

## Chapter #26

### THE PREDICTORS OF SMOKING STATUS AMONG SLOVAK SCHOOL CHILDREN

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#### ABSTRACT

The aims of this study were to explore (i) the incidence of risk factors associated with the change of the current smoking status from a non-smoker to a smoker among Slovak schoolchildren, (ii) the effect of the European school-based social influence intervention program *Unplugged* on the change in smoking status among schoolchildren using follow-up testing, (iii) the direct and indirect effects of parental knowledge change regarding children's behavior on the change of the current smoking status through the change in normative beliefs, as well as through the change in availability of cigarettes when an 18 month period was considered. The most powerful predictors of change in smoking status were a higher level of normative beliefs and availability of cigarettes. The effect of the *Unplugged* intervention on the change in pupils' smoking status was not found. The indirect effect of the decrease in parental knowledge on the change in smoking status through the increase in normative beliefs, as well as through the increase in the availability of cigarettes was found when the period between T1 and T2 was considered.

*Keywords:* smoking, normative beliefs, availability of cigarettes, parental knowledge, intervention program "Unplugged".

#### 1. INTRODUCTION

Schoolchildren's smoking and the investigation of the risk and the protective factors of schoolchildren's smoking is an important matter and a challenge for public health (Cousson-Gélie et al., 2018) and prevention science. Slovakia is one of the European countries with the highest lifetime prevalence rates of smoking and a country with high smoking rates during the last 30 days for girls (The ESPAD group, 2016). There is a clear need for the implementation of evidence-based prevention programs among Slovak schoolchildren.

One of the current prevention programs, *Unplugged*, is a school-based social influence intervention program and should be the prevention project with the best evidence of effectiveness in European studies according to the results of a systematic review of school-based alcohol and other drug prevention programs (Agabio et al., 2015). *Unplugged* addresses personal and social skills, knowledge and normative beliefs. Its effectiveness has been evaluated through a randomized trial involving 7,079 pupils from seven European countries and *Unplugged* was found to be effective in reducing smoking (Vigna-Taglianti et al., 2014).

This study aims to use follow-up testing to explore the effectiveness of the Slovak adaptation of the *Unplugged* intervention program which mainly focuses on the change in smoking status. It explores the incidence of risk factors associated with the change of the

current smoking status from a non-smoker to a smoker among Slovak schoolchildren during an 18-month time period.

Our previous study (Orosova et al., 2015) focused on the investigation of the short-term effect of Unplugged, three months after program implementation, and on the incidence of risk factors associated with the increase in the number of smokers among Slovak schoolchildren. It confirmed, that smoking was more common among boys, particularly among those with a higher level of normative beliefs, with a higher availability of cigarettes, and among those with a lower level of parental knowledge at the pre-test. Interestingly, normative beliefs were found to be the single variable which explained the increase in the number of smokers at the post-test (three months after the *Unplugged* had been implemented). This means that repeated measurements have demonstrated a significant increase in the number of smokers during a short period of time and emphasized the crucial role of normative beliefs in schoolchildren's smoking status (Orosova et al., 2015). Surprisingly, other explored variables such as risk perception concerning smoking, mother's/father's smoking or perceived parental approval were not found to be related to the increase in the number of smokers among Slovak schoolchildren (Orosova et al., 2015). Based on the results of this previous investigation, this study explored a longer period of time effect of the Unplugged program (18 months after the Unplugged program implementation) and contributions of normative beliefs, availability of cigarettes, parental knowledge, as well as intrapersonal skills which Unplugged addressed (self-control, novelty seeking) on the change in smoking status among schoolchildren.

Normative beliefs represent a central construct in a number of theories in social psychology (Thrul, Lipperman-Kreda, Grube, & Friend, 2014). Descriptive and injunctive norms contribute to the understanding and the prediction of smoking (Mead, Rimal, Ferrence, & Cohen, 2014). This study focused on descriptive norms which can be defined in terms of the perceived prevalence of a particular behavior, the perceptions of the extent to which significant others engage in this behavior such as the perception of an adult's or peer's smoking prevalence (Lochbuehler, Schuck, Otten, Ringlever, & Hiemstra, 2016, Thrul et al., 2014, Mead et al., 2014). The correction of the misperception of the extent to which significant others engage in risky behavior is an important protective component of any prevention program based on social norms (Chung & Rimal, 2016). It has been found that a community-based approach may contribute to improving the understanding of smoking behavior among adolescents (De Vries, 1995). Furthermore, the correction of normative beliefs may be beneficial, especially among schoolchildren who have not yet tried smoking prior to the prevention program implementation (Bavarian, Duncan, Lewis, Miao & Washburn, 2015). The investigation of the descriptive normative beliefs as predictors of the change of the current smoking status from a non-smoker to a smoker during an 18-month period was one of the main aims of this study.

