

Problem gambling among Czech adolescents: An exploration of its relationship to early initiation of tobacco smoking

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Background and aims: Gambling in adolescence is often related to licit and illicit substance use. Some evidence shows that teenage smokers gamble more than non-smokers. The aim of the study is to analyze the relationship between problem gambling and smoking among Czech adolescents. *Methods:* Data on 6,082 adolescents (50.1% boys and 49.9% girls) aged 15–19 years were collected as part of the ESPAD study in the Czech Republic in 2015. Logistic regression and linear regression models were used to test the hypothesis that the early onset of daily smoking increases the risk of problem gambling. *Results:* The age of initiation of daily smoking seems to be a more reliable marker of the risk of problem gambling than smoking status or intensity of smoking. More than 20% of smokers who started smoking daily at the age of 12 years or earlier are at risk of problem gambling, which shows a significantly increased probability compared to non-smokers (OR = 2.7). Other factors that increase the chances of becoming a problem gambler include being male, of higher age, and a student of a secondary school. *Discussion and conclusions:* The relationship between adolescent smoking and gambling is complex and is likely to be influenced by other underlying factors. Early daily smokers and at-risk gamblers tend in a similar way to risky behavior as a result of impulsivity. Interventions targeting early smoking and other substance-use behavior should not only aim at quitting smoking but could also include preventing smokers from developing problem gambling.

Keywords: adolescents, gambling, problem gambling, smoking, early initiation, ESPAD

INTRODUCTION

The increased availability of gambling as a result of widespread access to the Internet and the high level of adolescents' participation in gambling in developed countries are raising the importance of adolescent gambling as a public health issue (Volberg, Gupta, Griffiths, Olason, & Delfabbro, 2010). A recent review of worldwide research showed a high prevalence of both participation in gambling (Delfabbro, King, & Derevensky, 2016) and problem gambling (Calado, Alexandre, & Griffiths, 2017) in some European countries, suggesting that a substantial proportion of Czech adolescents might also be engaged in gambling activities. Data from the latest wave of the ESPAD study carried out in 2015 showed that 9% of 16-year-old Czech adolescents reported having gambled for money in the past 12 months (15% of the boys and 3% of the girls; Chomynová, Csémy, & Mravčík, 2016), or up to 18% if both online and offline gambling activities are considered (Molinaro et al., 2018). In the European context, the Czech Republic, together with Malta, Austria, Netherlands, Ukraine, Norway, Sweden, Liechtenstein, Lithuania, and

Iceland, is one of the countries with a low prevalence of gambling (Molinaro et al., 2018).

Adolescents are more vulnerable to risky behaviors such as gambling than adults (Derevensky, Gupta, & Winters, 2003). Although adolescents should have limited access to gambling activities, a majority of adolescents have gambled for money at least once in their lifetime (Delfabbro et al., 2016). Although most adolescents who have gambled do not subsequently suffer from severe problems, some are at risk of developing a gambling disorder. Involvement in problem gambling in adolescence increases the severity of gambling-related problems in young adulthood, including indebtedness, psychosocial impacts, and suicidal behavior (Richard, Blaszczynski, & Nower, 2014). From the point of view of public health policy, identifying the predictors of adolescent

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problem gambling may be of great importance for prevention and early intervention programs.

Smoking, and especially daily smoking, is one of the most widespread forms of substance use among adolescents, representing a serious public health concern in itself, also because the majority of adult smokers started smoking in adolescence (United States Department of Health and Human Services, 2014). A positive correlation between problem gambling and smoking has been established in the literature both in adults (Hayatbakhsh, Clavarino, Williams, Bor, & Najman, 2012) and adolescents (Kong et al., 2013; Molinaro et al., 2018; Volberg et al., 2010; Weinberger et al., 2015a, 2015b).

Analyzing the relationship between adolescent gambling and smoking in a sample of Connecticut secondary school students, Weinberger et al. (2015b) showed evidence that smokers gambled more severely than non-smokers. A second study based on the same sample found out that gamblers at risk are more likely to be regular smokers, start smoking at a younger age, and smoke with greater intensity (Weinberger et al., 2015a); these findings are in line with the findings from a study among Spanish students (Míguez & Becona, 2015). These results are consistent with recognized theories of adolescent substance use such as Jessor's problem-behavior theory (Donovan, Jessor, & Costa, 1991; Jessor, 1991) or general deviance syndrome theory (McGee & Newcomb, 1992), claiming that various forms of risk behavior and attitudes coexist among adolescents.

