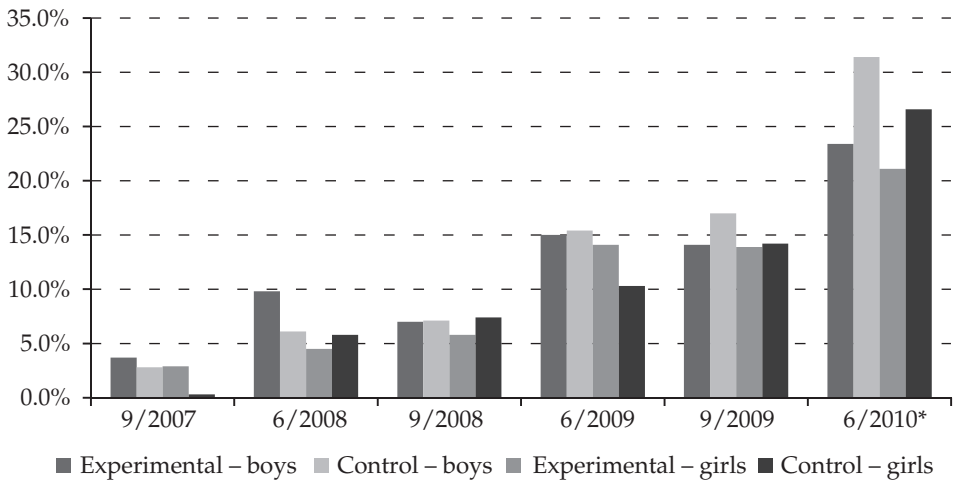
questionnaire is copyrighted, we requested permission from its authors before using it. The self-report questionnaires were administered and their completion facilitated by trained Unplugged staff, who sought to create a trusting and secure environment. As the administration of the questionnaire takes 45 minutes on average, data could always be collected within one lesson. The participants were identified by specific codes in order to ensure confidentiality. The same codes were used to match the questionnaires with the respondents at the follow-ups. The variables indicating the prevalence rates of the use of individual substances for each gender were examined for any statistically significant differences between the study groups (Pearson chi-square). The data were analysed and processed using SPSS statistical software (version 17.0). The variables pertaining to 30-day prevalence rates were analysed on a yes/no basis (1 = yes; 0 = no). The questions examining respective prevalence rates of drunkenness and cannabis and tobacco use in the past thirty days were selected from the questionnaire. The 30-day prevalence of drunkenness was chosen for analysis instead of the 30-day prevalence of alcohol use, as the former variable is a much 'harder' indicator and a better predictor of a higher level of use in subsequent years [Scheier, Botvin and Griffin 2001; Vigna-Taglianti et al. 2009]. In the European cultural context, at least one instance of cannabis use in the past 30 days can be considered an indicator of current regular cannabis use [Zábranský 2008; Novák et al. 2011] and is associated with users for whom cannabis is a part of their social activities and relaxation. Similarly, the 30-day prevalence of cigarette smoking reflects the current state of use and is regarded as a significant predictor of regular substance use in the future [Ellickson, Hays and Bell 1992; Miovský et al. 2012].

Results

As expected, the prevalence rates of substance use measured at the follow-ups (see Appendix Table 1) rose continuously as the participants grew older. While boys always showed higher levels in the 30-day prevalence of cannabis use and the 30-day prevalence of drunkenness indicators, both genders reported almost identical levels of tobacco use in the preceding 30 days. The only difference between the experimental and control groups observed in the baseline testing (9/2007) was in the 30-day prevalence of drunkenness among girls. This difference between the groups can be explained by the rarity of cases of girls getting drunk at such a young age.

As regards the 30-day prevalence of drunkenness indicator (Figure 1), the preventive intervention proved to be effective in boys only; girls showed only a slightly positive trend in favour of the experimental group. Boys recorded the first positive shift three months after the intervention (9/2008): after the two-month summer holidays the 30-day prevalence of drunkenness dropped from 9.8%, reported at the end of the academic year in which the intervention was delivered, to 7.0%, and a difference between the groups was also observed. A statistically sig-

Figure 1. 30-day prevalence of drunkenness

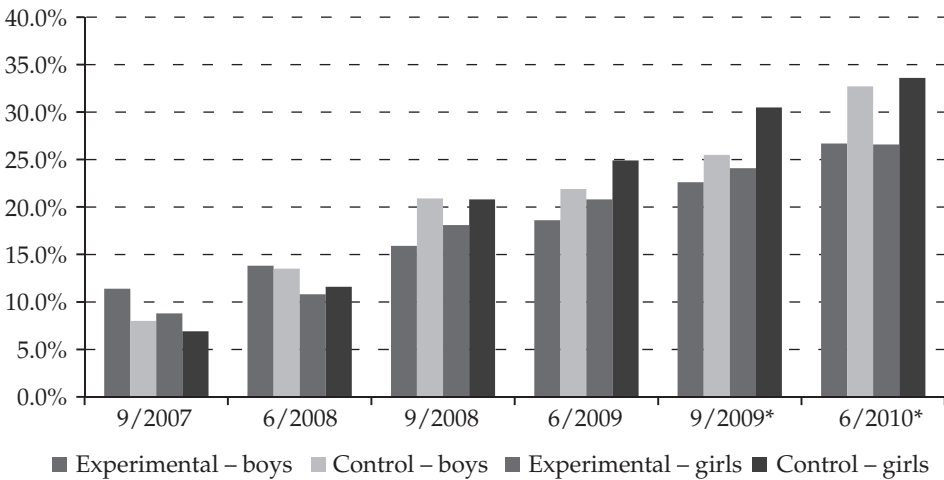


Note: Pearson chi-square; *sign. $p = 0.05$ – boys; implementation and delivery of the intervention took place in the 2007/2008 academic year—the first two waves of testing.

nificant effect ($p = 0.015$; Pearson chi-square = 5.884; $df = 1$) on boys was observed even two years after the intervention (6/2010): 23.4% versus 31.4% in the experimental and control groups respectively. The hypothesis (H1) that a positive effect of the intervention for the indicator of the 30-day prevalence of drunkenness will be observable only in the experimental group of boys was corroborated.