It is well-known that smoking among schoolchildren is associated with various factors and availability of cigarettes is one of the most important environmental factors (Khodayari et al., 2018). The accessibility of cigarettes is also important among adolescents in maintaining their social norm for smoking (Bigwanto, Mongkolcharti, Peltzer, & Laosec, 2017).

Previous studies have further provided evidence for the essential role of parents in socialization, the importance of house rules, specific psychosocial familial determinants, parental control, parental monitoring/supervision as protective factors against the onset of smoking among schoolchildren (Wellman et al., 2016, Zaborskis, & Sirvyte, 2015, Hiemstra et al., 2014, De Leeuw, Scholte, Sargent, Vermulst, & Engels, 2010). A link between general and smoking-specific parenting practices has been suggested as an important research topic

of smoking prevention (Den Exter Blokland, Hale, Meeus, & Engels, 2006). A review of research regarding the reasons for children's smoking (Williams, Knight, & Wills, 2015) has confirmed the importance of low parental monitoring and ineffective parenting as risk factors of adolescents' smoking.

Finally, associations between factors such as self-control, social self-control as well as novelty seeking and a higher likelihood of initiation smoking has been reported in previous studies (Stautz, Zupan, Field, & Marteau, 2017, Sussman et al., 2016, Pokhrel, Sussman, & Stacy, 2014).

Therefore, a further aim of this study was the investigation of these variables as predictors of the change in smoking status among Slovak schoolchildren using follow-up testing.

## 2. OBJECTIVES

The aims of this study were to explore (i) the incidence of risk factors associated with the change of the current smoking status from a non-smoker to a smoker among Slovak schoolchildren, (ii) the effect of the European school-based social influence intervention program *Unplugged* on the change in smoking status among schoolchildren using follow-up testing, (iii) the direct and indirect effects of the change in parental knowledge on the change of the current smoking status through the change in normative beliefs, as well as through the change in availability of cigarettes during an 18 month time period.

## 3. METHODS

### 3.1. Sample and study design

The study was carried out as a cluster randomized controlled trial with data collection conducted immediately before program implementation (T1) and at 18 months after program implementation (T2). The program involved 1295 participating schoolchildren (mean age of 11.52 years; 46.8% boys). The sampling used a list of primary schools in Slovakia in 2011, retrieved from the Institute of Information and Prognosis of Education (total 2,202 schools). Sixty elementary schools participated in the study, 30 schools were allocated to the experimental group (n=641) and 30 served as the control group (n=654). In each school, a single class of six graders was involved in this research. Randomization was done by using a web application created for the purposes of this research. Schools were selected from different cities based their geographical location in Eastern, Central and Western Slovakia with 6 clusters based on the population size. The official criteria defining towns and villages were used according to the Statistical Office of the Slovak Republic. The experimental group was exposed to the program *Unplugged*. The school-based prevention program *Unplugged* targets students 12–14 years of age and aims to address both experimental and regular use of alcohol as well as the use of tobacco and illicit drugs. This program consists of 12 lessons which were carried out once a week during the school year 2013/2014 (September – December) in this study. The program was delivered via lectures by teachers or psychologists who underwent a 3-day training course during which they trained for the program implementation in each lesson using class management techniques, Teacher's handbook and Student's workbook. The trainers of the training course were trained by the European developers, the master trainers of the EU-DAP Intervention Planning group.

### 3.2. Method

The measures included in the present study were:

Cigarette smoking. The schoolchildren who reported smoking on at least one occasion during the past 30 days were identified as smokers at every follow-up.