Although the existing evidence clearly shows a positive relationship between problem gambling and smoking in adolescence, to date, very little is known about causality and severity interactions. This study aims to analyze the relationship between smoking and gambling among Czech adolescents, with a focus on the relation between the intensity of smoking, early initiation into smoking, and the intensity of gambling and the risk of the development of problem gambling.

DATA AND METHODS

Sample

Data were collected as part of the European School Survey Project on Alcohol and Other Drugs (ESPAD) 2015, a cross-sectional questionnaire survey focusing on substance use among 15- to 16-year-old students that was carried out in 35 European countries (Chomynová et al., 2016; The ESPAD Group, 2016).

The ESPAD target population is defined as regular students who turn 16 years in the calendar year of the data collection (students born in 1999 for the 2015 survey), who are present in the classroom on the day of the survey (Hibell, 2014). The ESPAD study covers all grades containing at least 10% of the target population (i.e., the ninth grade of middle schools, first grade of secondary schools, and relevant grades of 8-year grammar schools). A stratified random sample of schools from all regions of the Czech Republic was prepared to ensure a representative sample of schools according to the region and type of school. The participation of the students was voluntary; students had the

right to refuse to fill in the questionnaire; altogether eight students refused to participate. The average time needed to complete the questionnaire was 46 min; younger students in middle schools needed more time compared to grammar school students. The Czech version of the ESPAD questionnaire was pilot-tested in one selected school prior to the survey data collection.

In the Czech Republic, a total of 6,707 self-completed questionnaires were collected at 209 randomly selected middle and secondary schools of all types in all regions of the country. For the purpose of the international ESPAD comparisons, only nationally representative samples of students reaching 16 years in the year of data collection are used ($N = 2,738$ in the Czech Republic in 2015); for the purpose of our analysis, we included all 6,082 valid observations from all students aged 15–19 years present in selected classes on the date of the data collection (50.1% boys and 49.9% girls). The aim of our analysis was to investigate risk factors related to problem gambling among Czech adolescents. Enlarging the data set to more than double significantly improves the precision of the results, especially when the subpopulation at risk is relatively small, and it allows the effect of age to be inspected, which would not be possible only among the subpopulation of 15- to 16-year-olds.

Measures

Logistic regression was used to identify the risk factors of problem gambling. The following independent variables entered the analysis: age, gender, school type, family structure (both parents = 1/different family structure = 0), three smoking status variables (occasional smoker = 1/other = 0; moderate daily smoker smoking up to 10 cigarettes a day = 1/other = 0; heavy daily smoker smoking 11+ cigarettes a day = 1/other = 0), and two variables of early initiation of daily smoking (at the age of 12 or earlier = 1/other = 0; at the age of 13 or 14 = 1/other = 0). The dependent variable of problem gambling was based on the Lie/Bet scale (Johnson et al., 1997) consisting of two items: "Have you ever had to lie to people important to you about how much you gambled?" (yes = 1/no = 0) and "Have you ever felt the need to bet more and more money?" (yes = 1/no = 0); students scoring 0 points for both questions were considered non-risky (0), whereas students scoring 1 or 2 points were considered to be at-risk gamblers (1).

A linear regression model was carried out on the subsample of students at risk according to the Lie/Bet scale in order to inspect the effect of the intensity of smoking on the intensity of gambling. The Consumption Screen for Problem Gambling (CSPG; Rockloff, 2012) was used to measure the intensity of gambling. The CSPG score entered the model as a dependent variable with the same explanatory variables as presented in the previous model. The CSPG consists of three questions measuring: (a) gambling frequency: "How often (if ever) have you gambled money in the last 12 months?" reported on a scale "I have not gambled money" = 0, "monthly or less" = 1, "2–4 times a month" = 2, "2–3 times a week" = 3, "4–5 times a week" = 4, and "6 or more times a week" = 5; (b) time spent on gambling: "How much time did you spend gambling on a typical day in