The most pronounced gender differences were recorded in the 30-day prevalence of tobacco smoking (Figure 2), where a statistically significant positive effect ($p < 0.05$) was observed among girls only, while the intervention seemed to have no statistically significant effect on boys, according to this indicator. Major differences between the experimental and control groups were observed at the last two follow-ups (15 and 24 months after the intervention). While fifteen months after the intervention (9/2009) there was a 6.4% difference between the experimental and control groups (24.1% versus 30.5% in the experimental and control groups; $p = 0.045$; Pearson chi-square = 4.018; $df = 1$), two years after the intervention (6/2010) the difference between the groups grew to 7.0% (26.6% and 33.6% in the experimental and control groups respectively; $p = 0.036$; Pearson chi-square = 4.390; $df = 1$). The hypothesis (H2) that the intervention programme would be observed to have a positive effect on the indicator of the 30-day prevalence of smoking tobacco only in the experimental group of girls was corroborated.

As early as three months after the intervention (9/2008), it was found to have statistically significant effects on the 30-day prevalence of cannabis use (Fig-

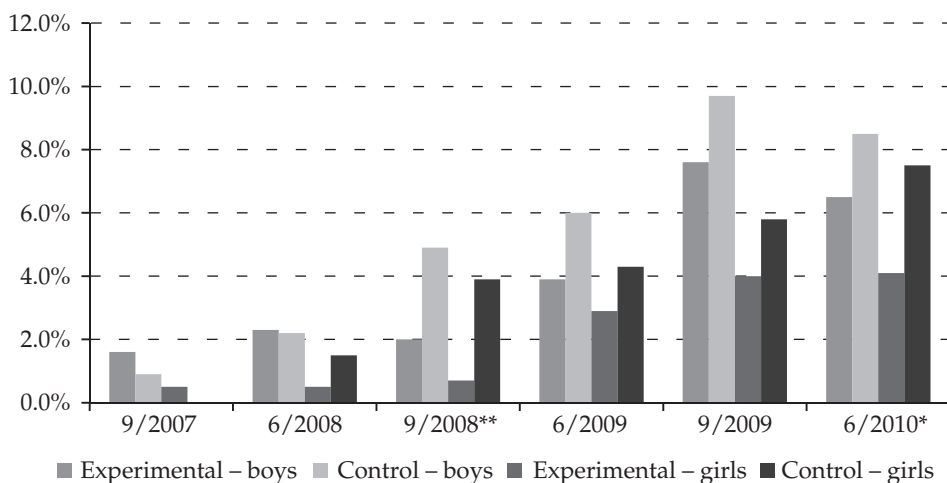
Figure 2. 30-day prevalence of tobacco smoking

Note: Pearson chi-square; *sign. $p = 0.05$ – girls; implementation and delivery of the intervention took place in the 2007/2008 academic year—the first two waves of testing.

ure 3) in the case of both genders. Only 2.0% of the boys from the experimental group had used cannabis in the past 30 days, while the figure was 4.9% in the group that did not take part in the intervention programme ($p = 0.027$; Pearson chi-square = 4.890; $df = 1$). After two months of holidays (9/2008) the effect of the intervention was even stronger among girls, with 3.9% of the control group having smoked cannabis in the past month, in comparison to dramatically fewer (0.7%) females in the experimental group who had used cannabis in the past 30 days ($p = 0.001$; Pearson chi-square = 10.271; $df = 1$). The sustainability of the effect on girls could still be observed two years after the intervention (9/2010), with the 30-day prevalence rates at 4.1% and 7.5% in the experimental and control groups, respectively ($p = 0.046$; Pearson chi-square = 3.966; $df = 1$). The hypothesis (H3) that the intervention would be observed to have a positive effect on the indicator of the 30-day prevalence of smoking cannabis for both genders in the experimental group and that the effect would be sustained for two years after the intervention was not corroborated, as the positive effect, already recorded two months after the intervention, was only sustained in the sub-population of girls.

The intervention programme showed measurable, statistically significant, positive effects for all three substances included in the study, irrespective of gender. Gender-specific differences in effectiveness were observed in the indicators of the 30-day prevalence of any drunkenness and any tobacco smoking: the intervention programme proved to be more effective in reducing high-risk alcohol

Figure 3. 30-day prevalence of cannabis use



Note: Pearson chi-square; **sign. $p = 0.05$ – boys, $p = 0.001$ – girls; *sign. $p = 0.05$ – girls; implementation and delivery of the intervention took place in the 2007/2008 academic year—the first two waves of testing.

consumption among boys and tobacco smoking among girls in the past thirty days. Both genders recorded improvements in the indicator of cannabis use in the past 30 days, although the findings suggest that the intervention programme may have a more lasting effect on female students.

The relationships between the indicators were identified using a statistical method of correlation analysis of selected variables of the ESPAD questionnaire. The results of the survey obtained in the sixth and last round of testing were centred and normed first. No significant correlations between the indicators were found. Only four pairs of indicators showed significant correlations at $p = 0.05$ (see Appendix Table 2), but these are relationships between variables that have no effects on the results of the research. No significant differences between the experimental and control samples were recorded.