The availability of cigarettes was measured by the question “How difficult do you think it would be for you to get cigarettes if you wanted?” The item was assessed on a 6-point scale and for the data analyses this was recorded from 1 – Impossible to 5 – Very easy (the answer “Don’t know was excluded from analyses in the present study).

Descriptive normative beliefs, the perceived norm for peer cigarette smoking was measured by the question „According to your estimation, how many of your friends smoke cigarettes?” This item was assessed on a 5-point scale from 1 – Nobody to 5 – Everybody.

Parental knowledge regarding children’s behavior was measured by the question “Do your parents know where you spend Saturday nights“. The item was assessed on a 4-point scale from 1-Always know to 4 – Usually don’t know.

To assess self-control, a Slovak translation of the short version of the original Self-control scale developed by Tangney, Baumaister, and Boone (2004) was used (Finkenauer, Engels, & Baumeister, 2005). The short version consisted of 11 items (Cronbach alpha=0.73). “*I am lazy, I have a hard time breaking bad habits, I wish I had more self-discipline*“ is an example item of the Self-control scale. Response categories ranged from 1-Not at all to 5-Very much.

A Slovak translation of the Novelty seeking factor of The Adolescent Resilience Scale was used (Oshio, Kaneko, Nagamine, & Nakaya, 2003). The Novelty seeking factor consisted of 7 items (Cronbach Alpha= 0.70). „*I seek new challenges*“ is an example item of The Novelty seeking factor. Respondents were asked to choose their rating on a scale using the anchors of 1-Definitely yes to 5-Definitely no.

### 3.3. Statistical analyses

In addition to descriptive measures, logistic regression models and a Sobel test were used for the data analyses.

## 4. RESULTS

At the baseline (T1) 2.4% of pupils were reported to be smokers (Table 1). When both waves were considered (T1-T2) 90.4% of respondents remained as non-smokers, 7.8% became smokers, 1.1% stopped smoking and 0.8% were smokers throughout (Table 1). The descriptive characteristics in the measured continuous variables are presented in Table 2. A higher level of availability of cigarettes, normative beliefs, and novelty seeking was found at a follow-up test (at 18 months after the baseline). A lower level of parental knowledge regarding children’s behavior and self-control was found at the follow-up.

Table 1.  
Smoking status among Slovak schoolchildren.

The baseline test (T1)		smokers	non-smokers		
N		28	1157		
Percent		2.40%	97.6%		
The baseline test (T1 vs. The follow- up test (T2)		became smokers	smokers	non-smokers	ex-smokers
N		59	6	685	8
Percent		7.80%	0.80%	90.40%	1.0%

Table 2.  
Descriptive characteristics of the sample in the continuous variables.

	Mean	SD
<b>Availability of cigarettes</b>		
T1	1.74	1.26
T2	2.96	1.64
<b>Normative beliefs</b>		
T1	1.51	0.79
T2	1.98	0.99
<b>Parental knowledge</b>		
T1	1.41	0.80
T2	1.50	0.88
<b>Self-control</b>		
T1	38.25	6.26
T2	37.04	6.51
<b>Novelty seeking</b>		
T1	24.26	3.81
T2	23.62	3.68

Notes: The baseline test (T1), The follow- up test (T2)

Table 3.  
The predictors of change in smoking status among Slovak schoolchildren.

	Sig.	Exp(B)	95% C.I.for EXP(B)	
T1			Lower	Upper
Unplugged	0.558	0.541	0.070	4.213
Gender	0.607	1.557	0.288	8.423
Availability T1	<b>0.003</b>	2.405	1.346	4.298
Normative beliefs T1	<b>0.003</b>	3.293	1.494	7.259
Parental knowledge T1	0.455	1.351	0.613	2.978
Self-control T1	0.230	1.075	0.955	1.210
Novelty seeking T1	<b>0.029</b>	0.736	0.559	0.970
R <sup>2</sup>		0.47		
	Sig.	Exp(B)	95% C.I.for EXP(B)	
T1-T2			Lower	Upper
Unplugged	0.405	1.594	0.532	4.770
Gender	0.469	0.665	0.220	2.007
Availability T2	<b>0.006</b>	2.866	1.344	6.112
Normative beliefs T2	<b>&lt;0.001</b>	2.739	1.565	4.792
Parental knowledge T2	0.068	1.549	0.968	2.478
Self-control T2	0.063	0.911	0.826	1.005
Novelty seeking T2	0.135	0.868	0.721	1.045
R <sup>2</sup>		0.53		