which you gambled in the last 12 months?” reported on a scale “I have not gambled money” = 0 and “less than 30 min” = 0, “between 30 min and 1 hr” = 1, “between 1 and 2 hr” = 2, “between 2 and 3 hr” = 3, and “3 hr or more” = 4; and (c) gambling intensity: “How often did you spend more than 2 hr gambling (on a single occasion) in the last 12 months?” reported on a scale “I have not gambled money” = 0 and “never” = 0, “less than monthly” = 1, “monthly” = 2, “weekly” = 3, and “daily or almost daily” = 4. Summing up the scores on the three questions, the respondents can gain 0–13 points on the scale; respondents scoring 0–1 points were considered at no risk, those with a sum of 2–3 points were considered at low risk, and those scoring 4+ points were considered at high risk of problem gambling. The cut-off points were calculated according to the literature to provide results comparable to those of other surveys and/or countries (Rockloff, 2012). For the purposes of this paper, the terms “gamblers at risk of problem gambling” and “problem gamblers” are used interchangeable.

Hypotheses

A model was conducted to test for the following hypotheses:

1. Smoking status is a risk factor for the development of problem gambling.
2. The relationship between smoking and gambling is more pronounced when intensity is taken into account.
3. The age of smoking initiation plays a significant role in the development of problem gambling than smoking status itself.

Missing values

The majority of the students (78%) left some answers in the questionnaire blank. On average, three answers were missing per completed questionnaire. Only 124 students (2%) did not answer one or more questions analyzed in the models. These missing values were treated as non-risky behavior for the analysis as students reporting no risk behavior in a given time frame skipped questions asking about the frequency or intensity of such behavior in more detail. The elimination of these observations did not lead to statistically different coefficients in the model.

Ethics

The ESPAD study is a cross-sectional questionnaire survey carried out in randomly selected schools; the emphasis is placed on anonymity and voluntary participation. No ethical committee approval was required for the ESPAD study in the Czech Republic in 2015, as it was already the sixth wave of data collection within this international project. As the participating respondents were aged over 15 years, no parental consent for the students’ participation was required. The researchers followed all relevant legislation in the Czech Republic with regard to personal data protection, that is, no personal data identifying individual students were requested. The participants returned their questionnaires in sealed envelopes in order to protect their anonymity, and the mass processing of the data guaranteed their anonymity.

RESULTS

Prevalence of problem gambling among Czech adolescents

The proportion of students at risk of problem gambling on the basis of the Lie/Bet scale was nearly 8%. A higher proportion of students at risk of problem gambling were observed among secondary school students (8%) compared to middle school students (5%). The significant difference between male and female students (13% of the males at risk, compared to 2% of the females) is in line with findings observed in previous studies on adolescent gambling.

Only a slight difference between occasional and moderate daily smokers and current non-smokers in terms of the prevalence of problem gambling was observed (Table 1). A significantly higher prevalence of problem gambling was found among heavy smokers, who showed a prevalence rate double that of non-smokers.

As regards, the age at which the first cigarette was smoked, the highest prevalence of problem gambling was observed among the youngest smokers (starting at the age of nine or younger), while starting smoking at 13 years or older did not increase the risk of problem gambling as compared with non-smokers.

The age of initiation into daily smoking seems to be a more reliable marker of the risk of problem gambling than smoking status or the age at which the first cigarette was smoked. One fifth of the students who smoked daily at the age of 12 or earlier were at risk of problem gambling. With postponement of the initiation into daily smoking to 13 or 14 years, the prevalence rate decreased sharply to 10%, and further to 7% among those who started smoking daily at 15 years or later.

When the population of daily smokers is sorted according to the age at which they initiated with smoking, a clear positive relationship can be observed between the risk of problem gambling and the age of daily smoking initiation (Figure 1).

The increased prevalence of problem gambling among early smokers may also be explained by the fact that early smokers are often heavy smokers, leading to a correlation between heavy smoking and problem gambling. However, when the age of initiation of daily smoking was controlled for by excluding students who started to smoke daily before the age of 15 years, no significant differences were observed between different levels of intensity of smoking. This suggests that it is the early initiation of daily smoking rather than intensity of smoking that increases the risk of problem gambling (Figure 2).

Problem gambling intensity and smoking intensity

The relationship between the intensity of gambling and smoking among the subgroup of adolescent gamblers at risk of problem gambling was further analyzed using the CSPG.

When the means of the CSPG score between smoking and non-smoking gamblers at risk were compared, a significantly higher score was observed among smoking gamblers (Figure 3). According to the CSPG, non-smoking individuals gamble with lower intensity and face a lower risk of problem gambling than their smoking peers.