Discussion

The analysis provided strong evidence that the school-based Unplugged prevention intervention programme had a positive effect on reducing the use of alcohol, tobacco, and cannabis. However, the degree of this effectiveness varies according to the gender of the participants. In conformity with other cannabis prevention programmes [e.g. Ariza et al. 2013], we expected the Unplugged intervention to be

gender-equally effective in terms of cannabis use, but, again, the effect of the Unplugged intervention programme showed a higher sustainability in girls in this respect. These findings contradict the results of the previous European trial, according to which the same preventive curriculum (Unplugged) showed greater effectiveness for boys [Vigna-Taglianti et al. 2009]. However, this difference between the two studies may be explained by the children's lower age at the beginning of the intervention in our study [Gabrhelik et al. 2012b]. Our analysis may thus contribute to the discussion elaborating on the argument that the programme may be more effective with girls in early adolescence who have not yet come into much contact with drug use [Kumpfer, Smith and Summerhays 2008]. Regarding alcohol, our findings were in line with those of the European trial [Vigna-Taglianti et al. 2009], as the 30-day prevalence of drunkenness indicator showed differences in positive two-year effects between the experimental and control groups in boys only. In comparison to the EU-Dap study [Faggiano et al. 2008, 2010], the upper age range was lowered to 12 years (i.e. the sixth grade of basic school) in consideration of the early onset of substance use among the population of Czech children. This finding was later taken into account in studies focusing on the smoking-specific performance of the Unplugged intervention programme [Gabrhelik et al. 2012b; Miovský et al. 2012], where the high level of effectiveness of individual aspects of the programme was also explained by the age at which the participants entered the study. The above also provides an explanation for the higher effectiveness of the intervention programme for the 30-day prevalence of drunkenness in boys and the absence of any positive effect on girls. Numerous studies suggest that a significant risk factor among girls is their contact with older boys from high-risk groups with risky lifestyles [Danielsson, Romelsjö and Tengström 2011; Kumpfer, Smith and Summerhays 2008; Orosová et al. 2007, etc.]. While a risky lifestyle may not necessarily be associated with illicit drug use, it almost always involves alcohol use, which is a socially normalised behaviour in Czech society and its consequences tend to be underestimated [Novák, Miovský and Šťastná 2009]. Friends (especially the reference group of older boys) have much more of an influence on adolescent girls than peer interaction in the class, which the Unplugged curriculum is based on [Kumpfer, Smith and Summerhays 2008; Agostinelli, Grube and Morgan 2003]. Alcohol use among girls is often associated with a perceived attractiveness, an effort to draw attention, and a dysfunctional approach to coping with affective conditions and relationship problems [Yeh, Chiang and Huang 2006]. A correlation was also found between drinking in early adolescence and the early onset of sexual activity among girls [Kumpfer, Smith and Summerhays 2008]. These efforts to make an impression, to fit in with the group, and to appear more attractive to the opposite sex lead girls to start drinking and experimenting with cannabis at an earlier age, while in boys they may lead to smoking [Blake et al. 2001; Kumpfer, Smith and Summerhays 2008; Yeh, Chiang and Huang 2006].

In order to address these differences, we need to understand which forms of prevention work for each gender. Programmes focusing on the development

of behavioural skills, including assertiveness, drug refusal strategies, and peer-pressure resistance, have proved to have the strongest preventive effect on substance use among girls [Springer et al. 2004]. Other suitable ways of enhancing the potential of prevention among girls include correcting their false perceptions of social norms and the frequency of substance use among their peers [Butters 2004], supporting positive partner relationships [Danielsson, Romelsjö and Tengström 2011], and encouraging good communication with parents and a protective family environment in general [Kumpfer, Smith and Summerhays 2008; Yeh, Chiang and Huang 2006]. Addressing false normative beliefs and denormalising substance use are crucial methods of effective school-based prevention, which should primarily seek to enhance students' general awareness of drug-related risks and morals and encourage the involvement of students themselves in tackling drug problems [Novák 2012]. Substance use tends to be highly regarded by fellow students, particularly among boys [Jarkovská 2009; Vojtíšková 2011]. By contrast, good academic performance is usually associated with girls [Mencin Čeplak 2013]. But neither regular nor experimental drug use should be regarded by students as desirable behaviour or a neutral social norm. School-based prevention programmes that have been shown to be particularly effective with boys are ones based on communication and interaction with their peers [Springer et al. 2004] and ones that focus on strategies for coping with anxiety and stress [Yeh, Chiang and Huang 2006]. Other elements that should be promoted among boys as part of preventive interventions include their ability to self-regulate and make rational choices [Butters 2004]. Consideration should also be given to the finding about the preferential transfer of gender-specific parental patterns of substance use [Yeh, Chiang and Huang 2006], where paternal and maternal use significantly increases the risk of use among sons and daughters, respectively. The following modifications to the educational and preventive aspects of the Unplugged curriculum to address its more gender-specific impact in Czech society should be considered: lesson 3 on alcohol should take a more girl-specific approach; lessons 5 and 9 (on tobacco smoking and illegal drugs) should focus more on altering (erroneous) perceptions about the dangers and frequency of substance use among male peer groups; activities to alter perceived norms (lesson 4) should focus more specifically on girls or incorporate a girl-specific component; lesson 11, dedicated to structured problem-solving and self-regulation, should take account of the special preventive potential of these strategies for boys; reintegrating the parental component, which was not included in the implementation of the intervention programme in the Czech school environment, could be useful for prevention targeted at girls.

The gender equality approach to the prevention of substance use should emphasise achieving identical outcomes and results from the intervention over creating equal baseline conditions for its delivery. The implementation process should reflect the specific characteristics of gender socialisation, as a process that results in different ways of dealing with social reality, and should encompass

proactive measures to prevent any group from being disadvantaged [Smetáčková 2009]. Although it may be difficult to support the argument that differentiated conditions may lead to greater equality in the results, prevention interventions should try to achieve the desirable blurring of gender differences by maximising the baseline potential and using gender-specific approaches to provide effective motivation to reach their goals.