Notes: before the program implementation (T1), at 18 months after the program implementation (T2)

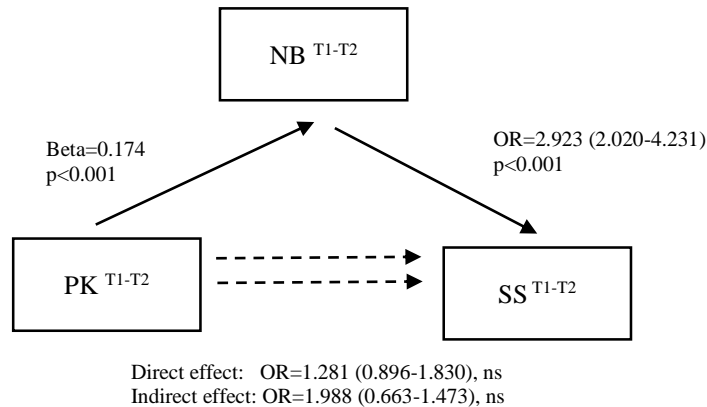
The significant predictors of smoking at the baseline (T1) were a higher level of normative beliefs, an availability of cigarettes, and novelty seeking (Table 3).

The significant predictors of the change in smoking status from being a non-smoker (T1) to becoming a smoker (T2) were a higher level of normative beliefs and the availability of cigarettes (Table 3).

The effect of the *Unplugged* intervention on the change in pupils' smoking status was not found (Table 3).

Finally, we used regression models and a Sobel test to assess the direct and indirect effects of parental knowledge change on the change of the current smoking status through the change in normative beliefs, as well as through the change in availability of cigarettes when the explored time period between T1 and T2 was considered (Figure 1 and 2).

Figure 1.  
Diagram of the indirect effect of parental knowledge change ( $PK^{T1-T2}$ ) on the change of smoking status ( $SS^{T1-T2}$ ) through the change in normative belief ( $NB^{T1-T2}$ ).

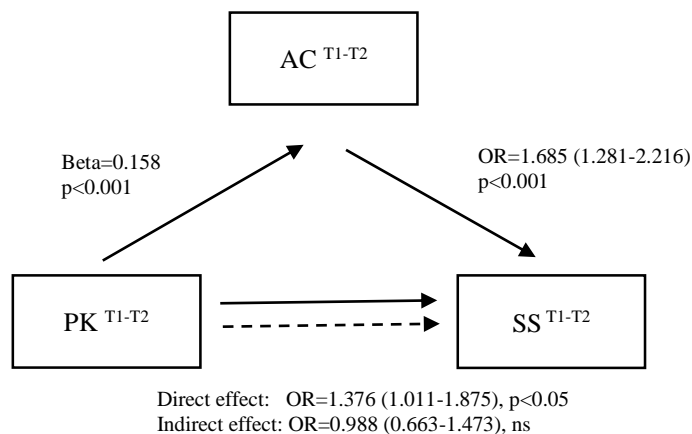


Notes: before the program implementation (T1), at 18 months after the program implementation (T2). All paths are adjusted for the change of availability of cigarettes ( $AC^{T1-T2}$ ), but not displayed for the parsimony of the figure.

The only indirect effect ( $Z=3.486$ ,  $p<0.05$ ) of the decrease in parental knowledge on the change in smoking status (from being a non-smoker to becoming a smoker) through the increase in normative beliefs was found when the period between T1 and T2 was considered (Figure 1).

The direct and indirect effects ( $Z=2.604$ ,  $p<0.05$ ) of the decrease in parental knowledge on the change in smoking status through the increase in availability cigarettes was found when the period between T1 and T2 was considered (Figure 2).

Figure 2.  
Diagram of the indirect effect of parental knowledge change ( $PK^{T1-T2}$ ) on the change of smoking status ( $SS^{T1-T2}$ ) through the change in availability of cigarettes ( $AC^{T1-T2}$ ).



Notes: before the program implementation (T1), at 18 months after the program implementation (T2). All paths are adjusted for the change of normative belief ( $NB^{T1-T2}$ ), but not displayed for the parsimony of the figure.