Table 1. Prevalence of problem gambling among Czech adolescents

	Lie/Bet score (distribution in %)			At risk (1 or 2 points in % Lie/Bet)	[95% CI]	Total (N)
	0	1	2			
Total	92.34	6.68	0.99	7.66	[7.0–8.3]	6,082
Gender						
Male	87.07	11.32	1.61	12.93	[11.7–14.1]	3,047
Female	97.63	2.01	0.36	2.37	[1.8–2.9]	3,035
Type of school						
Middle	95.01	4.12	0.87	4.99	[7.6–9.1]	1,263
Secondary	91.64	7.35	1.02	8.36	[3.8–6.2]	4,819
Current smoking status						
Non-smoker	92.86	6.45	0.69	7.14	[6.4–7.9]	4,187
Occasional smoker	91.76	7.17	1.08	8.24	[6.4–10.1]	837
Moderate daily smoker	92.65	6.02	1.34	7.35	[5.5–9.2]	748
Heavy daily smoker	86.13	10.00	3.87	13.87	[10.0–17.7]	310
First cigarette						
Never	93.25	6.25	0.50	6.75	[5.7–7.8]	2,016
At 9 years or earlier	87.13	9.65	3.22	12.87	[9.6–16.1]	404
At 10–12 years	90.57	7.70	1.73	9.43	[7.8–11.0]	1,273
At 13 or 14 years	93.07	6.35	0.58	6.93	[5.7–8.2]	1,544
At 15 years or later	93.96	5.33	0.71	6.04	[4.4–7.6]	845
Initiation of daily smoking						
Never	92.88	6.37	0.76	7.12	[6.4–7.9]	4,492
At 9 years or earlier	65.22	26.09	8.70	34.78	[15.3–54.2]	23
At 10–12 years	81.88	12.75	5.37	18.12	[11.9–24.3]	149
At 13 or 14 years	90.00	8.49	1.51	10.00	[7.4–12.6]	530
At 15 years or later	93.47	5.63	0.90	6.53	[4.9–8.2]	888

Note. CI: confidence interval.

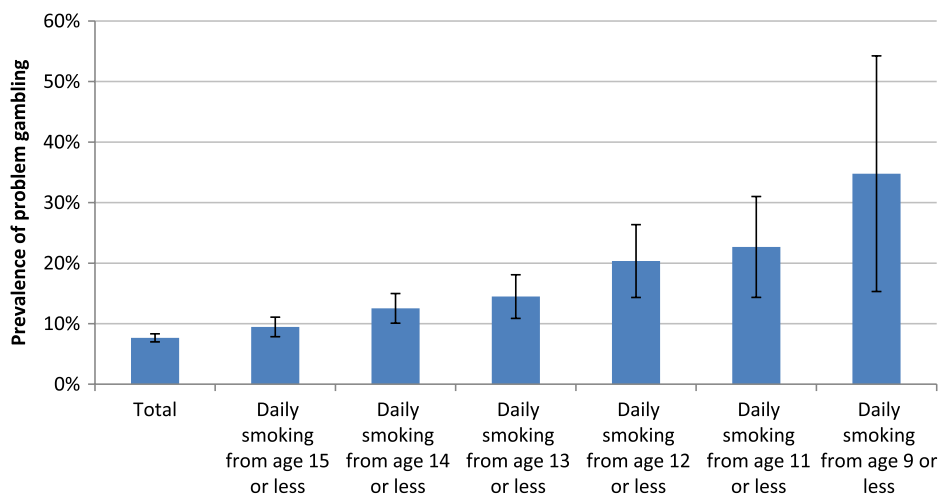


Figure 1. Prevalence of problem gambling by initiation into daily smoking. Note. The black lines represent 95% confidence intervals

Gamblers who smoke up to 10 cigarettes a day, or smoke occasionally, achieve similar CSPG scores (around 3 points) and do not differ significantly from non-smokers. A significantly higher intensity of gambling is associated with heavy smoking (11+ cigarettes a day). On average, heavy smokers scored 5+ points on the CSPG scale, which suggests a high intensity of gambling with a high risk of developing problem gambling.

The hypothesis that early initiation into daily smoking increases the risk of problem gambling was further tested in

a logistic regression model. In line with the hypothesis, smokers who start smoking daily at an early age should be at higher risk of problem gambling even when other explanatory variables such as gender, age, the type of the school (middle or secondary school), or family composition are controlled for. The logistic regression model showed that the variables of early initiation into daily smoking are significant – students who started smoking daily at the age of 12 years or earlier have 2.7 times higher odds of problem gambling than smokers who started later or non-smokers.