The major strengths of this research include the size of the school population sample, which comprised participants from multiple regions in the Czech Republic, and the long period and frequency of follow-up testing: follow-ups were carried out over two years after the prevention intervention was implemented [Gabrhelik et al. 2012a], i.e. 33 months elapsed between the baseline testing and the last follow-up. Studies using self-report questionnaires to collect data have been challenged as biased, allegedly owing to the instrumental answers provided by the student respondents. A number of epidemiological studies of adolescent substance use [e.g. Ariza et al. 2013; Caraballo, Giovino and Pechacek 2004; Post et al. 2005; Danielsson, Romelsjö and Tengström 2011; Vigna-Taglianti et al. 2009] show that the use of self-report questionnaires does not impair the reliability of the results and that the data collected using this method are not influenced by the respondent's gender [Kandel et al. 2006]. The advantage of using an internationally standardised and widely used questionnaire is that it is possible to compare results over time and internationally. Five schools (6.3%) from the control group withdrew from the research without being replaced [Adámková et al. 2009; Gabrhelik et al. 2012a], but this had no major impact on the characteristics of the control group. Certain limitations to the internal reliability of implementation may derive from the fact that the prevention intervention is delivered by in-school prevention workers who are members of the professional teaching staff appointed to assume this role, which may raise concerns about inconsistencies in the programme's implementation. On the other hand, an education professional who has been working in the school possesses better knowledge of the school environment and can create a secure and comfortable atmosphere. Another human resources variable that could affect the programme's implementation is that the majority of in-school prevention workers are women. The potential adverse effects of these two variables were eliminated by means of joint training prior to the intervention and ongoing supervision meetings [Jurystová, Gabrhelik and Miovský 2009]. A very positive result is the high rate of parental consent to the children's participation in the research (98.7%), which may be due to good communication with parents and school administrations, the commitment of education professionals, and the support for the project from the Ministry of Education of the Czech Republic [Gabrhelik et al. 2012a]. Nevertheless, we must admit that the ultimate effectiveness of the programme may have been affected by the exclusion of the parental component [van der Kreeft et al. 2009], which appears to be very effective for the sub-population of female students [Ariza et al. 2013]. Lowering the age of participants in order to enhance the programme's effective-

ness [Danielsson, Romelsjö and Tengström 2011; Gabrhelik et al. 2012a] made it difficult to compare our results with those of the EU-Dap project and may have produced more favourable outcomes for girls [Vigna-Taglianti et al. 2009]. While achieving reasonable agreement in both groups' socio-demographic indicators (gender, family economic situation, peer relationships, and school results), we found a statistically significant difference ($p = 0.01$) between the groups of girls in the baseline 30-day prevalence of drunkenness. However, this difference disappeared before the first follow-up and the trend in drunkenness proceeded to develop in opposite ways for both groups.

Conclusion

Substance use among adolescents is widespread. Our study showed that there were gender-specific differences to the effect of school-based prevention intervention on the regular use of alcohol and tobacco. Our findings concur with those of gender-specific effectiveness studies of substance use prevention that showed a stronger effect on girls in the case of preventive intervention on tobacco smoking among girls [e.g. Share, Quinn and Ryan 2004] and a lower prevalence of drunkenness in the past 30 days among boys [Vigna-Taglianti et al. 2009]. Only some agreement with referential studies [e.g. Ariza et al. 2013] was achieved as regards cannabis. While the intervention was found to be effective for both genders in this respect, girls were shown to gain a more sustained benefit from it than boys. We suggest that a school-based prevention intervention whose effectiveness varies according to the gender of its recipients could be improved by adding gender-specific elements to its curriculum. Our study indicates that it may be useful to extend and improve those components of the Unplugged intervention that address peer communication and interaction, anxiety- and stress-coping strategies, self-regulation, and rational decision-making, as this may help to increase the prevention potential for boys. On the other hand, a greater emphasis on the correction of false perceptions of social norms and of the frequency of use among peers and the integration of the parental involvement component could make the intervention more effective for girls.

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References

- Adámková, Tereza, Lucie Jurystová, Roman Gabrhelík, Lenka Miovská and Michal Miovský. 2009. 'Primary Prevention in Schools Involved in the EUDAP 2 Project.' *Adiktologie* 9 (2): 86–94.
- Agostinalli, Gina, Joel W. Grube and Mark Morgan. 2003. 'Social Distancing in Adolescents' Perceptions of Alcohol Use and Social Disapproval: The Moderating Roles of Culture and Gender.' *Journal of Applied Social Psychology* 33 (11): 2354–2372.
- Anderson, Peter and Ben Baumberg. 2006. *Alcohol in Europe: A Public Health Perspective*. London: Institute of Alcohol Studies.
- Ariza, Carles, Anna Pérez, Francesca Sánchez-Martínez, Marta Diéguez, Albert Espelt, Isabel M. Pasarín, Josep M. Suelves, Rafael De la Torre and Manuel Nebot. 2013. 'Valuation of the Effectiveness of a School-Based Cannabis Prevention Program.' *Drug and Alcohol Dependence* 132 (1): 257–264.