## 5. DISCUSSION AND CONCLUSION

The results of this study are consistent with previous findings which have suggested that the smoking of others, more than any other characteristic in the environment, has a significant effect on individuals' formation of norms and consequently manifests in behavior (Mead et al., 2014). The impact of media, peers, parents, and other important others via observational modeling and norm formation can improve the understanding of smoking behavior (Cousson-Gélie et al., 2018, Mead et al., 2014). This study has found that the most powerful predictors of the change in smoking status are higher levels of normative beliefs and the availability of cigarettes when an 18-month period was explored. These results are consistent with previous findings which have revealed the importance of tobacco advertising, perceived peer and family smoking status as well as highlighting the relevance of using the social norms approach to changing schoolchildren's perception of tobacco usage and engaging parents in intervention programs (Mbongwe, Tapera, Phaladze, Lord, & Zetola, 2017, Sheikh, Vadera, Ravey, Lovatt, & Kelly, 2017).

To sum up, the results of this study have confirmed the indirect effect of the decrease in parental knowledge regarding children's behavior on the change in smoking status (from being a non-smoker to becoming a smoker) through the increase in descriptive normative beliefs. Secondly, the study has provided evidence for the direct and indirect effects of the decrease in parental knowledge on the change in smoking status through the increase in availability of cigarettes. Parental knowledge in this study was measured by the question "Do your parents know where you spend Saturday nights?" and this means that the decrease in parental knowledge regarding the place where the child spends his/her free time with a potentially higher level of risky behavior incidence is related to an increase in descriptive normative beliefs and availability of cigarettes. These results extend the findings of previous studies. The association between parental knowledge about the smoking of their child and

his or her friends and the reduced likelihood of smoking initiation was confirmed (Den Exter Blokland et al., 2006). It was found „...that parental smoking-specific communication is associated with adolescent smoking directly but also indirectly by influencing the friends will associate with.“ (De Leeuw, Scholte, Harakeh, van Leeuwe, & Engels, 2008, p. 1229).

The importance of parental knowledge regarding a child's behavior and the importance of descriptive normative beliefs in relation to the perceived norms for peer cigarette smoking and availability of cigarettes has also been supported by the findings based on focus group discussions (Sheer & Mao, 2018). The results from group discussion research indicate a high prevalence of smoking initiation among peers under peer normative pressure (Sheer & Mao, 2018). The quality of parent - child communication, constructive and respectful parent - child communication about smoking, positive parenting, parental knowledge regarding child's behavior and her or his life among peers, friends, schoolmates supports a reduction in cigarette initiation and encourages cigarette refusal (Sheer & Mao, 2018, Talip, Kifli, Murang, & Naing, 2016, De Leeuw, Scholte, Vermulst, & Engels, 2010). A constructive and respectful parent - child communication can be considered as one of the important sources of parental knowledge.

This study highlights the importance of normative education not only among schoolchildren but also among parents. In particular, the ability of parents to be flexible, creative, and careful about proactively supporting the development of appropriate norms and beliefs about smoking behavior of their own child and child's peer group has a preventive and protective power.

However, the effect of the *Unplugged* intervention which focuses on the development of interpersonal and intrapersonal skills and correction of false normative beliefs and attitudes (Thomas & Perera, 2006 in Miovsky et al., 2012, p. 213) on the change in Slovak pupils' smoking status was not found in this study.

To conclude, the presented findings generally support the results of our previous study (Orosova et al., 2015) which did not confirm the short-term effect of the *Unplugged* program on Slovak schoolchildren's smoking. Teachers' perception of the importance of the *Unplugged* intervention as well as the implementation fidelity (Jurystova, Orosova, & Gabrhelik, 2017, Wang et al., 2015) may constitute a certain limitation of this investigation which should be considered. In order to improve this shortcoming, it is important that *Unplugged* is implemented with appropriate fidelity measures (Jurystova et al., 2017) which may improve the understanding of health-related behavior among schoolchildren (Middlestadt, Macy, & Geshnizjani, 2014).

The findings show that it is important to examine the effectiveness of the program which would be supplemented with other supportive prevention activities. Furthermore, more attention should be paid to the implementation fidelity when examining the effectiveness of the program.

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