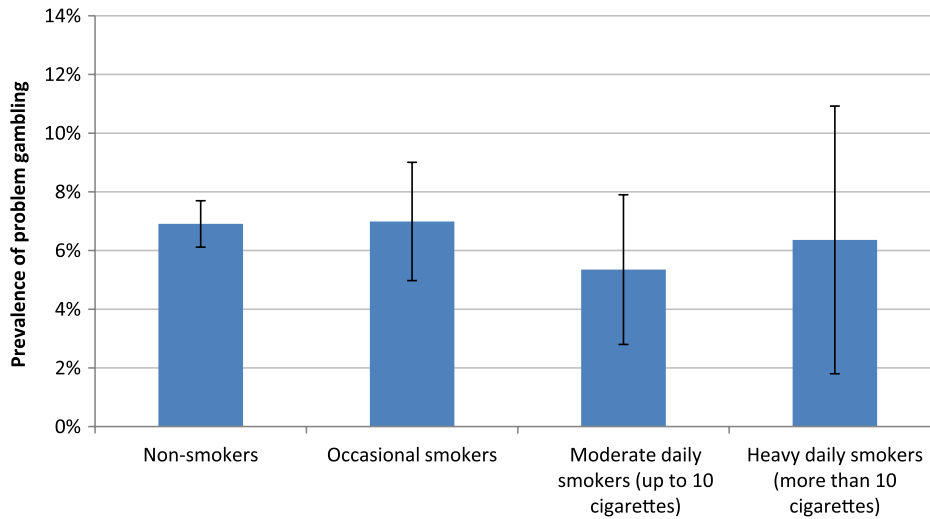


Figure 2. Prevalence of problem gambling in a subsample excluding daily smokers starting before the age of 15 years. Note. The black lines represent 95% confidence intervals

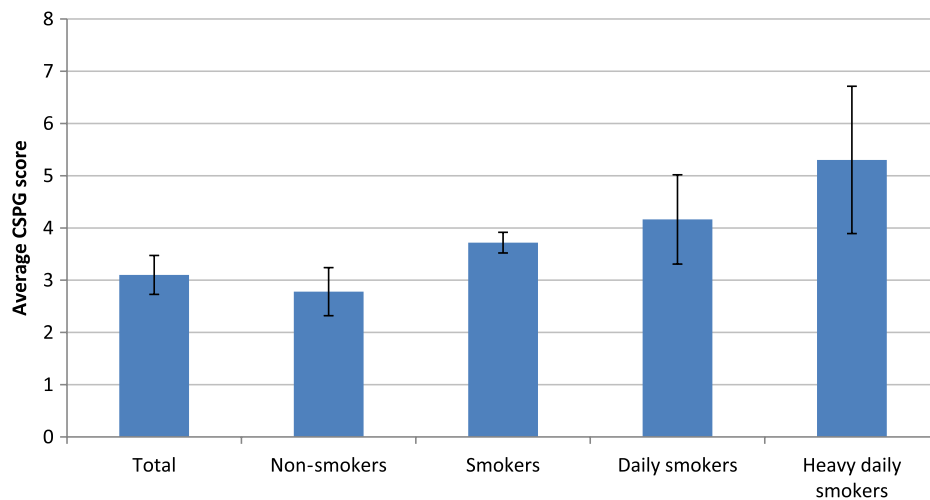


Figure 3. Smoking status and average CSPG score of gamblers at risk. Note. The black lines represent 95% confidence intervals

Those who start smoking at the age of 13 or 14 years have odds ratios (ORs) around 1.6. As already suggested, the variables of the intensity of smoking are not significant (OR close to 1). As expected, being male especially, older, and a student of a secondary school (rather than middle school) increases the chances of being a problem gambler, while a complete family composition acts as a protective factor (Table 2).

In addition, gamblers at risk of problem gambling were inspected in order to show how the intensity of smoking affects the intensity of gambling. To understand which of the two factors – the intensity of smoking or early initiation into daily smoking – predicts a higher CSPG score, a linear regression model with the logarithm of the CSPG score as a dependent variable was created, using the same explanatory variables as in the previous model (Table 3). On average, male gamblers scored about 60% higher than their female peers. In line with previous analysis, heavy smoking increases the CSPG score by 75%. The age of initiation into daily smoking is an

important factor for the intensity of gambling – gamblers smoking daily at the age of 12 years or earlier scored 84% higher.