- Best, David, Salman Rawaf, Jenny Rowley, Karen Floyd, Victoria Manning and John Strang. 2000. 'Drinking and Smoking as Concurrent Predictors of Illicit Drug Use and Positive Drug Attitudes in Adolescents.' *Drug and Alcohol Dependence* 60 (3): 319–322.
- Blake, Susan M., Hortensia Amaro, Pamela M. Schwartz and Laura J. Flinchbaugh. 2001. 'A Review of Substance Abuse Prevention Programs for Young Adolescent Girls.' *Journal of Early Adolescence* 21 (3): 294–324.
- Butters, Jennifer E. 2004. 'The Impact of Peers and Social Disapproval on High-Risk Cannabis Use: Gender Differences and Implications for Drug Education.' *Drugs: Education, Prevention and Policy* 11 (5): 381–390.
- Caraballo, Ralph S., Gary A. Giovino and Terry F. Pechacek. 2004. 'Self-reported Cigarette Smoking vs Serum Cotinine among US Adolescents.' *Nicotine & Tobacco Research* 6 (1): 19–25.
- Csémy, Ladislav and Karel Nešpor. 2002. 'Zkušenost s alkoholem, tabákem a marihuanou výrazně zvyšují riziko experimentování s heroinem a pervitinem.' (Experience with Alcohol, Tobacco, and Marijuana Increases the Risk of Experimenting with Heroin and Pervitin) *Česká a slovenská Psychiatrie* 98 (61): 358–359.
- Csémy, Ladislav, Pavla Lejčková and Petr Sadílek. 2007. 'Substance Use Among Czech Adolescents: An Overview of Trends in the International Context.' *Journal of Drug Issues* 37 (1): 119–132.
- Danielsson, Anna-Karin, Anders Romelsjö and Anders Tengström. 2011. 'Heavy Episodic Drinking in Early Adolescence: Gender-Specific Risk and Protective Factors.' *Substance Use and Misuse* 46 (5): 633–643.
- Ellickson, Phyllis L., Ron D. Hays and Robert M. Bell. 1992. 'Stepping through the Drug Use Sequence: Longitudinal Scalogram Analysis of Initiation and Regular Use.' *Journal of Abnormal Psychology* 101 (3): 441–451.
- EMCDDA. 2006. *A Gender Perspective on Drug Use and Responding to Drug Problems*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.
- EMCDDA. 2012. *Annual Report 2012: The State of the Drugs Problem in Europe*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.
- Faggiano, Fabrizio, Maria R. Galanti, Karl Bohrn, Gregor Burkhardt, Federica Vigna-Taglianti, Luca Cuomo, Leila Fabiani, Massimiliano Panella, Tatiana Perez, Roberta Siliquini, Peer van der Kreeft, Maro Vassara, Gudrun Wiborg and the EU-Dap Study Group. 2008. 'The Effectiveness of a School-Based Substance Abuse Prevention Program: EU-Dap Cluster Randomised Controlled Trial.' *Preventive Medicine* 47 (5): 537–543.
- Faggiano, Fabrizio, Federica Vigna-Taglianti, Gregor Burkhardt, Karl Bohrn, Luca Cuomo, Dario Gregori, Massimiliano Panella, Maria Scantigna, Roberta Siliquini, Laura Varona, Peer van der Kreeft, Maro Vassara, M., Gudrun Wiborg, Maria R. Galanti and the EU-Dap Study Group. 2010. 'The Effectiveness of a School-Based Substance Abuse Prevention Program: 18-Month Follow-Up of the EU-Dap Cluster Randomized Controlled Trial.' *Drug and Alcohol Dependence* 108 (1–2): 56–64.
- Flay, Brian R. 2009. 'School-Based Smoking Prevention Programs with the Promise of Long-Term Effects.' *Tobacco Induced Diseases* 5 (6): 1–18.
- Gabrhelík, Roman. 2010. 'Teoretické modely v primární prevenci a základní typy preventivních programů.' (Theoretical Models in Primary Prevention and General Types of Prevention Programmes) Pp. 43–52 in *Primární prevence rizikového chování ve školství*, edited by Michal Miovský, Lenka Skácelová, Jana Zapletalová and Petr Novák. Prague: Sdružení SCAN, Univerzita Karlova v Praze & Togga.
- Gabrhelík, Roman, Alexandra Duncan, Michal Miovsky, C. Debra M. Furr-Holden, Lenka Stastna and Lucie Jurystova. 2012a. 'Unplugged: A School-Based Randomized Control

- Trial to Prevent and Reduce Adolescent Substance Use in the Czech Republic.' *Drug and Alcohol Dependence* 124 (1–2): 79–87.
- Gabrhelik, Roman, Alexandra Duncan, Myong H. Lee, Lenka Stastna, C. Debra M. Furr-Holden and Michal Miovsky. 2012b. 'Sex Specific Trajectories in Cigarette Smoking Behaviors among Students Participating in the Unplugged School-Based Randomized Control Trial for Substance Use Prevention.' *Addictive Behaviors* 37 (10): 1145–1150.
- Gómez Cruz, Generoso, Miguel Barrueco Ferrero, Irene Aparicio Coca, José Á. Maderuelo and Miguel Torrecilla García. 2009. 'Program for the Prevention of Smoking in Secondary School Students.' *Archivos De Bronconeumologia* 45 (1): 16–23.
- Hecht, Stephen S. 1999. 'Tobacco Smoke Carcinogens and Lung Cancer.' *Journal of National Cancer Institute* 91 (14): 1194–1210.
- Hibell, Bjorn, Babro Andersson, Thoroddur Bjarnasson, Salme Ahlstrom, Olga Balakireva, Anna Kokkevi and Mark Morgan. 2004. *The ESPAD Report 2003. Alcohol and Other Drug Use Among Students in 35 European Countries*. Stockholm: Swedish Council for Information on Alcohol and Other Drugs (CAN) and the Pompidou Group at the Council of Europe.
- Hibell, Bjorn, Ulf Guttormsson, Salme Ahlstrom, Olga Balakireva, Thoroddur Bjarnasson, Anna Kokkevi and Ludwig Kraus. 2009. *The 2007 ESPAD Report: Substance Use Among Students in 35 European Countries*. Stockholm: Swedish Council for Information on Alcohol and Other Drugs.
- Hibell, Bjorn, Ulf Guttormsson, Salme Ahlstrom, Olga Balakireva, Thoroddur Bjarnasson, Anna Kokkevi and Ludwig Kraus. 2012. *The 2011 ESPAD Report: Substance Use Among Students in 36 European Countries*. Stockholm: Swedish Council for Information on Alcohol and Other Drugs.
- Horáček, Jiří. 2008. 'Užívání konopných drog a problematika psychotických stavů a schizofrenie.' (Cannabis Use and Psychotic Conditions and Schizophrenia) Pp. 300–312 in *Konopí a konopné drogy: adiktologické kompendium*, edited by Michal Miovský. Prague: Grada Publishing.
- Jarkovská, Lucie. 2009. 'Školní třída pod genderovou lupou.' (The Classroom from a Gender Perspective) *Sociologický časopis/Czech Sociological Review* 45 (4): 727–752.
- Jessor, Richard, Mark S. Turbin, Frances M. Costa, Qi Dong, Hongchuan Zhang and Wang Changhai. 2003. 'Adolescent Problem Behavior in China and the United States: A Cross-National Study of Psychosocial Protective Factors.' *Journal of Research on Adolescence* 13 (3): 329–360.
- Josendal, Ola, Leif E. Aaro, Torbjorn Torsheim and Jon Rasbash. 2005. 'Evaluation of the School-Based Smoking-Prevention Program BE smokeFREE.' *Scandinavian Journal of Psychology* 46 (2): 189–199.
- Jurystová, Lucie, Roman Gabrhelík and Michal Miovský. 2009. 'Unplugged Primary Prevention Programme—Evaluation of the Implementation Process by School Prevention Workers.' *Adiktologie* 9 (1): 10–19.
- Jurystová, Lucie and Michal Miovský. 2010. 'Vybrané aspekty organizační a odborné podpory pedagogů při realizaci metodiky Unplugged ve školách: Výsledky evaluace implementace projektu UEDAP.' (Selected Aspects of Organisational and Expert Support for Teachers and Other Education Professionals in Delivering the Unplugged Programme in Schools: Findings of the Evaluation of the Implementation of the EUDAP Project) *Adiktologie* 10 (3): 147–153.
- Kandel, Denise B., Christine Schaffran, Pamela C. Griesler, Mei-Chen Hu, Mark Davies and Neal Benowitz. 2006. 'Salivary Cotinine Concentration versus Self-reported Cigarette Smoking: Three Patterns of Inconsistency in Adolescence.' *Nicotine & Tobacco Research* 8 (4): 525–537.