DISCUSSION

This study represents the first attempt to investigate the relationship between problem gambling and smoking among adolescents in the Czech Republic. Using the ESPAD data, we presented the relationship between problem gambling and smoking, which shows that early initiation into daily smoking increases the risk of problem gambling as well as the intensity of gambling in problem gamblers. Interestingly, and contradictory to Weinberger et al. (2015a), no clear evidence for an association between the intensity of smoking and the risk of problem gambling was shown. On the other hand, among gamblers who are already at risk, a high intensity of smoking is associated with a higher intensity of gambling.

Table 2. Predictors of problem gambling – Logistic regression

	<i>B</i>	<i>SE</i>	<i>z</i> statistics	<i>p</i>	Odds ratio [95% CI]
Intercept	-6.587	1.174	-5.613	.000	–
Male	1.774	0.132	13.451	.000	5.9 [4.6–7.7]
Age	0.181	0.070	2.589	.010	1.2 [1.0–1.4]
Middle school	-0.345	0.162	-2.135	.033	0.7 [0.5–1.0]
Daily smoker from 13 or 14 years	0.449	0.178	2.529	.011	1.6 [1.1–2.2]
Daily smoker at the age of 12 years or earlier	1.000	0.214	4.679	.000	2.7 [1.8–4.1]
Living with both parents	-0.221	0.102	-2.165	.030	0.8 [0.7–1.0]
Occasional smoker	0.122	0.146	0.836	.403	1.1 [0.8–1.5]
Daily smoker – up to 10 cigarettes a day	-0.235	0.170	-1.379	.168	0.8 [0.6–1.1]
Daily smoker – more than 10 cigarettes a day	0.263	0.199	1.321	.187	1.3 [0.9–1.9]

Note. Model: Observations = 6,082; Akaike information criterion = 2,981; Nagelkerke’s $R^2 = .126$; *SE*: standard error; *CI*: confidence interval.

Table 3. Predictors of CSPG score – Linear regression on a subsample of gamblers in risk

	<i>B</i>	<i>SE</i>	<i>t</i> statistics	<i>p</i>	% change [95% CI]
Intercept	-0.839	1.030	-0.815	.416	-83.9 [-289.8–122.0]
Male	0.474	0.123	3.868	.000	60.7 [25.7–105.3]
Age	0.071	0.063	1.136	.257	7.1 [-5.4–19.6]
Middle school	0.026	0.166	0.155	.877	2.6 [-26.4–43.0]
Daily smoker from 13 or 14 years	0.149	0.173	0.858	.391	16.0 [-17.9–64.1]
Daily smoker at the age of 12 years or earlier	0.610	0.205	2.968	.003	84.0 [22.0–177.5]
Living with both parents	-0.046	0.102	-0.453	.651	-4.5 [-22.0–17.0]
Occasional smoker	0.121	0.145	0.832	.406	12.8 [-15.6–50.8]
Daily smoker – up to 10 cigarettes a day	0.087	0.162	0.540	.590	9.1 [-21.0–50.7]
Daily smoker – more than 10 cigarettes a day	0.559	0.217	2.582	.010	75.0 [13.4–169.9]

Note. Model: Observations = 466; $R^2 = .087$; Adjusted $R^2 = .069$; CSPG: Consumption Screen for Problem Gambling; *SE*: standard error; *CI*: confidence interval.

Slutske, Moffitt, Poulton, and Caspi (2012) argued that the individual risk of being addicted to pathological behavior depends strongly on the individual’s temperament, which is observable as soon as at the age of 3 years; and both impulsivity and sensation-seeking play an important role in the development of risk behaviors such as substance use and gambling. Working on the presumption, it means that students with low behavioral and emotional self-control (e.g., with increased impulsivity) tend to engage in risky behavior, such as daily smoking, binge drinking, use of other substances, or gambling. Since cigarettes are one of the most accessible addictive substances in the Czech environment, early initiation into daily smoking may represent an important indicator for general vulnerability for the development of risky behavior, including problem gambling. However, as some authors (Canale, Scacchi, & Griffiths, 2016; Leeman, Hoff, Krishnan-Sarin, Patock-Peckham, & Potenza, 2014; Malmberg et al., 2013) have argued, part of the relationship between impulsivity, sensation-seeking, and participation in gambling might be influenced by involvement in a part-time job that provided adolescents with money available for gambling activities.

Adolescent problem gambling is strongly associated with impulsivity and delay discounting (Cosenza & Nigro, 2015; Nigro & Cosenza, 2016), and the same cognitive distortions are also connected to smoking (Friedel, Dehart, Madden, & Odum, 2014). Individuals with impulsivity and steep delay

discounting may be regarded as a vulnerable group suitable for prevention and intervention programs targeted at all kinds of risk behaviors, focusing on the most prevalent risk activities. In general, adolescents “living in the now” (Nigro & Cosenza, 2016) might be at greater risk of any problem behavior. Our finding that earlier initiation into smoking is associated with the development of problem gambling some years later might also be explained by the common risk factor of impulsivity and delay discounting.

Empirical evidence also shows that gambling in adolescence is associated not only with the use of tobacco, but also with other substances such as alcohol, illicit drugs (especially cannabis, but also cocaine or non-medical use of prescription drugs), or energy drinks (Canale et al., 2017; Cook et al., 2015; Vieno et al., 2018). It is also associated with risky sexual behavior (Martins, Lee, Kim, Letourneau, & Storr, 2014; Räsänen, Lintonen, Joronen, & Konu, 2015) and other health risks and various forms of anti-social behavior such as driving under the influence of alcohol, being involved in a fight, or carrying a weapon (Chaumeton, Ramowski, & Nystrom, 2011; Mishra, Lalumière, Morgan, & Williams, 2011; Proimos, DuRant, Pierce, & Goodman, 1998).

In this study, adolescents already at risk of problem gambling gambled more intensively if they had started smoking at the age of 12 years or earlier and/or if they smoked 11 or more cigarettes a day. Even when heavy smoking itself does not significantly increase the risk of

problem gambling as measured by the Lie/Bet screen, it predicts a higher intensity of gambling in gamblers at risk. Such results argue in favor of the problem behavior theory (Jessor, 1991) suggesting that impulsivity increases the risk of smoking and gambling addiction and that impulsive behavior leads to more intensive smoking and gambling. At the moment, we are not aware of any comparable study in another country that may confirm or refute these findings. However, we believe that our findings may be generalized to other (European) countries, as they try to describe a general relationship between two different forms of risk behavior among adolescents. More research is needed to understand the multifaceted association between smoking and gambling as they coexist in adolescence, being also associated with other forms of risk behaviors from very early ages.

These findings may have implications for prevention policy. In this study, early initiation into daily smoking in late childhood has proved to be a strong predictor of problem gambling in adolescence. Early interventions targeted at young smokers should aim not only at their quitting smoking but also at preventing smokers from developing the risk of problem gambling and other risk behaviors.

Limitations of this study

Several limitations of this study exist. The ESPAD study's target population is the cohort of 15- to 16-year-old students attending regular schools that are randomly selected in order to reach a representative sample on a national level. In order to investigate risk factors related to problem gambling among Czech students, we decided, for the purpose of our analysis, to include all valid observations collected within the project. Similarly to other cross-sectional surveys, the ESPAD data do not allow testing for the causality of the relationship between different forms of risky behaviors, so including students of other ages may help to shed light on the associations between the variables analyzed. Another limitation of the study lies in the self-reporting design of the ESPAD questionnaire; students might overestimate, as well as underestimate, their responses. Moreover, school surveys like ESPAD use cluster sampling, which would increase the size of the confidence intervals. Still, the ESPAD study is considered to be a valuable source of data on adolescent risky behavior (e.g., Király et al., 2014; Molinaro et al., 2014; Vorobjov, Saat, & Kull, 2014), including participation in gambling activities (Molinaro et al., 2018).

CONCLUSIONS

Early initiation of daily smoking increases the risk of problem gambling and the intensity of gambling in problem gamblers. However, the relationship between adolescent smoking and gambling seems to be more complex than just simply positively correlated. On the basis of the results of this study, it is highly probable that the relationship is rather indirect. Early daily smoking, as well as other substance use and problem gambling, is likely to arise from common psychological traits expressed as impulsive behavior.

The identification of pre-adolescent daily smokers and prevention programs targeting those not only at risk of smoking, but also of other forms of substance use and risk behavior, including excessive gambling, could significantly reduce the prevalence of adverse consequences in adolescents and help them to pass through adolescence in a better health and social state.

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