- Klein, Susan S. 1991. *Handbook for Achieving Sex Equity through Education*. Baltimore, MD: The Johns Hopkins University Press.
- Krmencík, Pavel. 2008. 'Somatická rizika spojená s užíváním konopných drog.' (Somatic Risks Associated with Cannabis Use) Pp. 335–354 in *Konopí a konopné drogy: adiktologické kompendium*, edited by Michal Miovský. Prague: Grada Publishing.
- Kumpfer, Karol L., Paula Smith and Julia F. Summerhays. 2008. 'A Wakeup Call to the Prevention Field: Are Prevention Programs for Substance Use Effective for Girls?' *Substance Use and Misuse* 43 (8–9): 978–1001.
- Lerner, Richard M. 1985. 'Adolescent Maturational Changes and Psychosocial Development: A Dynamic Interactional Perspective.' *Journal of Youth and Adolescence* 14 (4): 335–372.
- Mencin Čepлак, Metka. 2012. 'The Individualisation of Responsibility and School Achievement.' *Sociologický časopis/Czech Sociological Review* 48 (6): 1093–1114.
- Miovská, Lenka. 2005. *Užívání drog v národních menšinách v ČR—Souhrn dostupných informací. Drugs in Focus 2.* (Drug Use among Ethnic Minorities in the Czech Republic—Summary of the Available Information. Drugs in Focus 2) Prague: Úřad vlády ČR.
- Miovská, Lenka, Michal Miovský and Alexandra Šulcová. 2008. 'Vliv užívání konopných drog na kognitivní funkce.' (The Effects of Cannabis Use on Cognitive Functions) Pp. 334–365 in *Konopí a konopné drogy: adiktologické kompendium*, edited by Michal Miovský. Prague: Grada Publishing.
- Miovský, Michal, Lenka Skácelová, Jana Zapletalová and Petr Novák (eds.). 2010. *Primární prevence rizikového chování ve školství.* (Primary Prevention of Risk Behaviour within the School System) Prague: Sdružení SCAN, Univerzita Karlova v Praze & Togga.
- Miovský, Michal, Petr Novák, Lenka Štastná, Roman Gabrhelík, Lucie Jurystová and Jirí Vopravil. 2012. 'The Effect of the School-Based Unplugged Preventive Intervention on Tobacco Use in the Czech Republic.' *Adicciones* 24 (3): 211–218.
- Morgan, Mark and Joel W. Grube. 1994. 'Lifestyle Changes: A Social Psychological Perspective with Reference to Cigarette Smoking among Adolescents.' *The Irish Journal of Psychology* 15 (1): 179–190.
- Mravčík, Viktor, Kateřina Grohmannová, Pavla Chomynová, Vlastimil Nečas, Lucie Grolmusová, Lucia Kiššová, Blanka Nechanská, Hana Fidesová, Kamil Kalina, Jiří Vopravil, Lenka Kostelecká and Lucie Jurystová. 2012. *Výroční zpráva o stavu ve věcech drog v České republice v roce 2011.* (The 2011 Drug Situation in the Czech Republic—Annual Report) Prague: Úřad vlády České republiky.
- Novák, Petr. 2012. 'Normalita v primární prevenci.' (Normality in Primary Prevention) Pp. 99–102 in *Výkladový slovník základních pojmů školské prevence rizikového chování*, edited by Michal Miovský et al. Prague: Univerzita Karlova v Praze & Togga.
- Novák, Petr, Michal Miovský and Lenka Štastná. 2009. 'The Media Portrayal of Cannabis in Relation to Criminal Activities.' *Adiktologie* 9 (4): 196–203.
- Novák, Petr, Michal Miovský, Jiří Vopravil, Lenka Štastná, Roman Gabrhelík and Lucie Jurystová. 2011. 'Efektivita školního primárně preventivního programu Unplugged zaměřeného proti užívání konopí.' (The Effectiveness of the School-Based Unplugged Primary Prevention Programme on Cannabis Use) *Adiktologie* 11 (Supplement): 10–16.
- Orosová, Olga, Beáta Gajdošová, Andrea Madarasová-Gecková and Jitse P. van Dijk. 2007. 'Rizikové faktory užívania drog dospievajúcimi.' (Risk Factors in the Prevention of Drug Dependencies) *Československá psychologie* 51 (1): 32–47.
- Post, Ann, Hans Gilljam, Ingvar Rosendahl, Lennard Meurling, Sven Bremberg and Maria R. Galanti. 2005. 'Validity of Self Reports in a Cohort of Swedish Adolescent Smokers and Smokeless Tobacco (snus) Users.' *Tobacco Control* 14 (2): 114–117.

- Sale, Elizabeth, Soledad Sambrano, J. Fred Springer and Charles W. Turner. 2005. 'Risk, Protection, and Substance Use in Adolescents: A Multi-site Model.' *Journal of Drug Education* 33 (1): 91–105.
- Scheier, Lawrence M., Gilbert J. Botvin and Kenneth W. Griffin. 2001. 'Preventive Intervention Effects on Developmental Progression in Drug Use: Structural Equation Modeling Analyses Using Longitudinal Data.' *Prevention Science* 2 (2): 91–112.
- Schinke, Steven P. 1994. 'Prevention Science and Practice: An Agenda for Action.' *Journal of Primary Prevention* 15 (1): 45–57.
- Schmidt, Bettina. 2001. *Suchtprävention bei konsumierenden Jugendlichen: suchtpräventive Ansätze in der geschlechtsbezogenen Drogenarbeit*. Weinheim and Munich: Juventa Verlag.
- Share, Michelle, Margo Quinn and Collette Ryan. 2004. 'Evaluation of a 5-Year School-Based County-Wide Smoking Education Programme.' *Irish Medical Journal* 97 (9): 264–267.
- Smetáčková, Irena. 2009. 'Politika genderové rovnosti ve vzdělávání.' (The Policy of Gender Equality in Education) *Gender, rovné příležitosti, výzkum* 10 (2): 10–19.
- Springer, J. Fred, Elizabeth Sale, Jack Hermann, Soledad Sambrano, Rafa Kasim and Mary Nistler. 2004. 'Characteristics of Effective Substance Abuse Prevention Programs for High-Risk Youth.' *Journal of Primary Prevention* 25 (2): 171–219.
- Sussman, Steve, Mitchell Earleywine, Thomas Wills, Christine Cody, Tony Biglan, Clyde W. Dent and Michael D. Newcomb. 2004. 'The Motivation, Skills, and Decision-Making Model of "Drug Abuse" Prevention.' *Substance Use and Misuse* 39 (10–12): 1971–2016.
- Szalay, Lorand B., Andres Inn and Kathleen T. Doherty. 1996. 'Social Influences: Effects of the Social Environment on the Use of Alcohol and Other Drugs.' *Substance Use and Misuse* 31 (3): 343–373.
- Thomas, Roger E. and Rafael Perera. 2006. 'School-Based Programmes for Preventing Smoking.' *The Cochrane Database of Systematic Reviews* (3): 1–187.
- Tobler, Nancy S., Michael R. Roona, Peter M. Ochshorn, Diana G. Marschall, Andrei V. Streke and Kimberly M. Stackpole. 2000. 'School-Based Adolescent Drug Prevention Programmes: 1998 Meta-Analysis.' *Journal of Primary Prevention* 20 (4): 275–336.
- UNICRI. 2003. *School-Based Drug Education: A Guide for Practitioners and the Wider Community*. Vienna: United Nations Office for Drug Control and Crime Prevention.
- van der Kreeft, Peer, Gudrun Wiborg, Maria R. Galanti, Roberta Siliquini, Karl Bohrn, Maria Scatigna, Ann-Marie Lindahl, Juan C. Melero, Maro Vassara, Fabrizio Faggiano and the EU-Dap Study Group. 2009. 'Unplugged: A New European School Program against Substance Abuse.' *Drugs: Education Prevention and Policy* 16 (2): 167–181.
- Van Ryzin, Mark J., Gregory M. Fosco and Thomas J. Dishion. 2012. 'Family and Peer Predictors of Substance Use from Early Adolescence to Early Adulthood: An 11-Year Prospective Analysis.' *Addictive Behaviors* 37 (12): 1314–1324.
- Vigna-Taglianti, Federica, Serena Vadrucci, Fabrizio Faggiano, Gregor Burkhardt, Roberta Siliquini, Maria R. Galanti and the EU-Dap Study Group. 2009. 'Is Universal Prevention against Youths' Substance Misuse Really Universal? Gender-Specific Effects in the EU-Dap School-Based Prevention Trial.' *Journal of Epidemiological and Community Health* 63 (9): 722–728.
- Voelkl, Kristin E. and Michael R. Frone. 2000. 'Predictors of Substance Use at School among High School Students.' *Journal of Educational Psychology* 92 (3): 583–592.
- Vojtíšková, Kateřina. 2011. 'Školní úspěšnost a její (re)produkce na základní škole.' (Academic Success and the Intergenerational Reproduction of Academic Performance at Basic School) *Sociologický časopis/Czech Sociological Review* 47 (5): 911–935.

- Yeh Mei-Yu, I-Chyun Chiang and Song-Yuan Huang. 2006. 'Gender Differences in Predictors of Drinking Behavior in Adolescents.' *Addictive Behaviors* 31 (10): 1929–1938.
- Zábranský, Tomáš. 2008. 'Epidemiologie užívání konopných drog a s ním souvisejících fenoménů.' (Epidemiology of Cannabis Use and Related Phenomena) Pp. 182–211 in *Konopí a konopné drogy: adiktologické kompendium*, edited by Michal Miovský. Prague: Grada Publishing.

Appendix

Table 1. Substance use prevalence data

Follow-up 30-day prevalence	Experi- mental - boys %	Control - boys %	Pearson chi-square, df = 1	<i>p</i> -value	Experi- mental - girls %	Control - girls %	Pearson chi-square, df = 1	<i>p</i> -value
9/2007 drunkenness	3.7	2.8	0.485	0.486	2.9	0.3	7.541	0.006
6/2008 drunkenness	9.8	6.1	3.100	0.078	4.5	5.8	0.649	0.420
9/2008 drunkenness	7.0	7.1	0.004	0.948	5.8	7.4	0.847	0.357
6/2009 drunkenness	15.0	15.4	0.034	0.853	14.1	10.3	2.678	0.102
9/2009 drunkenness	14.1	17.0	1.187	0.276	13.9	14.2	0.009	0.923
6/2010 drunkenness	23.4	31.4	5.884	0.015	21.1	26.6	2.973	0.085
9/2007 tobacco smoking	11.4	8.0	2.351	0.125	8.8	6.9	0.969	0.325
6/2008 tobacco smoking	13.8	13.5	0.019	0.892	10.8	11.6	0.116	0.734
9/2008 tobacco smoking	15.9	20.9	3.353	0.067	18.1	20.8	1.025	0.311
6/2009 tobacco smoking	18.6	21.9	1.394	0.238	20.8	24.9	1.908	0.167
9/2009 tobacco smoking	22.6	25.5	0.873	0.350	24.1	30.5	4.018	0.045
6/2010 tobacco smoking	26.7	32.7	3.164	0.075	26.6	33.6	4.390	0.036
9/2007 cannabis use	1.6	0.9	0.652	0.419	0.5	0.0	1.653	0.198
6/2008 cannabis use	2.3	2.2	0.003	0.960	0.5	1.5	2.008	0.156
9/2008 cannabis use	2.0	4.9	4.890	0.027	0.7	3.9	10.271	0.001
6/2009 cannabis use	3.9	6.0	1.980	0.159	2.9	4.3	1.244	0.265
9/2009 cannabis use	7.6	9.7	1.031	0.310	4.0	5.8	1.427	0.232
6/2010 cannabis use	6.5	8.5	1.049	0.306	4.1	7.5	3.966	0.046

Table 2. Pearson correlations

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
A	1	-0.010	0.015	-0.062	-0.015	0.076	0.072	0.069	0.060	0.037	0.033	-0.019	0.013	-0.027	0.012	-0.008	0.009
B	-0.010	1	-0.437	-0.131	-0.175	-0.016	-0.064	-0.037	0.090	0.061	0.050	-0.043	-0.088	0.067	0.055	0.110	-0.066
C	0.015	-0.437	1	0.161	0.117	0.006	0.002	0.027	-0.018	-0.019	-0.012	-0.007	0.008	-0.008	-0.028	-0.063	0.089
D	-0.062	-0.131	0.161	1	-0.100	-0.082	-0.007	-0.101	-0.014	0.000	-0.011	-0.049	-0.024	0.012	-0.040	-0.058	-0.027
E	-0.015	-0.175	0.117	-0.100	1	0.277	0.170	0.154	-0.050	-0.094	-0.120	-0.014	-0.069	0.022	0.131	0.051	-0.020
F	0.076	-0.016	0.006	-0.082	0.277	1	0.467	0.318	0.138	0.082	0.011	-0.050	-0.073	-0.071	0.142	0.112	-0.013
g	0.072	-0.064	0.002	-0.007	0.170	0.467	1	0.458	0.049	0.068	0.000	-0.032	-0.025	-0.161	0.133	0.078	-0.029
h	0.069	-0.037	0.027	-0.101	0.154	0.318	0.458	1	0.041	0.046	0.039	0.008	0.035	-0.126	0.142	0.104	0.028
i	0.060	0.090	-0.018	-0.014	-0.050	0.138	0.049	0.041	1	0.812	0.780	0.009	-0.018	0.065	0.102	0.098	-0.010
j	0.037	0.061	-0.019	0.000	-0.094	0.082	0.068	0.046	0.812	1	0.844	0.016	-0.012	0.068	0.063	0.097	0.025
K	0.033	0.050	-0.012	-0.011	-0.120	0.011	0.000	0.039	0.780	0.844	1	0.040	0.023	0.042	0.062	0.097	0.028
l	-0.019	-0.043	-0.007	-0.049	-0.014	-0.050	-0.032	0.008	0.009	0.016	0.040	1	0.531	-0.149	-0.008	0.024	-0.003
m	0.013	-0.088	0.008	-0.024	-0.069	-0.073	-0.025	0.035	-0.018	-0.012	0.023	0.531	1	-0.159	-0.034	-0.021	-0.049
n	-0.027	0.067	-0.008	0.012	0.022	-0.071	-0.161	-0.126	0.065	0.068	0.042	-0.149	-0.159	1	0.094	0.089	0.100
O	0.012	0.055	-0.028	-0.040	0.131	0.142	0.133	0.142	0.102	0.063	0.062	-0.008	-0.034	0.094	1	0.487	0.237
p	-0.008	0.110	-0.063	-0.058	0.051	0.112	0.078	0.104	0.098	0.097	0.097	0.024	-0.021	0.089	0.487	1	0.247
q	0.009	-0.066	0.089	-0.027	-0.020	-0.013	-0.029	0.028	-0.010	0.025	0.028	-0.003	-0.049	0.100	0.237	0.247	1

Note: Bold values are significant correlations at the 0.05 level. Variables: (a) sample group; (b) sex; (c) computer games; (d) sport; (e) school results; (f) 30-day tobacco; (g) 30-day drunkenness; (h) 30-day cannabis; (i) older sibling tobacco; (j) older sibling drunkenness; (k) older sibling cannabis; (l) education – father; (m) education – mother; (n) family economic situation; (o) relationship with mother; (p) relationship with father; (q) relationship with friends.